

AN EMPIRICAL ASSESSMENT OF BUSINESS
FORECASTING TECHNIQUES: A STUDY ON
FORECASTING BANK PROFIT IN NIGERIA

BY

SABO, Bello

A DESSERTATION SUBMITTED TO THE POSTGRADUATE SCHOOL
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD
OF THE DEGREE OF DOCTOR OF PHILOSOPHY IN BUSINESS
ADMINISTRATION

DEPARTMENT OF BUSINESS ADMINISTRATION
FACULTY OF ADMINISTRATION
AHMADU BELLO UNIVERSITY
ZARIA

JULY, 2007

Declaration

I declare that the work in this thesis entitled “An Empirical Assessment Of Business Forecasting Techniques: A Study On Forecasting Bank Profit In Nigeria” has been carried out by me in the Department of Business Administration under the supervision of Dr. M.N. Maiturare, Dr. A.M. Abu-Abdissamad, and Dr. B.U. Kurfi. The information obtained has been duly acknowledged in the text and a list of references was provided. I also declare that this work is entirely a product of my own research efforts and to the best of my knowledge, it was not presented for the award of any diploma, degree or any certificate anywhere in any institution of learning.

SABO, Bello

Name of Student:

Signature

Date

Dedication

This thesis is dedicated to the memory of my late grand father Alhaji Yahaya Atiku Dalhatu, who struggled so tirelessly for my Western & Islamic Education.

Certification

This is to certify that this thesis entitled “An Empirical Assessment Of Business Forecasting Techniques: A Study On Forecasting Bank Profit In Nigeria” by SABO, Bello meets the regulations governing the award of the degree of Doctor of Philosophy (PhD) in Business Administration of Ahmadu Bello University, Zaria and it is therefore approved for its contribution to knowledge and literary presentation.

Dr. M.N. Maiturare
Chairman, Supervisory Committee

Signature

Date

Dr. A.M. Abu-Abdissamad
Member, Supervisory Committee

Signature

Date

Dr. B.U. Kurfi
Member, Supervisory Committee

Signature

Date

Professor A. M. Bashir
External Examiner

Signature

Date

Dean, Postgraduate School

Signature

Date

Acknowledgement

All praises are due to Allah (SWT); The Lord of all Worlds The Beneficent and The Merciful. May His blessings and salutations be on his last messenger Muhammad and his Companions and all those who follow His path until the last day. I thank Allah for sparing my life to see the completion of this programme.

I would like to express my sincere gratitude to many people and institutions who contributed in one way or the other towards the successful completion of this programme. I must first of all thank sincerely my Major supervisor, Dr. Muhammad Nasiruddeen Maiturare who, despite his numerous university and national assignments, spared time to thoroughly go through this work and guide its conduct from its inception to its final stage. This has greatly enhanced the quality of this research. I also owe a lot of gratitude to my Minor Supervisor Dr. A.M. Abu-Abdissamad for his constructive suggestions on the work and for the continuous pressure as PhD Coordinator for the timely completion of the work. I am grateful to my second Minor Supervisor, Dr. B.U. Kurfi for his advice on and support, which added a big impetus to the work. I also acknowledge the tremendous support, assistance and useful suggestions from Professor Mike Kwanashe, Professor H.I. Abubakar, Professor Adejo Odoh, Professor Zakari Mohammed, Dr C.S Molem, Dr. A.B. Akpan, Dr A.A Anyebe, Mal. Bala Magaji Garba and Dr. Salisu Mamman, which greatly improved the quality of this work. I also acknowledge the useful suggestions by Dr. Sani A. Abdullahi which on many occasions diffused tension and facilitated the smooth flow of the work.

My special thanks also go to Professor Arsham Hossein of University of Baltimore, Maryland, USA and Prof. Armstrong J. Scott of the Wharton School of the University of Pennsylvania, USA for the unrestricted access to their various scholarly works on the area which greatly facilitated this work. I also wish to express my sincere appreciation to numerous staff of the various banks under study that actively participated and assisted tremendously with the data and questionnaire for the work, whose names are too many to mention here. I am equally grateful to Mal M.W. Shebe for the software training and appreciation, which greatly assisted this work. My sincere thanks also go to numerous staff of the Securities and Exchange Commission, Nigerian Deposit Insurance Corporation (NDIC), Central Bank of Nigeria, Umaru Maitamari, Engr Mohammed Ali, Isyaku Bala Tilde, Miss Waba Jefeda and Kabiru S/Pawa among others. My sincere gratitude also goes to Mal Bashir Bugaje, former Managing Director of Bank of the North Ltd, not only for the constructive advice but for assisting in the administration of questionnaires to some top bank executives, which greatly aided this research. I am especially grateful to the members of my PhD class of 2001/2002 Session for their support and spirit of togetherness, which we all exhibited throughout the programme.

My sincere gratitude also goes to the following friends and colleagues for the interest and support they have shown in the timely completion of this thesis. These are Alh. Sadauki Nuhu Paki, Shehu Aliyu (Zonal), Usman Abubakar, Mohammed Kabiru Isah, Bashir Jumare and many others. My sincere appreciation goes to the entire academic and administrative staff of the Department of Business Administration, Faculty of Administration, Ahmadu Bello University, Zaria for their support and goodwill. My sincere thanks also go to the International Institute of Business Forecasting, New York ,USA for

accepting to register me as a member which no doubt facilitated the speedy completion of the work. My profound gratitude and appreciations also go to my lecturer and my mentor Dr Ahmed U. Sanda of the economics department of Usmanu Danfodiyo University, Sokoto for the consistent, support & encouragement he has demonstrated for my educational career right from inception.

Last but by no means the least, I must thank members of my family particularly, my wife Bailau Bello, for the support and understanding throughout the duration of this programme. May Allah reward each and everyone abundantly.

ABSTRACT

Banking environment by its very nature is volatile, uncertain & risky. Due to sudden changes in monetary policies, interests and other variables, banks are placed in a serious position with regards to designing policy measures to deal

with these events as and when they arise so that they can take advantages of situations and also get protected from severe shocks of the environmental changes and risks. Like any other business entity, a bank should be able to anticipate with some level of accuracy, those changing variables that affect its earnings/loss and by extension; its existence so that it can take appropriate decisions to deal with the emerging situations in which it finds itself. Similarly owing to problems of volatility in exchange rate, assets, deposit and level of earning , loss of confidence in the sector developed and the banks and monetary authorities are looking for policies or combination of techniques that could help them turn this ugly situation around. Against this background, this thesis undertakes the empirical assessment of business forecasting techniques in forecasting bank profit in Nigeria. The study utilized a random sample of 150 respondents drawn from 10 sampled banks quoted on the Nigerian Stock Exchange. A questionnaire made up of both open and close-ended questions was used in collecting the primary data. These were processed using SPSS software and analyzed using qualitative evaluation method. Secondary data in the form of earnings before interest and taxation (EBIT) was also extracted from the sampled banks various annual accounts for the period 1996 – 2005. The secondary data was used for running the three exponential smoothing techniques selected for the study namely; simple exponential smoothing, Holt's two-parameter model and Winter's three-parameter model using appropriate soft wares. The study found a moderately weak correlation between actual and forecast profit of the sampled banks, indicating low model consistency and inability of the forecast generated under each of the models to reliably and accurately forecast the EBIT under the present conditions. Using a MAPE benchmark of 0.25, the study also established the inability of the techniques to forecast bank profit under conditions of earnings volatility and uncertainty. It also found out that the three models, each has a

unique measure of accuracy depending on the bank data on which it was applied. The study also established that type A Banks appeared to have relatively lower Mean Absolute Percentage Error (MAPE) under Winter's Three Parameter model compared to other banks, which did not indicate any inclination towards any of the other two models. It was also established that fluctuations in earnings are more pronounced in type C and Type B banks compared to Type A banks which have relatively stable earnings. The study also found that under the existing conditions, Winter's Three-Parameter Model has the highest tendency for accuracy when compared to the other two models, which enabled the study to conclude that the higher the explanatory variables of the models the higher the tendency for its accuracy. Finally, the study also found a significant relationship between bank managers' academic qualification and their familiarity with the forecasting techniques. The study calls for continuous search, identification, experimentation and development of suitable techniques for Nigerian banks taking into consideration their own peculiarities and volatility of the environment. Efforts should be intensified by banks in anticipating the fluctuations/changes of important parameters affecting their earnings giving continued priority to educational training & model development. The study also called for consistent efforts by banks at increasing their performing asset and loan bases by cutting down cost and risky outlets since the size of assets has been found to affect earnings stability of the banks. We also called for consistency and stability in macroeconomic and monetary policies.

TABLE OF CONTENTS

Title page	i
Declaration	ii

Dedication	iii
Certification	iv
Acknowledgement	v
Abstract	viii
Table of Contents	x
List of tables	xiv
List of Figures	xvi

CHAPTER ONE INTRODUCTION

1.1	Background to the Study	-	-	-	-	1
1.2	Statement of the Problem	-	-	-	-	12
1.3	The Research Questions	-	-	-	-	13
1.4	Objectives of the Study	-	-	-	-	18
1.5	Research Assumptions	-	-	-	-	19
1.6	Statement of Hypotheses	-	-	-	-	10
1.7	Justification of the Study	-	-	-	-	21
1.8	Significance of the Study	-	-	-	-	22
1.9	Scope of the Study	-	-	-	-	24
1.10	Limitations of the Study	-	-	-	-	25
1.11	Plan of the Study	-	-	-	-	26

1.12	Operational definitions of Terms	-	-	27
------	----------------------------------	---	---	----

CHAPTER TWO: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1	Introduction	-	-	-	-	32
2.2	Definitions and Concepts	-	-	-	-	33
2.3	Criticisms on forecasting	-	-	-	-	38
2.4	Review of developments in forecasting techniques				-	41
2.5	Contributions of forecasting to the field of management				-	47
2.6	Review of empirical studies on business forecasting				-	50
2.7	Forecasting & Planning	-	-	-	-	72
2.7.1	Situations Favoring the Use of Strategic Business Planning					78
2.8	Forecasting Bank Profit	-	-	-	-	80
2.9	Risk & Uncertainty in the Nigerian Banking Industry				- -	90
2.10	Theoretical framework	-	-	-	-	100
2.10.1	Business Forecasting Models				-	101
2.10.1.1	The Qualitative Forecasting Techniques				-	110
2.10.1.2	The Quantitative Forecasting techniques				- --	116
2.11	Measures of forecast accuracy	-	-		--	129
2.12	Limitations in the selection of forecasting techniques				-	136
2.13	Chapter Summary	-	-	-		140

CHAPTER THREE: METHODOLOGY

3.1	Introduction	-	-	-	-	143
3.2	Research Design	-	-	-	-	144
3.3	Method of Data Collection	-	-	-	-	145
3.3.1	Sources of data	-	-	-	-	145
3.3.2	Population of the study	-	-	-	-	147
3.3.3	Sampling Procedure and techniques	-	-	-	-	148
3.4	Method of Data Analysis	-	-	-	-	151
3.5	Justification of the Data Analysis Instruments	-	-	-	-	160
3.6	Pilot study	-	-	-	-	162
3.7	Validity, Reliability & Limitations of Primary Data Instrument	-	-	-	-	163
3.8	Chapter Summary	-	-	-	-	165

CHAPTER FOUR: DATA PRESENTATION & ANALYSIS

4.1	Introduction	166
4.2	Analysis of Responses to the Research questionnaire	168
4.3	Analysis of Secondary Data	191

4.4 Hypotheses Testing	194
4.5 Discussion of Findings	208
4.6 Chapter Summary	214

CHAPTER FIVE: SUMMARY, CONCLUSION & RECOMMENDATIONS

5.1 Introduction	215
5.2 Summary of the Study	215
5.3 Conclusions	220
5.4 Recommendations	223
5.5 Suggestions for further studies	225
Bibliography	226
Appendices	244

LIST OF TABLES

Table 3.1	Interpretation procedure of correlation coefficient	152
Table 3.2	Computational Procedure for One-Way Classification of ANOVA	156
Table 3.3	Computation of Reliability Coefficient	164
Table 4.1	Summary of Responses to the Research Questionnaire	168
Table 4.2	Summary of Questionnaire Responses By Bank	170
Table 4.3	Responses on the accuracy of the forecast performed	171
Table 4.4	Respondents' familiarity with Delphi technique of forecasting	175
Table 4.5	Respondents' familiarity with Executive Opinion technique of forecasting	176
Table 4.6	Respondents' familiarity with Exponential Smoothing technique of forecasting	177
Table 4.7	Respondents' familiarity with other techniques of forecasting	178
Table 4.8	Responses on qualifications of respondents' * Respondents familiarity with the forecasting techniques Crosstabulation.	180
Table 4.9	Responses on respondents' years of working experience* Respondents familiarity with the forecasting techniques Crosstabulation.	182
Table 4.10	Responses on the usefulness of exponential smoothing in forecasting	183
Table 4.11	Responses on aspect of operation considered in profit forecasting	184
Table 4.12	Responses on the satisfaction of respondents with existing profit forecasting procedure.	185
Table 4.13	Responses on the problems hindering effective profit forecasting.	186
Table 4.14	Responses on the Frequency with which Management Profitability Report (MRP) meetings are held.	189
Table 4.15	Responses on the frequency at which staff are sent for forecasting workshops/training.	190

Table 4.16	Earnings Before Interest and Taxation (EBIT) of Sampled Banks (1996-2005).	193
Table 4.17(a)	Correlations of actual Bank Profits with Forecast Profits (Single-Parameter Model)	195
Table 4.17(b)	Correlations of actual Bank Profits with Forecast Profits (Holt's Two-Parameter Model).	195
Table 4.17(c)	Correlations of actual Bank Profits with Forecast Profits (Winters's Three-Parameter Model).	196
Table 4.18	Summary of Computed Measures of Forecast accuracy (MAPE)	199
Table 4.19	ANOVA Output.	202
Table 4.20	Scheffe's Post Hoc Test Output	204
Table 4.21	Chi-square test Output	206

LIST OF FIGURES

Figure 2.1	Framework for Formal Planning and Forecasting	75
Figure 2.2	Forecasting Methodology Tree	103
Figure 2.3	Arshams' Classification of Forecasting Techniques	106

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The task of business planning involves making assumptions about the future course of business activities. In fact, business activities have been characterized by alternating periods of prosperity and depression. It is thus the purpose of business cycle theory to throw as much light on the nature and causes of these disturbing and costly problems within the economy. While this happens, it is borne in mind that all businesses aim at growth and survival by making some amounts as earning or profits. Owing to the likely severe consequences and implications of these vital cyclical problems/changes on these golden business goals and objectives, a significant amount of effort has been put in research to find solution to these vital problems. The goal being that business organizations do not continue to suffer in the event of sudden and unanticipated change in the cyclic movements within the economy (Russel, 1956). Similarly, Burns and Mitchell (1946) attempted to capture the basic attributes of business cycles highlighting the reasons why business organizations usually give considerable attention to these cyclic and environmental movements and change them. They described business cycle as a type of fluctuation found in the aggregate economic activity with a definite radius. It consists of expansions occurring at about the same time, in many economic activities, followed by similarly general recessions, contractions and revivals, which merge into expansion phase of the next cycle.

Maishanu (2003) argued that all organizations move to entropy and demise unless the tendency towards such movement and demise is arrested or reversed. This is because the environment in which they operate is usually highly dynamic and volatile. Unless organizations discover means of accommodating and handling the ever-changing variables, they may not survive to achieve even the goals of their corporate existence. This poses an important task for business organizations to plan, understand and anticipate their future environmental variables so that they take appropriate decisions to manage them. Promising businesses attempt to understand the elements and behaviors of the business cycle and try to take a very good advantage of their knowledge of these parameters. This can assist them to minimize the possible loss that may be associated with the failure to understand the movement of the cycle as well as its causative agents and determinants within the economy in which the businesses operate. By understanding these behaviors, a business can be able to forecast other variables affecting its operation such as inventory, personnel, sales, cost behavior, production rates and its financing with which it can achieve its stated objectives. The study argues that the best means of minimizing the impact of risks of over or under production is perhaps reliable forecast.

For a business organization (whether public or privately owned) to continue to prosper, there is the need for its earnings to be relatively stable for its expansion and growth over time. In addition to its level of earnings, its external environment must also be carefully understood and reliably anticipated. (Burns and Mitchell 1946) .Earnings and business environments are so serious issues that a business must study and understand in order to face its opportunities and threats with vigor and determination. Where for

instance, the business does not recognize the effects of changes in external environment which may necessitate changes in business earnings, it may suffer some losses consequently.

John and Richard (1998) supported the assertion and stated that changes were rapid in the early 1970s and 1990s. These posed serious challenges for forecast in the 1990s. They posited that pressing problem for modern business managers would be that of ensuring the capacity and ability of their businesses to survive. They maintain however, that this would be done through anticipation and adapting to environmental changes in ways that provide for new opportunities for growth and profitability to be created. In order to discharge this responsibility, the businesses, must understand and be able to accurately and cautiously anticipate and predict the impact of the environmental factors so as to anticipate its sales/production target based on some reliable data base. The level of its operating profits to a very large extent determines the extent of its success and strengths. While increasing profit itself, is a function of several components including output, sales, cost of production. This perhaps explains why there has been continuing search by modern business to improve their methods of productions necessary to cut down costs, and to develop new attributes/products, which may have wider appeal and satisfaction to their customers. On the other hand, the environmental and cyclical conditions are usually volatile and dynamic. This underscores the need for business firms to be able to reliably conduct forecast not only for their future demands/sales for their goods and services but also other variables that affect them directly such as their personnel and future profits. The volatility of the changes in the variables from the external environment in specific ways from the immediate factory level to the remote

industry and task environments can some times be very significant. John and Richard (1998) utilized the varying attitudes and experience of United States of America and Japanese automobile firms, and their approaches towards forecasting to support these assertions. They cited as examples the year 1973, which witnessed a 20% penetration of U.S. new car market, the oil embargo in 1973, rapidly climbing fuel prices and uncertain future supplies of crude oil. They wondered why the long-term implications of these predictable factors on future auto sales were largely ignored by U.S. automakers. On the other hand, the Japanese anticipated the future for fuel efficiency, quality and service through careful market research and environmental forecasting. As a result, the Japanese gained additional market share at Detroit expense. (John and Richard, 1998)

The experience above points to the fact that success in strategic decisions rest not solely on amount realized or annually reported as earning, but also on the anticipation of and systematic preparation for the future in terms of how the events would turn out and how the variable being dealt with by the business firm may be forecast. While preparing for the future, the firm bears in mind that complete certainty in the business environment is out of question, since these conditions keep on changing very often and rapidly and that the past is not always indicative of the future.

With this reality, perhaps the best means of minimizing the impact of risk is accurate and reliable forecasting, since it enables the firm to organise its production, marketing, sales and financial plans to achieve its objectives. Thus, forecasting involves making the best possible judgement about some future events. In today's rapidly changing business world such judgement

can make difference between success and failure. Hence, predicting the future is one of the strongest cognitive desires of modern man. The actualization of this desire and goal has resulted in the development and evolution of scientifically based forecasting models, which may help a great deal in the area of human health, behaviour, politics, business operations, economics and weather, to name only a handful of these areas. Perhaps, these diversified applications of forecasting to various human endeavors explain the reason for the sharp surge in the global quest for forecasting in production management of businesses. The manufacturing industries seem to be in forefront of this quest especially in developed countries where forecasting has fast become a daily criterion for assessing the productivity and viability of manufacturing industries.

The past six decades have no doubt witnessed an upsurge and a number of developments in estimation and prediction that have some direct relevance and application in organization forecasting. These advances in both theory and practice have been necessitated by the increasing complexity, sophistications, competitiveness and rate of change in the environmental variables and policies (Makridakis and Wheelwright, 1971). With these realities, facing modern organisations, they find it essential to make some kind of future forecast which is aimed at reducing the uncertainty of the environment by giving them an idea or clue ahead of time of what/how some variable or yardsticks will be or behave and by so doing taking full advantage of the opportunities which are available to the organisation. It may also help them in avoiding some risks and taking appropriate steps and policies to reduce losses arising from unanticipated business trends/situations. This is appropriate because there has always been some

consistent time differentials between awareness of an impending event or need and the eventual occurrence of that event. The lead-time in between is the main reason for planning and forecasting. Specifically, if the lead-time is negligible or close to zero, there may not be need for planning. If on the other hand, the lead-time appears to be relatively long and the outcome of the final event, depending upon the identifiable variables and factors, planning can then perform an important role. Again, in such conditions, forecasting is required to determine when and how an event will occur or probably a need arises, so that appropriate actions and deviations can be put in place to put the organization in a proper and better position vis-à-vis the anticipated situations or conditions. Thus, the inherent uncertainty of business environment complicates planning and coordination of essential business functions. Understanding fundamental market drivers and their respective influences in shaping product demand, sales is an integral part of good business planning and full utilization of company resources (Somerset, 2004).

According to Louise (1963) most business forecasting decisions tend to focus on future rather than the current situations simply because it is usually late and difficult if not impossible to alter the present. He argued that Instead, managers tend to deal with what is expected in the future i.e. based on the available data relating to the past. Decisions on production, purchases, sales employment are thus based on anticipated future events as revealed by the existing forecasting process in place. The ultimate success of mass producer therefore depends on his ability to forecast his future sales, and markets , so reliably to the extent that neither more nor less is produced than what is actually required. This is because either of the two extreme

situations will leave the producer with increased costs to be incurred arising from the deviations, associated with any of the two. Categorically, Louise (1963) cautions management on the associated consequences in the following words:

Considering the severe financial consequences of either over or under production, sales forecasting errors can cut into profits and raise costs of making the goods, even if expenses which are associated with sluggish sales (storage, costs, and inventory carrying charges risk of obsolesce) are disregarded for the moment. Yet, despite its extra-ordinary importance, it is truly a formidable task to predict the volume of sales in this competitive world, where substitute products mushroom, where consumer tastes change overnight and where economic conditions often take sudden turns responding to legislative actions or fiscal policies...”

However, at this point there is the need to point out that the fact that a good forecast has been conducted on the future behavior of some variables, it does not in any way imply 100% accuracy or addressing all the problems as highlighted above. Higher accuracy can thus assist the management in reducing the associated costs. There could be some limitations as we are going to see later which limit the forecast accuracy and by so doing, they form the basis of arguments against forecasting. These arguments must be understood and addressed by forecasters. Another frequent argument against forecasting stems up from flat dismissal of forecasting methodology due to misunderstanding or incomplete knowledge of the science and art of forecasting. These, coupled with sharp and sudden changes in macro-economic and or industrial policies throws some threats to the forecast as an exercise and it requires more time and understanding for the organization to identify and stick to a method of forecasting.

This brings us to the issue of developments in the banking industry in Nigeria particularly those that affect bank failure and the major reasons/arguments that have been advanced to explain these. Maiturare (2000) observed that the pre-SAP banking scheme was characterized by systematic changes introduced from time to time and designed to promote the banking industry in the country. These changes are commonly categorized into three phases namely, the era of laissez faire banking (1892-1952), the era of limited banking regulations (1952-1958), the regime of intensive regulation (1958-1986) and the era of deregulation (1986-1995).

The government of Nigeria in 1995 announced its strategy of "guided deregulation," which included the introduction of a more market-based system for foreign exchange allocation for all transactions except those of the government. Since then, the authorities tightened fiscal and monetary policy and declared support for private sector-led growth. This has made significant impact on bank performance and earnings. In January 1999, the IMF agreed to a "staff monitored programme" for Nigeria. This came after the government of General Abdulsalami Abubakar, which came to power in June 1998, had abolished the dual exchange rate, deregulated the domestic fuel market and promised speedy privatization. This added another impact on the profitability & performance of the banking industry.

The un-abating pressure on the foreign exchange market resulted in the policy reversal in 1994 to that of "guided deregulation", which led to the creation of the Autonomous Foreign Exchange Market (AFEM). Apart from the institution of an appropriate mechanism for exchange rate determination, other measures applied in managing Nigeria's foreign exchange included demand management and supply side policies. The CBN and the

government have actively fostered the development of institutions such as the commercial banks operating within the banking industry. These changes as well as modifications to them through several government monetary and fiscal policy circulars continued up to the year 2005, which marked the beginning of another era ;the era of capitalisation & consolidation. The study considered this period very appealing because all banks for which the data for the study would be collected must have survived not only most of these policy reforms of the era of guided deregulation but also the distress of the 1990s.

It is important to point out that during this period; a number of policy reforms were formulated and introduced to strengthen the banking industry in Nigeria. Despite the fact that some of these policies contributed positively to the growth of the banks, and banking practices, a lot was left to be desired to bring about the much needed performance in the banking industry. There is no doubt that banking regulations had some salutary effects on the banks and their customers. They certainly improved the viability of banks in Nigeria by stemming the tide of massive bank failures witnessed in the formative years of banking in Nigeria. However, despite the benefits associated with this development a number of problems arose from the banking regulations, especially in the early 80's and questioned the entire mode of banking regulations. (Maiturare, 2000)

However, the era of deregulation (1986-1995) saw introduction of various reforms aimed at improving commercial banks' performance and stability in Nigeria. Several reasons/factors have been advanced by various scholars and monetary authorities as causing the bank failures and poor performances

despite the reform measures that have been put in place from time to time. For instance, studies such as those of Agada (1993), Ebodaghe (1993), Olugun (1994), Onuiwa (1994), Maishanu (2003) all concurred on the causes of the various bank failures and distress in the country as comprising of poor and deteriorating assets quality, large portfolio of non-performing credits, liquidity, mismatch between assets and liabilities. Other causes include management inefficiency, insider abuses, interference by shareholders, negative earning capital, inadequacy of capital, rapid proliferation of financial institutions, policy-induced shocks and instability.

However, one major factor, which in our view has often not been given appropriate attention, is the issue of strategic planning through forecasting and prediction of future performance indices of the commercial banks (money deposit banks). The works of Stevens (1999) and Blyther (2000) established the inability of the business firms to adequately anticipate and forecast several operating variables in them as a very critical factor in explaining their non-performance. They argued that it is dangerous for a firm to fail to anticipate its cash flow sales, profits and production under whatever situation it finds itself. Questions such as: which factors pose challenge to the success of a firm? Does the organisation expect a specific level of operating profits, expansion or rise in operating expenses or sales? Ojo (1986) argued: “The existing conventional ways of measuring performance especially the profitability of enterprises cannot be regarded as adequate for measuring bank profits because of the imperfect market situation and the wide distortion in the economy”.

More robust forecasting techniques used today are based upon traditional linear and non-linear statistical models such as regression analysis moving averages and exponential smoothing. Forbes et al (2005) for instance demonstrated that exponential smoothing techniques are widely used for forecasting demand, sales & profit in supply chain management for data that conforms to time series. Their relative simplicity and robustness together with their reliance on the stylized facts of time series analysis mean that they are also well suited for automated approaches to forecasting. Their central place in time series analysis has been reinforced by repetitive successes against more sophisticated approaches in a succession of forecasting competition. They cited studies complementing their work such as those of Lewandowski (1962), Anderson (1982) and Simmons (1993).

However, the utility of these or otherwise to the forecasting of profits in Nigerian banks, to the best of our knowledge, has not been established. Hence, this study undertakes an empirical assessment of Business Forecasting Techniques using exponential smoothing techniques to forecasting of commercial bank's profits in Nigeria. At the end of the study, certain questions which border on the applicability, relevance or otherwise, choice of technique are expected to be addressed, as answers to the research problem.

1.2 Statement of the Problem

If a business organization is to cope with seasonality, sudden changes in demands and sales levels, price-cutting tactics of the competition, unanticipated swings in macro-economic variables, sound and reliable forecasts of these variables is no longer luxury but necessity. A business organization should be able to anticipate with some level of accuracy those variables that affect any aspect of its existence so that it does not suffer serious loss in the event of sudden variation in any of these variables. By knowing for instance, via forecast the expected number of people to demand for its products vis-à-vis expected number of staff to leave its services, the organization can plan its production (expansion or contraction), its marketing and even plan for the finances required to accommodate the anticipated realities.

It is important to note that banking environment is by its nature very risky. Due to sudden changes in the monetary policies, interest rates and other variables, banks are placed in a better position to design policy measures to deal with these events as and when they arise so that they can take advantages of the situations and also get protected from severe shocks of environmental changes and risks.

There is also an information asymmetry in the banking industry more than any other sector. Information known to you about some bank parameters may be unknown to someone and someone may have sensitive information that you may not have (Umoh, 2004). This created another risky situation facing banks. Added to these problems is the volatility of the exchange rates,

assets and deposit quality, earnings quality and other macro economic parameters which further compounded the problem; the results of which is serious banking crisis internationally. This created loss of confidence in the sector and banks monetary authorities concerned were looking for policies or combination of techniques that would help them turn around this ugly situation.

Studies have established that banks in Nigeria rely mostly on qualitative approaches & techniques in evaluating loan proposals. (Abu-Abdissamad, 2000). The same could be said to be true for forecasting. This trend underscores the need for these banks to ascertain or forecast not only their earnings, but also a variable of interest to them which actually affect their operation. This can help them to target and focus their plans which may allow for more effective allocation of resources, assist in identifying areas of weaknesses, trouble spots and leading to better understanding of bank operation and its business dimensions. As Barr etal (1994) rightly observed, the most efficient banks attempts to control operating expenses, promote earnings, manage interest rate sensitivity, manage risks by projecting or forecasting these parameters and based on the forecast strategically plan for the bank and its future markets.

The practices in developed countries indicated that banks have developed their own forecasting models to deal with their own internal forecasting problems. Most of the models used are quantitative owing to their advantages and they thus have an edge over those used by our Nigerian banks in terms of forecast accuracy. For instance, the Bank of New Zealand developed a model called Forecasting and Policy System (Drew and Hunt,

1999), the Bank of Canada developed two models; the first by Laxton and Tetlow (1992) and second by Poloz et al (1994).

Pagan (2003) developed two models for the banks of England, the first being MM-model and the second NMM- model. Wallis (2004), assessing the two models reported that they are found to be unbiased and reliable, although the latter is undergoing some technical adjustments in the light of some development within its banking industry.

In the USA, Barr et al (1994) developed a model named data envelopment analysis (DEA) to be used for general forecasting of bank parameters, using federal reserve Bank of Dallas as case study. The DEA model according to a post-application report by Barr et al (1994) has proved robust and accurate.

These developments indicated that banks in Nigeria could emulate these practices and find ways of making progress in these areas using the most recently available software. The developments also indicated that there is a seeming tilt internationally towards quantitative approaches on the basis of the data requirements of the models and the situations of the host environments. With the current globalization derive; absence of more reliable tools/methods becomes a problem. More especially with the consolidation policy in Nigeria and the fact that our banks need to be key international players, it means that our banks cannot be isolated from the larger world; within the global village. This leads us to ask questions as to why the quantitative techniques are not applied in Nigeria? How can these be developed and applied to suit our internal peculiarity and achieve high accuracy and reliability in forecast?

Our preliminary investigations indicate that for the purpose of forecasting earning in Nigeria, no Nigerian bank applied any of the quantitatively based formal techniques despite their existence. Nigerian Banks rely on qualitative projections which have relatively low measure of accuracy. Identification of appropriate quantitative forecasting technique by banks, which is hitherto absent in the industry, could assist in bridging this gap and give the banks the opportunity to perform forecast using these tools and also test their accuracy indices side by side with the existing frameworks. It may also give them the opportunity to test for the possibility of combining forecasts from two extreme models, which as we shall see in the literature has enhanced forecast accuracy reported in various studies. Furthermore, the study observes that despite the increasing application and development in quantitative business forecasting techniques, most commercial banks in the country are using the rule of thumb qualitative and management intuition approach to conduct their forecasts. In some banks, the extent of the application of even the rule- of- thumb approach is deviating seriously from the established and formal patterns of these methods. This has caused serious problems for the banks in their efforts to forecast various aspects of their operation within the volatile and rapidly changing Nigerian economic environment. Consequently, the banks merely rely on the traditional or rule of thumb methods to make their forecasts (at best) or even ignore these in making forecast of very crucial aspects which affect their operation (at worst).

While it is expected that commercial banks should have their separate internal forecasting mechanisms or procedures, these are largely subjectively and or intuitively applied. In most cases, they are carried out by smaller percentage of the organization which can also manipulate any forecast arrived at in respect of any variable of interest being forecast. Therefore, these techniques are not adequate. Given the increasing sophistication in computer development and the development of advanced forecasting models, it is our contention that the banks could give trial to some of the quantitative techniques, which are available for predicting corporate performance. There are a number of models for predicting corporate performance and failure which some of the banks might have tried, yet none of the models can be strictly used for forecasting of future profits.

Over the years many forecasting models have been developed and applied elsewhere with some definite levels of accuracy. This study therefore believes that it is high time we start exploring the applicability and viability of these techniques to Nigerian banks, using our internal setting and data so that the Nigerian business community in addition to the targeted banks can fully utilize and reap the potentials of these techniques. If at the end of this study the applicability of any technique in any of the banks under study is established, exploration of the possible similar areas of application and improvement can be made and suggestions could be offered. In situations, where the applicability is not feasible, explanations will be offered for further possibilities and application.

1.3 The Research Questions

In order to find solution to the research problem and hence achieve the objectives of our study, the study seeks to find answers to the following questions:

- i) Is profit forecasting relevant and useful to commercial banks in Nigeria?
- ii) Do banks in Nigeria make any profit forecast and which methods do they use in generating such forecasts?
- iii) To what extent do commercial banks in Nigeria appreciate modern forecasting techniques and or put them into application?
- iv) Which methods can a bank adopt to conduct a reliable profit forecast?
- v) Can exponential smoothing techniques be used in forecasting banks profits in Nigeria?
- vi) What are the obstacles if any, hindering effective profit forecasting by banks in Nigeria?
- vii) To what extent can the techniques be applied to forecasting of commercial bank profits in Nigeria and what are the associated limitations?
- viii) Which issues must a bank pay special attention to in its choice of forecasting techniques or procedures?
- ix) Is there any relationship between managers' qualifications and their familiarity with the forecasting techniques?

1.4 Objectives of the Study

The main statement of this thesis is that quantitative tools of business forecasting are not good forecasters of bank profits in Nigeria under conditions of risk and uncertainty. This thesis is out to provide empirical evidence on this or otherwise. In an attempt to provide the desired empirical evidence on this statement, the study set out to achieve the following specific objectives:

- i) To determine the extent to which exponential smoothing technique could be used in forecasting bank profits;
- ii) To determine the major issues needed to be considered in selecting and applying a forecasting technique;
- iii) To facilitate more awareness among the bank executives on the existence of quantitative forecasting techniques and their utility in forecasting parameters of interest to their banks.
- iv) To assess the extent to which banks in Nigeria utilize and apply forecasting.
- v) To identify the major obstacles if any, hindering the effective application of business forecasting techniques in forecasting of bank profits in Nigeria.
- vi) To assess the level of familiarity of bank managers with formal forecasting techniques.
- vii) To identify the relationship between bank managers qualification and experience and their familiarity with formal forecasting techniques.

- viii) Based on the findings of the study, make recommendations capable of addressing the identified problems.

1.5 Research Assumptions

This study rests on the following assumptions:

- i) To make forecasts, it is not possible to state what the future will be with complete certainty.
- ii) That forecast techniques are of general application except where they fail to apply due to given situations and data requirements.
- iii) That forecasts will from time to time deviate from actual. Hence, they can be accepted at face value but they serve to inform and remind policy-makers by discussing the risks foreseeable around the forecast, so that actions can be taken to adjust policy and behavior accordingly.
- iv) That forecasts are expected to be used by policy makers to make decisions, which will in turn affect the future.
- v) That for the purpose of this study we recognize earnings before tax (EBIT) of our case studies as profit.

1.6 Statement of Hypotheses

In order to prove or disprove the statement of our thesis and to achieve the objectives of the study, the following hypotheses were formulated and tested:

H₁: There is no significant correlation between actual profit and forecast profit of commercial banks in Nigeria.

H₂: Exponential smoothing techniques cannot forecast commercial banks profits in Nigeria.

H₃: There is no significant difference between forecast error distribution of simple exponential smoothing and those of modified exponential smoothing techniques.

H₄: There is no significant relationship between bank managers' academic qualifications and their ability to apply formal forecasting techniques.

1.7 Justification of the Study

This study sought to explore the application of experimental smoothing techniques in forecasting bank profits in Nigeria. The study specifically chose the exponential Smoothing techniques out of the many available models because of its reported levels of forecast accuracy by recent studies. The study holds that despite the existence of a number of forecasting techniques and soft wares, the exploratory studies for these, especially in the Nigerian setting are on the low side. To the best of our knowledge, not much research has been done in the area and, in order to establish their utility or otherwise, the extent to which they can fit our own peculiarity as a Nation, to understand and determine the major issues affecting their application and to create general awareness on the basis of empirical evidence established, a study such as this is justified. At the end of the study, suggestions based on identified problems would be offered for practitioners to improve their forecasting activities.

This study, being a pioneer effort in the Nigerian setting intends to offer some useful suggestions to forecasting practitioners and organizations aimed at improving their forecasting activities. The study is also expected to trigger off similar empirical studies in the area of forecasting with specific emphasis on various aspects of organizations operations such as sales, production, personnel and even overall business cycle.

1.8 Significance of the Study

Going by current evidence from the previous studies as well as the foregoing discussions, it is apparent that there are enough reasons to warrant a study that will examine the application of some popular business forecasting techniques in forecasting bank profits in Nigeria. Our current investigations revealed little scientific research effort in this area. This study would therefore pioneer a search for a true position of the applicability of the techniques.

- i) This study seeks to examine the applicability of the exponential forecasting techniques in forecasting profits of banks in Nigeria. We are not aware of any research conducted in Nigeria with special emphasis on forecast earnings of banks. Hence, the major significance of this study lies in the fact that our findings would definitely extend the frontiers of knowledge in this area.
- ii) Secondly, the study is significant in the sense that despite the large number of forecasting techniques and software useful in business decisions, we have not come across study in Nigeria, which seeks to apply any of them to a specific research case study with a view to establishing their viability, relevance and associated problems.
- iii) This study is also important not only to the banks involved as case study in our research, or the banking industry in Nigeria but also to the entire Nigeria business community. Our findings will go a long way in educating and enlightening the general business community on the need for proper planning of their operations through forecasting. With explanation and prediction as the fundamental goals of any science, as observed by Pratt (2004) this study is also

significant for its ability to demonstrate in the course of data analysis how these two objectives interact in forecasting banks profits in Nigeria ;in addition to the contribution in the development of the body of literature in the area.

- iv) This study is significant to the banks forecasting executives in the sense that it will enable them reexamine their positions and adjust their forecasting practices to take advantages of some developments in the area as may be identified by this study.
- v) Through conducting a study in Nigeria, similar to those conducted abroad on a similar and a related data or model, our contribution to knowledge would come from the replication. This would be through establishing what would be the results upon this, whether the same results could be obtained using our Nigerian data and if no what is it that must have accounted for the identified deviations?

1.9 Scope of the Study

The scope of the study was defined in terms of the period covered by the study as well as the nature and type of banks involved in the study. The study therefore utilized extensively, the data extracted from annual financial statements of banks published for the period covered by the study. We also utilized the publications of the Nigeria's stock exchange as they affected the data appropriate to the study. The variable of forecast for the study was profitability in terms of Earning Before Interest & Taxation (EBIT). This is therefore the main issue addressed by the work in terms of scope.

The period of the study is ten years i.e. 1996-2005, both years inclusive. We considered this period strategic and appealing because, the period not only fell at the tail end of era of deregulation but because all banks for which we obtain data would have survived the distress problem of the early 1990's. It has also coincided with the commencement of the era of capitalization and consolidation of Nigerian banks. The duration chosen would provide us with the necessary time series data on the operating profits of commercial banks. The period also suited the study because it allows for proper application of the models within a relatively adequate period of time. The 31 licensed commercial banks of Nigeria which are quoted on the Nigerian Stock Exchange prior to CBN consolidation policy constituted the population of the study. Out of these, we drew a sample of ten banks for the study. The scientific procedure of this has been discussed in chapter three. The selection of these banks was based on the size of their deposits and age. This could assist in the reduction of noisy components and errors and foster easier

application of the model on the time series data published by these banks needed for testing the hypotheses.

1.10 Limitations of the Study

A study of this nature may not be free from some limitations. Some of these limitations include:

a) Lack of Uniform Reporting Format

We noticed from the preliminary research design that, while some banks use vertical presentation style of financial statements, some use horizontal style and in some cases, items of financial statements vary with respect to the case study. Some items e.g. deductions included in the vertical format at times are missing in the horizontal format. Despite these variations, we rely on the reported figures of Earnings before Interest Tax (EBIT) for banks quoted on the Nigeria Stock Exchange to develop our time series data needed for the study.

b) Income smoothing

The practice of income smoothing by commercial banks has led to the reporting of “paper profits” usually through deliberate manipulation or falsification of the actual earnings [Muhammad, 2004]. However, this practice would have little effects on the use of published financial statements as these were legally sanctioned by appropriate regulatory and monetary authorities.

c) Lack of qualitative forecast

Another limitation of this study arose from the unwillingness of most bank management to release copies of their internally generated forecast using their forecasting techniques i.e. using their qualitative approaches, which with they are mostly familiar. This would have enabled us to compare this forecast with the one generated using the techniques adopted in this study. This could enable us to compare the two forecasts to be able to see their viability. Most banks were however not willing to release, such figures so that comparism could be made. In the absence of these, the study relied upon forecast generated using the techniques adopted in the study and their applicability assessed.

1.11 Plan of the Study

In order to ensure full realization of the objectives of the study as outlined earlier, the study is structured according to this plan of study. It is made up of five (5) chapters. Chapter one is for the general introduction of the study and chapter two is for the review of the relevant literature and theoretical framework. Chapter three presents the methodology of the study and chapter four presents and analyzes data collected for the study and in chapter five we present summary, conclusion and recommendations.

1.12 Operational Definition of Terms

This section presents definitions of some useful terms as they are operationalized in this study. The study also presented definitions of some terms which even though are not unique to the study, they help the readers especially the laymen in the area to easily read the work and comprehend.

Accuracy

The correctness or reliability of a given forecast as measured against the actual values. This is usually measured by mean squared error (MSE), mean absolute percentage error (MAPE), Mean absolute deviations (MAD), Tracking signal (TS) .

APR An acronym for annual profit report. It is a document which is usually submitted by the branch to show its expected earnings and expenses for the coming period so that management can have idea of next year's profit.

Beta (β)

This is another smoothing constant which is used in Brown's, Winters' and Holt's exponential smoothing. Its value also lies between 0 and 1 and it is used to smoothing the trend in the data. This is the randomness or movement towards a particular trend often found in the data series exhibited by wide variation, which can affect the forecast accuracy. It is used in establishing under or over prediction of a model.

Box-Jenkins

This is a model, which makes use of auto- correlative structure of sales data or any variable of forecast to develop an autoregressive moving average forecast from past sales and forecast errors.

Bottom Up Approach

This is an approach to forecasting whereby a substantial input to the final forecast is derived from branches through the area offices to the corporate level for final use by the bank.

Business Forecasting

The process of gathering data on any business parameter, evaluating it and making a prediction on such parameters on the basis of the analysed data.

Decomposition

This is the process of breaking the forecast data into seasonal, cyclical, trend and noisy components and projecting each into the future for the purpose of forecasting

Exponential Smoothing

This refers to a smoothing technique, which is based on a weighted average of current and past observation whereby most weight is given to the recent observation and declining weights given to past observations. This is a value used in computing exponentially smoothed forecast values of time series. In this study it refers to alpha (α) where, $0 < \alpha < 1$

Mean Absolute Deviation (MAD)

This is the mean of the absolute values of all unadjusted forecast errors of forecast from the actual values. It is used to assess the forecast accuracy.

Mean Absolute Percentage Error (MAPE)

This refers to the mean of the sum of all the percentage errors for a given data set taken without giving any attention to the sign of the data (i.e. modulus). It describes the forecast accuracy in percentage terms.

Mean Percentage Error (MPE)

This refers to the average of all percentage errors for a given data set. This statistic allows for positive and negative errors to cancel one another and it is hence used as a measure of bias or accuracy in the application of forecast model.

Mean Squared Error (MSE)

A statistical measure of forecast accuracy obtained by squaring the individual errors for each item in the data set and using these to find the mean or average value of the sum of those squares. It is useful in that it gives greater weight to large errors than to small errors due to its tendency to square all errors (Makridakis and Wheelwright 1978).

Income Smoothing

This is a deliberate attempt to alter the actual income earning of a business concern in an attempt to give fascinating and attracting picture of the business standing during the period under review.

Smoothing

This refers to the averaging or shaping of a data series in order to eliminate or control fluctuations that are caused by wide variations

Tracking Signal

This measure seeks to monitor and control the forecast bias. It is the ratio of running sum of forecast errors (RSFE) to mean absolute deviation (MAD). The more unbiased the forecast model is, the more insignificant will be this ratio.

Pattern-based Forecasting

This is simply a forecasting method which is based on the assumption that the future is a function of the past.

Jury of Executive Opinion

This is a method of forecasting which consists of combining top executive views concerning future sales or values of any item being forecast.

Life Cycle Analysis

This is a method of forecasting which is strictly based on the study of whether the product is adjudged to be in the introduction, growth maturity or decline state of its life cycle and based on its appropriate forecast are developed.

MCD

This is acronym for management control document. It is a form designed by bank management, which branches are expected to fill and submit to guide

Management control the operation of the branch or the SBU as the case may be.

MPD

This is an acronym for management planning document. It is a document which consists of useful information on the year under review for the purpose of projecting the performance of the bank into the future.

MPR

This is an acronym for management profitability report, which denotes the periodic meeting held by bank management to assess its level of operation at a given time interval.

Neural Networks

This is a computer -based -technique which has the ability to look for and establish patterns in previous history of sales, earnings and explanatory data to uncover relationships. The established relationships are then used to produce the forecast.

Weighted - Moving Average (WMA)

This is a method of forecasting whereby data series are given proportionate/appropriate weights depending on the age of the data for the purpose of projecting into the future.

CHAPTER TWO

LITERATURE REVIEW & THEORETICAL FRAMEWORK

2.1 Introduction

This chapter reviews the existing literature and works written on smoothing techniques and or other related areas. The aim of this review is to provide some theoretical exposition of some forecasting issues from the existing literature and related studies. The theoretical framework for the study would also be presented in this chapter. This would enable us to sketch clearly the parameters of the techniques of our study as well as how to properly apply or utilize the techniques in conducting the study.

Hence, section 2.2 discussed definitional issues and concepts relating to the nature of forecasting. Section 2.3 examined some criticisms on forecasting exercise and section 2.4 reviewed some developments in forecasting techniques. In section 2.5, we reviewed contributions of forecasting to the field of management. Section 2.6 presented a review of empirical studies on business forecasting. In Section 2.7 we presented the important linkages between forecasting and planning. Under section 2.8, we reviewed some important issues on forecasting bank profit in Nigeria. Under section 2.9, we reviewed literature on risk and uncertainty in the Nigerian banking environment and under section 2.10 we examined the theoretical framework and section 2.11 discussed measures of forecast accuracy. Under section 2.12, we discussed the limitations in the selection of forecasting techniques and summarized the chapter in section 2.13.

2.2 Definitions and Concepts

We have established in chapter one the essence of forecasting to business organizations. A forecast is thus necessary to every decision or policy planning of an organization. Essentially, to use the words of Armstrong (2005) a policy or a decision one advocates assumes a forecasts of what will happen as a result of the action being recommended. Hence, forecast as an activity permeates all aspects of public management and business policy making. According to the American Heritage Dictionary of the English Language (2000), the word forecast is a conjoin of two other words 'fore' and 'cast', which means to plan before hand: fore-fore + casten, means to throw, calculate, prepare. It means to estimate or calculate in advance especially to predict by analysis of some data. To forecast means to serve as an advance indication of, i.e. to fore shadow or estimate some thing in advance. Thus, forecasting means foretelling, prediction and prognostication, all representing some kinds of forecasting.

Forecasting, to use the words of Lyman and Carlo (1978) refers to "gathering of data, evaluating it and then making predictions about the future on the basis of analysis". They contend that when some business decisions are made based on some forecasts developed in this systematic manner, the business person has taken a major step in the direction of sound management practice. Forgarty (1989) on the other hand views forecasting as "the process of attempting to predict the value of some variable at a future time period". Forecasting is thus made up of systematic manipulation of time series data relating to the operational history of an organization and attempting to use it to produce some desirable concrete and some reliable

projection of similar or different behavior pattern in the years or future time period to come. Wilson and Barry (1994) viewed it as numerical estimates by date of the future that can be achieved with a specified level of support.

Burita (2004) defines it as a systematic study of future and formulation of scientific statement on potential variants of development. It is not theoretical activity taking place in isolation but it is concerned with general scientific cognition stemming from knowledge about the past, it is devoted to re-shaping of present on the basis of the appraisal of possibilities and needs of the future. In business practice, forecasting becomes a part of process of management and planning. Scientific levels of forecast are based on their completeness, complexity, multidiscipline character and cleaners. Salzman (1968) has provided a distinction between science and art in the forecasting realm. He suggests that after the usual adjustments are made to the data in a computational approach “from then on, the science of forecast melts to a degree, and the liquid part is called art”. We can define the artist in most general terms as one who knows the science of his subjects and is able to adapt it to his needs. He further notes, computational forecasting techniques are little more than potentially valuable tools, they can enable the forecaster “to gain insight into and help him to make more sophisticated value judgments”. Hence, from the above works, three important points follow:

- a) except for the nature of the tools used, there is nothing particularly scientific about forecasting;
- b) the computational techniques and models which are described under our theoretical framework and typology are in fact only tools of analysis; and

- c) the exercise of judgment can never be escaped, even when following most formal computational approaches available.

From these it could be deduced that a successful forecaster is therefore one who uses computational tools and who must exercise some good judgment in selecting and adjusting the tools themselves to give fair and reliable results. In this sense, the forecaster has utilized science in practicing the art. Drawing from the words of Lyman and Carlo (1978), a forecast refers to gathering data, evaluating it and then making predictions about the future on the basis of the analyzed data. However, the basis of this definition came from the actual desire of the organization itself to have some predictable variables in the future period to come using some specified data base. Forecasting is thus the process of attempting to predict the value of some variable at a future period of time (Forgarty, 1989).

The fundamental element in any forecast of future value of any “dependent” variable such as the rate of inflation – is some explanation of how, in the past the variable in question has been linked or related to some other explanatory variables, which it is thought possible to predict or take as given. For example, it may be believed that on the basis of data for previous years that the rate of inflation, employment or sales in any one year has been related in any manner to the rate of increase in the money supply over the previous two years. Since the later is known with some degree of certainty, it is simple to use it as a basis to predict next year’s inflation and vice-versa for other linearly related variables over the last few decades, the models used to predict the economic variables have become bigger and bigger and more and more complex. This has been facilitated by fascinating advancement in computer technology in the past few decades. It seemed to be ideal and

suitable due to failure of some forecast exercises to be accurate, at least reasonably. As a result, continuous efforts have been put in place by scholars to strengthen the underlying models used for the predictions by adding more explanatory variables, most of which will be determined by other equations in the model. Thus, more variables (explanatory) are added to enhance the predictive ability of the econometric models concerned. This has increased their explanatory power. This assertion has been confirmed in the studies by Chant (1980), Bhasker and Morris (1984), Astley and Haldane (1995), Zarnowitz (1992), Ball and Watts (1972). There are however other studies on the other sides which supported the superiority of other models rather than loading any given specified model with too many explanatory variables. These include the works of Chatfield (1996), Callen et al (1996), and Olemen (1989).

This study shares the second group's view because of the series of limitations of obtaining information in the entire variables as presumed by the first group of opinion. Whichever school of opinion one views the forecast from, one may not expect to have 100% accuracy. However, the accuracy and reliability of any forecast task, therefore rests on its extent of minimizing the possible forecast errors in the model. A good forecasting method:

will on the average have a small forecast error; that is the difference between the forecast price and the actual market price will be small. Further, the forecast must be unbiased ... the errors should overshoot the actual price as often and by as much as they understand it [Skrivankova, 1999].

Forecasts are simply to serve as critical inputs to a wide range of business decision-making processes. However, according to Wallonnick (2004) forecast of any variable is based on several basic assumptions. Specifically he identified three basic assumptions as follows:

- (i) There is no way to state what future will be with complete certainty. Regardless, of the methods/models used in arriving at the forecast, there will always be an element of uncertainty until the forecast horizon has come to pass.
- (ii) There will always be some blind spots in forecast. It may not be possible for example to forecast completely new technologies for which there are no existing paradigms i.e. it is based and stems from a known paradigm and projects into unknown but closely realistic depending on the accuracy of the forecast, and
- (iii) Providing the forecasts to policy makers will help them to formulate business policy. The new business policy, in turn will affect the future, thus changing the accuracy of the forecast.

Thus, like the position of Skrivankova (1999) cited above, forecasts are not in anyway to provide 100% results. They are to give clue, idea and possible behavior of the variable being forecast at any given future period. Taking this line of argument, a science fiction novelist, Frederick Pohl (1993) suggested that the “only time a forecast has any real utility is when it is not totally reliable”. He proposes a thought experiment where a gypsy fortune teller predicts that certain people would be ran over and killed, if they leave certain place. He concluded that if they knew that his forecasts are 100% accurate, then the prediction is useless because they would not be able to alter the forecast. He argued that “predictions only become useful when they are not completely reliable. The apparent paradox created by Pohl’s

thought experiment is only a function of the particular situation. The paradox exists only when (i) we want the future to be different than prediction and (ii) when we believe that there is no way for us to adapt to or affect the forthcoming changes. We argue that a forecast can be 100% accurate (although not often) and still be useful. In a more practical example, suppose, the prediction is that our manufacturing company will receive twice as many orders of a product X as we had anticipated. If we are aware that the forecast is to some significant extent accurate, our company would be wise enough to order more raw materials and increase our production staff required to meet the coming demand.

2.3 Criticisms on forecasting

However, there are a number of arguments offered against forecasting exercise. Wilson and Keating (1994) for instance identify three basic criticisms usually raised against forecasting. The first criticism concerns bad personal experience with forecasts for products, investments, weather, politics, economics as well as stock market. They hold that owing to some poor result obtained in previous attempts at forecasting some variables of interests by foreign companies, that forecasting exercise is useless. However, empirical studies such as that of Jordi (2003), Clemen (1989), Armstrong (1989), Joseph II (1992), Mahmoud (1989), Rothermell (1982) seem to debunk the above positions and assert that forecast is very much relevant to modern organizations. They demonstrated that depending on the model used, the situation and the database used among others, forecast could go a long way in guiding business decisions with some varying degrees of

accuracy. This study shares the position of the last group because of our argument in the last two sentences of section 2.2 expressed.

The second criticism stems from the fact that it is viewed as a user's resentment of speculations of loose-cannon journalists; extreme claims of sensation seekers or ill-informed college or university professors. Wilson and Keating (1994) argue that these are rarely any systematic forecasts as they are not based on logical forecasting procedure and methodology.

The third criticism centers on the flat dismissal of forecasting methodology due to ignorance and inexperience in the required procedures. If we accept forecast as "numerical estimates by date of the future that can be achieved with a specified level of support" [Mohn 1989], then we can safely argue that flat dismissal of forecast methodology may be due to ignorance. We may not expect a person to appreciate what he does not imagine, except with some convincing arguments and proofs.

However, as rightly observed by Rothermel (1982), the use of forecasting in most companies is confined to short term prediction. This is largely due to the fact that top management is being interested about the capabilities of the economists and the reliability of their long-term forecast/calculations. It might be also due to the fact that macroeconomic variables as well as some important predictive parameters keep on changing unexpectedly, thereby making it difficult to rely on any long-term forecast, especially having bearings to the human behaviour and interaction. Yet, organizations that treat modelling techniques as the stepchildren of strategic management may be overlooking an important management tool.

Contributing to the discourse of whether future can be predicted, Cornish (1977) argues that scholars tend to respond both positively and negatively to this question, depending on their mood or frame of reference – because the question he argues is ambiguous. Some people prefer to use “predict” to indicate an absolutely precise infallible knowledge about the future. Since people are infallible and make incorrect statements about the future (just as they make incorrect statements about the past), it is correct to say that no one can predict the future. But the word predict is also used in the sense of making forecast of what will of will happen i.e. a statement of what one thinks will happen, even though one concedes that one may be wrong. In this latter sense many events can be predicted. Similarly, some people argue that it is possible to have knowledge of the past but never of the future. The statement is half-truth that is used generally to support the view that there is no point to thinking about the future. The truth in the statement argues Cornish (1977) is that our knowledge of the world and selves is derived from experience, i.e. the perceptions and feelings we have had in the past. But that does not prevent us from making accurate statements about what will happen in the future: we may make mistakes in our forecast just as we make mistakes in our recollections both forecast and recollections are part of our ‘knowledge’. Hence, Rothermel (1982) chronicled how forecasts in capital intensive industries proved remarkably accurate in predicting not only the most important variables of a particular market as long as ten years into the future but also the investment behaviour of competitors as they react to the market. Indeed this explained why a lot of efforts in research have been put to finding more useful aspects of forecasting. In another study, Olenzak (1982) attempted to describe the forecasting scenario as follows:

Forecasting might be thought of as analogous car driving through snowstorm at night. A bit of what lies ahead is revealed, not always clearly so that the driver may find his way. It is not necessary for the driver to recognize every landmark and road sign but merely to avoid danger and pick out enough details so that he may arrive at his planned destination.

As argued earlier, the success in business forecasting depends on careful characterization and forecasting of the conditions surrounding a decision environment. Once these conditions are established, a manager can forecast what is likely or what is the likely direction and timing of competition and decisions towards a particular issue.

2.4 Review of Developments in Forecasting Techniques

From the foregoing, it is noteworthy that the inherent uncertainty of the business environment, complicates planning and coordination of essential business functions. Understanding fundamental market drivers and their influence in shaping product demand and by extension sales & profit is integral to good business planning and full utilization of company's resources.

In order to give historical background of forecasting, the works of Hawkins (2005), Cox (1929) and Lebergott (1945) would be referred to from time to time. Hawkins (2005) posits that prior to 1950s there was little or no systematic area known as business forecasting though, a handful of forecasting methods, such as regression and other time series based were

developed and available in statistical literature at that time. Yet, their application was limited to successful economics department in an academic or government agency. They noted that widespread use of these models was seriously hampered by the lack of timely data to run the necessary model and the tedious nature of the required information and the required calculations of the works.

However, in the mid 1950s two major breakthroughs changed the forecasting fields. The first was the introduction of a broad range of exponential smoothing techniques, which were first employed by the military and gradually spread to business organizations. The choice of exponential smoothing technique was perhaps as noted by Hawkins (2006) due to its simplicity as well as ease of computation using fewer amounts of data. Although these methods have significantly appealed to the practitioners, most academics and professionals thought that such simple method could not be sufficiently accurate to deserve any serious attention in the first place. Hence, it took thirty years before exponential smoothing tools became widely accepted technique for adoption in business forecasting. A second important milestone in the forecast history was the introduction of computer to forecasting exercise, which has actually provided the base for more practical computations using exponential smoothing and even more than one parameter situation. The computer made the application of exponential smoothing not only possible; it also enhanced and facilitated the experimentation of many other techniques on a much more continuous basis (Ibrahim, 1997).

Since the initial work on smoothing in the 1950s, a number of variations and extensions of such a technique have been developed. Most notably among these were those of Brown (1950), Holt (1957), and Winters (1960). Not long after these attentions gained by the exponential smoothing, decomposition methods, experienced a rise in their popularity. Prominent group responsible for this was Shishkin (1961) of the Census Bureau of United States Government. Although the decomposition method had little statistical inclination, it still enjoyed some considerable degree of appeal for business practitioners as well as those in government.

With the increasing developments in computer technology, the doors opened for more statistically sophisticated forecasting methods. Techniques such as multiple-regression and econometric method became practical and were used to quantify and test economic theory with quantitative data within that decade, the field of econometrics and forecasting had developed as a profession in its own right. Most forecasting researches up through 1979 were primarily aimed at developing “new” techniques and demonstrating, often on the basis of one or two examples, their superiority to existing forecasting tools. According to Armstrong (1985), during the first major evaluation of multiple forecasting method, over one hundred cases were published, thereby launching a new interest in forecasting with a shifted emphasis on evaluation of forecasting methods. This new orientation has attempted to identify which contingencies or situations favour the use of which of the forecasting methods.

However, prior to Box and Jenkins (1979) study, it is important to point out that the area of forecasting and model building witnessed a decline in the respectability reliability of forecasting and model building. Rothermel (1982) argued that this was primarily due to absence of more robust and accurate tool of forecasting capable of accommodating various parameters and factors affecting forecast of a product. He noted that the decline and respectability of forecasting model did not imply that companies don't forecast in business planning; there is no such thing as not forecasting. But companies concentrate on straightforward predictions of demand or sales based on historical and other verifiable data. Executives hold little faith in a corporate planner's ability to accurately forecast or predict anything else, partly because good forecasts, other than those of demand are all too rare.

Burita (2004), holds that 60's and up to 80's was the golden age of forecasting. During this period according to him, especially in the western part of formerly divided worlds as well as based on government initiatives due to the cold war, forecasting was purposefully developed and fostered. Many workshops and symposia and working meetings were held and systematic acquisition of data on forecasting methods was carried out. In the far Czechoslovakia for instance, forecasting, Burita (2004) argues was the domain of the economic universities and especially of the Institute of Future of the Academy of Science. Hence, several variations of the auto regressive or moving average (ARMA) methods, developed by Box and Jenkins began to emerge by the mid-70s. Complementing these variations were more efficient approaches for modeling and forecasting time series situations/variables. These modifications to our understanding corrected some of the inadequacies inherent in the Box and Jenkins methodology

overcame some of the computational difficulties and aided the easy and smooth interpretation of results which hitherto had been a difficult exercise. It is important to note here that though approaches and methods of forecasting come from many different disciplines, such as economics, mathematics, engineering, psychology and statistics, it has only been over the last 20 years that forecasting has become an identifiable and serious area of study. Most forecasting research observes Armstrong (1985) up through 1979 were primarily based at developing 'new' techniques and demonstrating, often on the basis of one or two examples, their superiority to existing forecasting tools.

However, in the mid 1980's an additional orientation emerged in forecasting research. This approach focused on forecasting as human activity rather than a mere mechanistic exercise and started to study forecasting as a human and social activity. This led to the social science orientation of forecasting of the study of forecasting, especially in public sector as well as in the private sector. At the public sector for instance, macroeconomic forecast argues Hawkins (2006), has long history although a more formalized and robust tools were absent at the early stages. Economic forecasting is a prerequisite for a forward looking macroeconomic policy. Even if fiscal authorities eschew counter-cyclical fiscal policy in favor of adhering to medium term rules, economic forecasting is necessary to frame a budget. According to Hawkins (2006), the ancient Egyptians foretold harvests (a large part of what today we can call their GDP) from the level reached by the Nile in the flood season.. As narrated by Hawkins (2006) in the 17th century, Sir Williams Petty discerned a seven--year business cycle, suggesting a basis for systematic and deliberate economic forecast.

While these developments were taking place, a number of studies were also taking place to find more sophisticated techniques that could be used in making effective and reliable forecast. However, some of the studies pointed out organizational problems frequently do not allow the use of forecast even when such forecast could demonstrate highly accurate performance at the time. They have also established presence of several individual behavior characteristics that could hinder effective use of forecasting, for it was pointed out that management revisions of forecasts were often based on wishful thinking, biased illusions and political influence rather than objective reality. Hence, while accepting that forecasting is a difficult task, forecasters should keep trying to improve the identified forecasting methodology to suit their organizational and economic situations. Analyzing forecast errors can be an important part of this process. The development of forecasting techniques over the past decades indicates that more methods will be developed to take care of the inadequacies of some methods.

2.5 Contributions of Forecasting Techniques to the field of Management

Most forecasting techniques used today are based upon traditional linear or non-linear statistical models such as refreshing analysis, moving averages and exponential smoothing or indexing. Although, these models are useful and have been utilized for many years to predict, the models are somewhat limited in their ability to forecast under certain situations. Given the changing nature of technology and globalization of business and often very rapidly as financial nature of business transactions these days, it is becoming increasingly important to be able to quickly and accurately forecast and predict trends and patterns in data. This can help to maintain competitiveness of the business concern more specifically again, it is becoming increasingly important for forecast techniques today to be able to deduce and identify non-linear relationship while allowing for high levels of noisy data and presence of significant random and chaotic components (Ballard ,2004).

The essence of forecasting is seen very clearly recently (September – October, 2005) in the USA with the ‘hurricane Katrina’, ‘hurricane Rita’ and ‘hurricane Wilma’ incidences. The ability of weather forecasters to provide somewhat reliable trends of the hurricanes in good time perhaps made it easier for the arrival time of each of the hurricanes to be predicted in good time with some level of precision. This has also facilitated the efforts of the authorities of the affected states to take steps in good time and order for evacuation of the citizens to the neighboring towns/cities and to set up rescue operation teams on the arrival of the hurricanes. Business companies

also took advantages of the forecast information to make some anticipatory decisions at least to deal with the situations pending when it is put under control. Even though the United States government lost billions of US Dollars, one can imagine how colossal the loss would have been to both the society and the business companies had there not been adequate information through the process of weather forecasting.

The manner in which forecasts can be of any value to users varies by individual management style, its ability to identify and apply appropriate forecasting tool which best meets/suits its given peculiarities and interests. As such a number of roles can be played by forecasts in a business firm. Wilson and Barry (1994) for instance, classify the uses of forecasting into three (3) headings: Planning, Control and Communication. In Planning, they argue that forecasts identify new needs. They highlight opportunities and threats, establish goals, reveal problems, and clarify issues needing better information, show timing and help to determine lead time questions.

On the other hand, as control mechanism forecasts establish, required performance and timing and clarifying areas needing serious monitoring so that they can be used as communication vehicle. Forecasts are used to sensitize management on specific areas which require prompt attention. Indeed as noted above, it is thus strategically inadequate and perhaps even dangerous for the enterprise only to be responsible to its present environment and situation of performance enterprise must decide whether business or non-profit-oriented needs to plan for the future. This implies that some forecasting exercise must be in place to guide management

decision. Morden (1993) thus suggests three reasons which forecasting is relevant to business in organisations:

- (i) Making forecasts and their eventual review forces managers to think ahead and to be prepared for future. The business firm should know the future consequences of existing commitments and plans that it is implementing. Thus, it should be able to describe or predict some of the most probable scenarios it is likely to face over the next few years or period to come.
- (ii) Since systematic forecasts involve systematic thought and analysis, it is particularly useful in an organisation that has tendency to be “long on action” but “short on thought”.
- (iii) The systematic forecasting may help to unify and coordinate the wider process of business planning. It may provide a useful framework by which the various strands and variables of the planning process can be related and upon which the planning process can be focused.

This position is indeed consistent with the earlier one expressed by above. Yet, it is expedient to add here that for a more practical business purposes, forecasting goes beyond the three areas listed by Morden (1997) above. The essence indeed cut across several others too numerous to be itemized using any classification typology, using variables of interests. Although the results of forecasting can be used for multiplicity of purposes such as setting realistic sales quotas, evaluating sales territories, budgeting sales expenses, allocating production capacities, so that the predicted sales volume is being made available as an when needed, it is only after sales forecast is generated that a production programme can be mapped out. The flow of materials to

the plant and within the plant can be regulated, economic production lot be established lead times brought in line with production requirements and all sorts of inter-related production decisions are made to attain efficient production (Louise 1963).

2.6 Review of Empirical Studies on Business Forecasting

The past decades have witnessed some interesting increase in the range of forecasting methods available and in the number of statisticians, operation researchers and management scientists trained to apply them. These increases in the development of the tools and those to apply them provide the basis for the substantial growth in the systematic and effective application of forecasting methods in the recent decades. The failure of the predicted rapid expansion of management science to materialize in the mid 60's, they observed has demonstrated the importance of developing an effective interface between the management scientist and the user and of developing supporting organizational efforts needed for effective application of the forecasting tools within these organizations.

Makridakis and Wheelwright (1978) also maintained that there are two key areas that are central in organizing and implementing the forecasting within business organisation. The first deals with establishing a forecasting system within a firm. This involves determining the necessary resource gathering them together in a single subunit of the organisation and providing the needed support and direction necessary to work on and deal with forecasting problems effectively. The second area is effectively applying forecasting methods and resources to individual situations. This area include developing

these specific steps for anew forecasting application that will enhance its success.

Dalrymple (1975) and Wheelwright and Clarke (1976) made two important studies in which they attempted to identify and understand the status and success of forecasting in business organisations. The results of these studies were reported in Makridakis and Wheelwright (1978). As a basis for demonstrating dimensions that can be utilized and applied to assess the status of forecasting in organization and to serve as an overview of forecasting in the mid-seventies, these two studies marked the basis for that exposition in forecasting literature.

Dalrymple (1975) designed and administered 500 questionnaires to businessmen in the Midwestern United States. He collected responses from 35% of them. Dalrymple (1975) reported that of the business organisations within his sample, 64% saw sales forecasting within their organisations as important to the success of their firms. 28% saw forecasting as important but not critical and yet 6% saw it as of some value but 2% regarded it as of limited value. This finding supports the view that organizations indeed utilized forecasting and considered it as central in their success. In addition, Dalrymple (1975) further requested to know the composition or proportion of the departments making use of forecast through the companies under study. The results showed an increasing trend in the number of sections/departments using the forecast. Of all the 13 departments considered, all reported an increase in the application of forecasting over a period between 1967 and 1975. (See Makridakis and Wheelwright, 1978).

In the Wheelwright and Clarke (1976) study, the respondent firms were asked to compare their status in forecasting with the status of other business firms in their industry. The findings were that most of the respondents viewed themselves as being ahead of their industry in terms of the methods applied, the management, use of the forecast and the accuracy of the forecasting methods employed. Furthermore, this study pursued the question of company's status in forecasting by examining the acceptance and use of alternative forecasting technique on the respondent companies. The authors also examined eight forecasting methodologies with a view to assessing their level of familiarity and usage in organizations.

Wheelwright and Clarke (1976) thus reported that of eight forecasting methodologies which they sought to evaluate, the jury of executive opinion technique was the most widely applied by those familiar with it and was used on an ongoing basis 89% of those firms who tried it. Regression was the next broadly used methodology. They confirmed that of the firms that had tried it 91% of them were still using it, of those familiar with it, 76% were actually using it. Most of the remaining six techniques surveyed were also commonly used. The only exception they found was in respect of index numbers and Box-Jenkins approaches. The reasons advanced by most firms for dropping these were due to their complexity.

The major weaknesses of these studies is that the population and sample of the study only concentrated within a particular country i.e. U.S.A. and Indian for a more generalized findings, we argue that there is need for a more broad based sampling to include countries other than those where the researches were conducted. This would enhance the universality of the

findings. This would also enhance updating the results with current data since more than 3 decades have now passed after the study.

During the decade of the 1960s and in the early 1970s, regression methods of forecasting became very popular partially because of the impressive record of accuracy. Many of these regression-based models were of econometric type dealing with several variables of several equations (Makridakis and Wheelwright 1978). However, with time passing this popularity is tilted towards univariate models such as the exponential smoothing.

In another study, which seeks to replicate the early study barely after ten years, Dalrymple (1987), using a sample of forecasting and marketing managers mailed questionnaire to 134 respondents (16%) and he found out that most popular techniques were sales force composite and jury of executive opinions. His findings affirmed that industries have strong preference for sales force composite methods. According to him a typical one-month forecast error was 9.5% with a variance of 7.7%. However a typical one year forecast error was 9.9% with a variance of 7.9%.

In a study undertaken by Fildes and Lusk (1984), the researcher found out that Box-Jenkins was the most accurate for short-lead times while trend analysis was ranked first for longer lead times. Similarly Fildes and Lusk (1984) also found out that exponential smoothing was also considered more accurate than the adaptive smoothing which was a modification of exponential smoothing. The major problem of the above study, is that the evaluative criteria adopted in the study were not very much clear. It was

also not clear to us whether computers were employed in generating the forecast from the data utilized.

Similarly Mentzer and Cox (1984) in a related study discovered that majority of the firms contacted under their sample study appeared to use subjective techniques for short range forecasts (less than 3 months). They discovered that jury of executive opinion was favoured across all times and horizons and corporate level of forecasts. They found out that the forecast accuracy generally decreased as forecast level moved down to individual product forecasts. Accuracy decreased significantly as the time horizon increased. They obtained a forecast accuracy of 85% (average) across forecast levels. They pointed out that the ease of use of the method was significant in the method. The major weakness of this study however is that as a qualitative tool of forecasting the methodology adopted by the authors did not say much about precautions against biased data or some managerial influences and manipulations due to their inclinations on the technique. This is in addition to the fact that the study focused largely on the U.S. forecasting managers as its target population and sample.

Furthermore, Wilson and Delbeck (1989) conducted a study on the American Marketing Association members, ranked survey and opinion polling judge as the most important method followed by the jury of executive opinion. However, the major weaknesses, of this study is that it only emphasized the forecast accuracy and did not place appropriate emphasis or interest in the evaluation criteria which was not clearly spelt out. The population and sample for the study only focused on the members of a professional association (marketing) which may or may not be real

practicing managers dealing with day to day forecasting in their organisations. Hence, it would be difficult to use the findings for any meaningful generalizations even at U.S. not to talk of some other countries of the world.

Sparkes and McHugh (1984) conducted yet another study specifically aimed at finding the existing sales forecasting practices. They used for instance as their target ,British cost and management accountants as their sample. With a response rate of 25%, the study identified general lack of awareness of Box-Jenkins models well known to respondents. From responses, it became evident that responses from U.S. and U.K. are similar for all the methods used under the research design except for Bayesian methods where U.K. respondents appeared to be more familiar than their counterparts in the United States. The study also discovered that the more sophisticated the techniques the lower the level of usage. It also established that the executive opinion method was the most widely used by those familiar with it. The study also found that moving average and exponential smoothing techniques have the tendency for high accuracy when applied on short-term forecasts like the executive opinion methods. However, the authors did not find any trend across the entire time-horizon selected for the study. They also reported that these methods were the most easily comprehended and applied by the practitioners.

However, the major weakness of this study lies on the insignificance of its sample size for the purpose of generalization. The respondents as we observed were not in any way practicing managers responsible for forecast

in their organisations rather than being only professionals in forecasting business.

A decade after Mentzer and Cox (1984) published their study; another ten-year retrospective study was undertaken to answer yet another important question: “Have sales forecasting practices changed over the past ten years?” This study by Mentzer and Kahn (1995) utilized a mail survey of 200 forecasting executives was employed to investigate this important question. From their data analysis, the findings revealed that both discrepancies and similarities between today’s sales forecasting practices and those of ten years ago. One particular finding arising from that study indicated greater reliance on and satisfaction with quantitative forecasting techniques that time versus ten years ago. Moreover, this study also indicated that forecasting accuracy has not improved over the past ten years, even though as Mentzer and Kahn (1995) argued that the familiarity and usage of various sophisticated sales forecasting techniques have considerably increased. However, akin to Mentzer and Cox (1984), the majority of the respondents of the Mentzer and Kahn (1995) study identified accuracy (92%) and credibility (92%) as top criteria for assessing and evaluating sales forecasting effectiveness. Majority of the respondents also identified customer service performance (77%), ease of use (75%) and inventory forms as criteria for evaluating sales forecasting effectiveness. Interestingly, respondents in the Mentzer and Kahn study (1995) considered cost (41%) and return on investment (35%) as lesser criteria for evaluating forecasting effectiveness. This finding reveals that forecasting techniques are not often evaluated on the basis of financial measures. Our present study supports this position. This is because, it is not

the financial outlay committed to forecasting exercise that necessarily provides and yields accurate forecast figures.

With regards to the issue of familiarity, forecasting executives are reported in Mentzer and Kahn (1995) to be more familiar with quantitative techniques than ten years ago. Practitioners are, in particular, more familiar with techniques of exponential smoothing. Practitioners also appeared to be less familiar with the qualitative technique of jury of executive opinion than they were ten years ago. This revelation is especially critical in the light of other studies, reviewed earlier which tended to indicate higher familiarity with the jury of executive opinion technique. (Dalrymple, 1987; Wilson and Daubeck, 1989). Moreover, it was evident from the findings that forecasting executives were more satisfied with exponential smoothing, indicating that exponential smoothing was a more successful technique than it was ten years ago. Conversely, respondents in the Mentzer and Kahn (1995) study appeared to be less satisfied with the jury of executive opinion, suggesting that it was a less successful technique. While this would suggest a positive relationship between familiarity and satisfaction, this was not always the case.

As for usage the respondents in the Mentzer and Kahn (1995) study appeared to be concentrating on sales in a 3-month to 2-year time horizon. This finding in our opinion is in contrast to the earlier findings of Mentzer and Cox (1984) where respondents were generally likely to use techniques across all time horizons. The most popular (i.e greatest degree of usage) forecasting technique was exponential smoothing applied in a 3-month to a 2-year time horizon. The study also found that within this same time

horizon majority of the respondents also applied jury of executive opinion, customer expectations, regression and trend line analysis. Interestingly, jury of executive opinion was shown to be a popular technique in this time horizon, as it was in the Sparkes and McHugh (1984) study earlier reported. However, the jury of executive opinion reflected less satisfaction than each of the other popular techniques cited above.

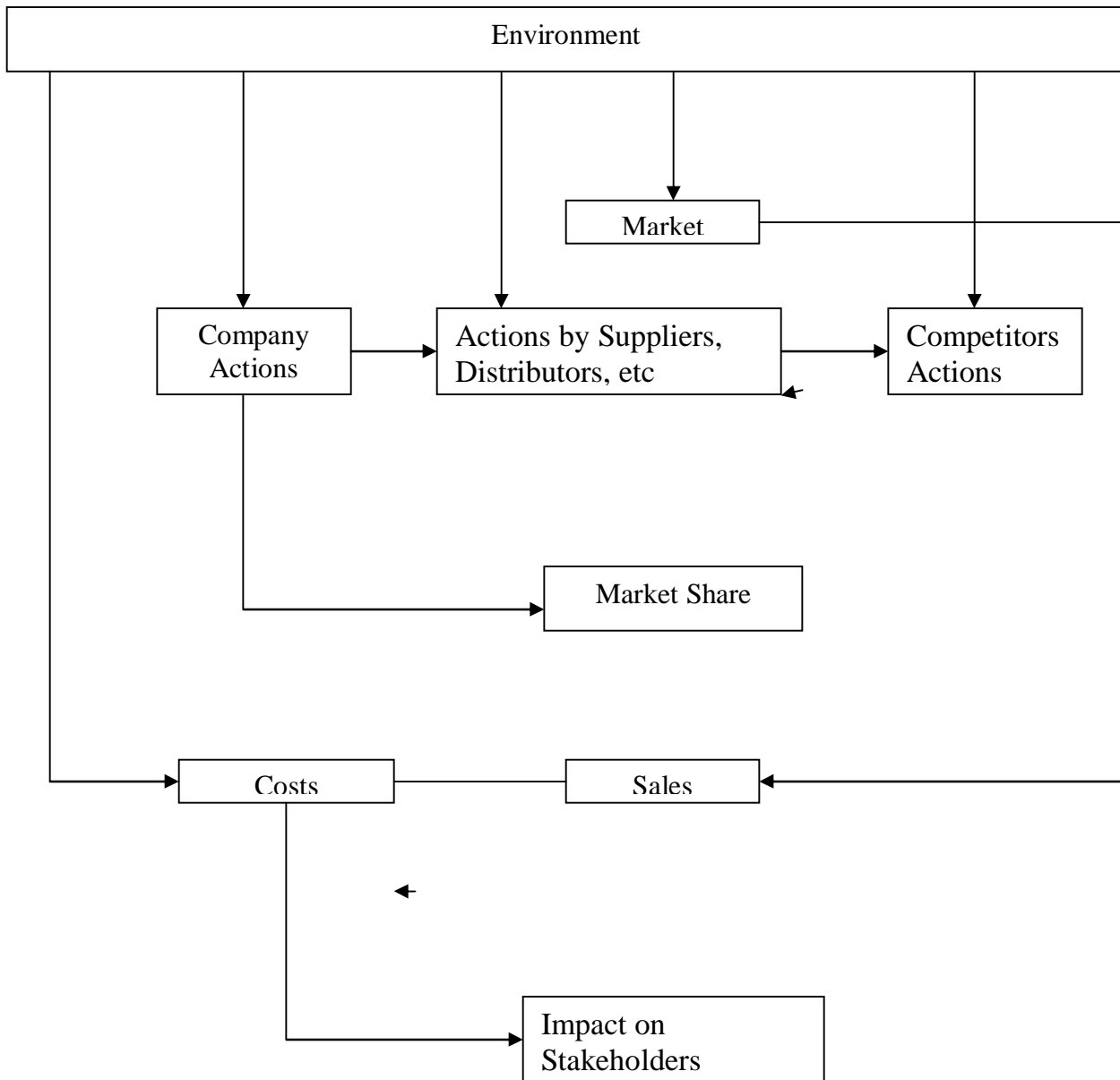
However, the major criticism against this study is that its sampled population was ambiguous. Throughout its research design; no specific mention was made in terms of the criteria adopted for its sampling and how the 207 questionnaires were distributed and on what basis. For example, it was not clear whether the whole was administered in U.S.A., or to some other countries or using which sampling procedures. However, despite this weakness, the study provided a new baseline for sales forecasting practices. It has also opened room for academics as well as practitioners to utilize its findings as benchmark for current and future forecasting practices. It also made a strong case for future research aimed at assessing sales forecast to give special consideration to the four areas it addressed i.e. technique familiarity, technique satisfaction, technique usage and technique application.

However, whichever of these issues was chosen and considered relevant for further studies, a very prominent question such as what is the appropriate framework for marketing/business forecasting may be raised. For example which factors must a forecaster pay attention to or consider when forecasting for marketing decision making ? Armstrong et al (1987) developed a model establishing this framework and he used a diagram to explain the

relationship. According to them, ten (10) questions must be raised and analysed in the light of any forecasting methodology to be put in place by any business organisation. These questions are:

- a) What forecasts are needed (e.g. sales, market share, competitive reactions, marketing costs)?
- b) What situations exist (e.g. stage of the product lifecycle, state of the economy, degree of regulation in the industry)?
- c) What forecast horizon is appropriate (e.g. current status, short-, medium- or long-range)?
- d) What data are relevant and available?
- e) With what frequency must the forecast be prepared?
- f) Who will prepare the forecast and how much time and resources will be committed to the task?
- g) Who will use the forecast and in what manner?
- h) What process is to be used (e.g. how are the data to be gathered and analyzed and how is the forecast to be presented)?
- i) When is the forecast needed?
- j) What uncertainty measures are needed?

Certainly, there are other relevant factors, but these serve to illustrate the complexity involved. From the list above thousands of different circumstances could be implied. Armstrong et al (1987) argued that where one attempt to examine a judgemental forecast of the long-range expected market sales for a new product with few data, where the intent is to assess the effect on stockholders, one might then consider various forecasting methods. The Armstrong et al (1987) model could be presented as follows:



SOURCE: Armstrong et al (1987)

Organization should thus have a system for scanning the environment to be sure that they do not overlook variables that may have large impact on their market. Periodic brainstorming with a heterogeneous group of experts should be efficient to identify which variables to track, so that important variables among these are identified and the directions of their effects are assessed. Once these parameters are identified, some crude estimates of their coefficients are necessary in order to obtain useful forecasts. The model also

implied that, for a reasonable and meaningful forecast these careful estimates or assessment of the variables must extend to cover areas such as company actions, marketing mix), competitors actions, (marketing mix) action by suppliers, distributors and the cost implication of the various scenarios to business organization.

Competitors may alter their actions in response to changes in the environment, action by other firms or dissatisfaction with their own past performance. To what degree is it possible to forecast the actions of competitors? The development of a successful marketing strategy often depends upon having a good forecast of the actions and reactions of competitions. Armstrong et al (1987) also found evidence that varieties of techniques can be used to forecast competitive actions. These include expert opinion, extrapolation (statistical analysis of analogous situations), intentions (ask competitor) experimentation, game theory and role playing (formal acting out of the interaction involved). However, one weakness of this classification is the fact that little evidence exists on the predictive ability or validity of the methods listed in above.

In order to develop a successful marketing strategy, it is also often important to forecast the reactions of the suppliers, distributors and to even government. Occasionally, one might even need to forecast the actions of other interest groups, such as concerned minorities. A range of techniques similar to those for forecasting competitors actions appears useful. In an attempt to forecast decisions by supermarkets, Montgomery (1975) developed a model of a supermarket buying committee. He utilized it in developing predictions about the shelving of a new product. This model, as

noted by Wellman (1986) was based on information such as advertising for the product, reputation of the supplier margin product novelty and retail prices provided reasonable prediction for a hold out sample.

However, in Armstrong (1987) study, role playing was used to forecast relations between suppliers and distributors. However, for this model to be effective, it requires secrecy on the part of the actors so that the control group should not realize that its actions are being studied. Moreover, the Armstrong et al (1987) model also implies that if an organization wishes to approach sales forecasting problems, it is necessary only to multiply the industry sales and the market share forecasts to calculate a company's sales forecast. Usually, however, attempts were made to forecast sales directly. One interesting question then could be: under what conditions is it useful to go through all of the steps as outlined in the Armstrong et al (1987) framework? [Naert and Leeflang 1978]. Similarly, Dalrymple's (1987) survey shows that this direct approach to sales forecasting is widely used. The direct approach also appears to be most appropriate especially in the short-range sales forecasting especially in situations where one is not concerned about assessing the effects of alternative strategies.

In view of the foregoing, it is evident that significant gains have been made in forecasting for business in the past quarter century. Some progress has also been made in the development of qualitative methods such as Delphi role playing, intentions and opinion surveys. Serious progress has also been made in the area of quantitative methods such as extrapolation and econometrics, as well as in the recently developed Artificial Neural Network approach.

Another important area in which forecasting has generated empirical results is the forecasting of stock prices in the stock exchange markets as well as market values of such stocks. One of the latest techniques employed in this regard is the artificial neural network model (ANN). Garcia (2004) has made an exposition for the application of Artificial Neural Networks (ANN) in business areas. ANN are computer-based, software systems designed for the purpose of inferring relevant data based on observation data for the purpose of sound predictions. His study sought to address amongst other things, what are the most significant applications of ANN in today's business environment? Citing earlier study by Walkzak and Cerpa (1999), he demonstrated that the applications of ANN exist in financial, manufacturing, marketing, telecommunication, biomedical and other domains. The study by Garcia (2004) however did not reveal the basic assumptions under which the predictions were conducted as well as anticipated obstacles and limitations which our study believes are very critical in determining the efficiency of any given forecasting model.

In an earlier study, Wong et al (1995) identified one hundred and fourteen (114) different applications of ANN in six different business functions between 1988 and 1994. They argued that with so many different applications, management might reasonably conclude that ANN technology might provide essential comparative advantages over forecasting softwares. Their study however, did not foresee and make provisions for possible limitations arising there from owing to the size of the data for learning the data patterns or that they may perform inconsistently and unpredictable because of complex financial data to be used as input.

ANN has also been used in stock market prediction during the last decade. One of the first projects as reported by Kimoto et al (1999) who had used ANN for the prediction of Tokyo stock exchange index with some substantial accuracy index. Mizuno (1998) also applied ANN again to Tokyo Stock Exchange to predict buying and selling signals with an overall prediction rate of 63%. Sexton et al (1998) concluded in 1998 that the use of momentum and state of learning at random points occurs in training process. Phua et al (2002) also applied neural network with genetic algorithm to stock exchange market of Singapore and used it to predict the market direction with an accuracy of 81%. Egeli et al (2003) also applied the ANN for the forecast of Istanbul Stock Exchange (ISE) market Index values and concluded that the prediction models based on ANN were more accurate than the ones based on moving average methods or econometric methods.

In a related study, Sabo (2002) also sought to test the applicability of exponential technique in forecasting business performance in Nigeria. Using secondary data from the sampled commercial banks, the study computed the unadjusted forecast for the remaining periods as well as measures for the forecast accuracy. The study established the applicability of the technique with some reasonable measures of accuracy (0.25). The study also cautioned against lack of commitment to stabilization of economic environment by the monetary and fiscal agencies, arbitrary and unhealthy income smoothing and laxity on enforcing relevant laws necessary in checking other unethical practices by banks that have to do with their profits earnings and even general performance.

The major weakness of this study lies in its definition of business performance. The choice of earnings before interest and tax as a measure of performance could not be all embracing. There could be several other indices of performance, which could have been recognized by the study and utilized appropriately for a more robust and reliable results. The conclusion and findings of this study are similar to those of Granger (1999) and Gardner (1985) at their various case studies.

Another interesting and related study conducted by Sunday (2005) sought to determine the extent to which Nigerian banks use forecasting models in their human resources planning. Sunday (2005), also sought to compare the effectiveness of statistics based models in manpower forecasting in relation to the non-statistically based models. Sunday (2005) citing earlier works of Bechet (1994) and that of Parker and Caine (1996) argued that despite fundamental changes in business processes and environment over the last few decades human resources forecasting models have not changed significantly. Similarly, the basic assumptions of the techniques have not changed so also their methodology. Citing other studies Blaug (1970), Ahmad and Blaug (1973), conducted on Canada, USA, UK, France, India, Sweden and Thailand, which sought to evaluate ten manpower-forecasting models. Sunday (2005) notes that the major criticisms from which the models suffered include the fact that:

- Considerable forecast errors were associated with projections of employment using the dominant model of manpower forecasting.
- The forecasting errors were larger the longer the time horizon of the forecast

- No empirical evidence was found linking manpower forecast to any organised and policy decisions
- In some cases, manpower forecast, give support to what would turn out to be a wrong decision. Hence, the argument that forecasting improves organizational policy should be approached with a lot of caution. In addition to these Sunday (2005) also identified some drawbacks in the current flow oriented forecasting models. These include the fact that:
 - i) the models are heavily dependable on historical data which may not be applicable in a changing world;
 - ii) the organisations lacked data on transition rates when new functions appear in the organizational structure
 - iii) shortage of professional planners required to identify and analyse currently, the manpower needs
 - iv) unstable manpower environment and
 - v) lack of or inadequate executive capacity needed for the proper implementation of organizational plans devoid of favoritism and biasedness.

The study also established that Corporate Human Resource Planning (CHRP) of any typical organisation is dependent on certain factors. There should be a clear knowledge of what corporate plans and objectives as well as a clear knowledge of corporate plans and objectives. Another crucial factor is the need to have adequate information the manpower environment. In order to specifically conduct forecast of manpower planning certain factor must be carefully understood and analysed. These are economics factors, the labour market, government legislations, regulations and practices,

technological innovations. On the extent of usage of forecasting tool, most of the respondents 45.60% strongly agreed that was needed for a formal forecasting in planning; 32% agreed and 4.41% strongly disagreed. It was also evident from these findings that 45.59% use forecasting techniques, while 54.41% do not appear to use any form of forecasting. Similarly, on the preferred methods of forecasting, manpower, 33.82% preferred statistical methods, 36.76% non-statistical method, while 29.41% preferred both methods of forecasting. It was also found out that larger firms (in staff strength terms) have preference for statistical methods than smaller firms. However, one of the implications of Sunday (2005)'s study is that most manpower planners are not using forecasting techniques in addressing their problems.

The study by Sunday (2005) above has indeed made some useful contributions to the area of manpower forecasting and business forecasting generally in Nigeria. However, one of the shortcomings of this study is that it did not obtain and present the actual data it needed from its case studies for the application of non-statistical (rule of thumb) and statistical model (Key Privation Model) as it promised to do in its research methodology. Rather than comparing the models based on the collected data on case study, it concentrated largely on the responses from the questionnaire administered which were largely self-opinionated. For any model to be tested for effectiveness, accuracy, its model specification and data requirements must be satisfied. Without appropriate data applied into the models, no meaningful finding can be obtained.

Pappalardo and Serafini (2004) compared linear and non-linear models and sought to establish their relative forecast accuracy in terms of inflation forecast. By replicating the study of Granger and Terasvista (1993), who earlier on argued in favour of linear models, they established the value added of linear over non-linear models in inflation forecast for the European Union economy. However, Stock and Watson (1999) proposed a comparison for a large set of variables for the United States of America instead. Pappalardo and Serafini (2004) suggested for the assigning of equal and constant weights to each of the forecast in such a way as to minimize the sum of squared errors, although they are quick to caution that this may prove inadequate, especially where changes in policy regimes may induce structural changes in the pattern of forecast errors of the different models. The possible usefulness of time-varying combinations weights has long been recognized in the forecast combinations literature. Following the line of Stock and Watson (1999) in his, Marcellino (2002) used about 500 macroeconomic variables to develop the same results for the Euro markets under study.

Janet et al (2004) sought to compare the ANN approach to log-linear regression model for predicting private residential property prices in Hong Kong using aggregate variables such as real housing prices, real income, interest rate, demographic variables and. Their results show that log-linear regression approach has less standard error in forecasting although the ANN has an advantage in its ability to map complicated non-linear relationships between variables in addition to its reasonable good predictive power.

Shuqin (2002) compared three models used in forecasting enrolment into community schools of California and attempted to examine their forecast accuracy. The models are regression, auto regression and tree component models. They applied them to six community-based colleges. The three models were compared using MAPE. Their results shows that the regression and autoregressive methods worked very well and the tree component model worked very well for each of the six colleges. They concluded that a complex model may not necessarily be a better model.

Robb and Silver (2002) used composite moving average to forecast sales in respect of New Zealand -based steel distributor. They found that Combining Moving Average is a simple and practical means to improving sales forecasting. They developed a natural extension whereby combinations of all possible moving averages up to a given number of periods are employed. The study also evaluated the methods performance relative to other methods such as simple moving averages and exponentially weighted moving averages on two industrial data sets.

Pratt (2004) also utilized a combination of multiple regression models to forecast U.S. presidential elections. He utilized factors such as presidential popularity just before election, incumbency factor, economy to develop some acts of sample forecast of United States Presidential elections from 1948-1992, using three models:

i. ***The economy-popularity model***

Using GNP and popularity as independent variables to forecast the elections with $R^2=0.85$, MAE= 2.01 n=12.

ii. ***Out-of-Sample Forecasts:*** using the predicted and actual popular votes to establish the accuracy in eight out of 12 elections during the study period.

iii. ***Multivariate forecasting models:*** This used the factors such as presidential approvals, GDP growth, incumbency, income gravity, leading indicators. to develop their forecast with average accuracy of 0.83%.

Zeng and Swanson (1998) conducted a predictive evaluation of econometric forecasting models used in commodity future markets of U.S.A. The authors compared the predictive accuracy of various econometric models including random walks, vector autoregressive and vector error correlation models using daily future prices of 4 commodities. Results show that error-correction models perform better in shorter horizons.

Forbes et al (2005) establishment that exponential smoothing techniques are widely used for forecasting demand in supply chain management; profits and sales .Their relative simplicity and robustness together with their reliance on the stylized facts of time series analysis mean that they are also well suited for automated approaches to forecasting. Their central place in time series analysis has been reinforced by repetitive successes against more sophisticated approaches in a succession of forecasting competition. Under exponential smoothing techniques the forecast is equal to the old one plus some proportion of the past forecasting errors.

The central place of exponential smoothing technique as Forbes et al (2005) observed has been reinforced by repeated successes against more sophisticated approaches in succession of forecasting competitions. Yet, the emphasis on traditional implementations of exponential smoothing has normally been on getting good forecasts. Accurate measures of uncertainty can be very important. Safety stocks in inventory control, for example held to meet above normal levels of demand for instance should be based on reliable measures of uncertainty. The lack of statistical framework has hampered progress in this direction (Forbes, et al 2005). They cited similar studies complementing their study such as those of Lewandowski (1962), Anderson (1982) and Simmons (1993).

Similarly, the results of Shuqin (2002) revealed that a complex forecasting method may not yield more accurate projection numbers. This is consistent with position of Kantowitz et al (1991) who indicated that, if two theories have the same number of concepts, then the one that can explain more results is a better theory. If two theories can explain the same number of results, then one with fewer explanatory concepts is to be preferred. In the same vein Shuqin (2002) argued logically that the criterion adopted by Kantowitz et al (1991) could be borrowed in selecting forecasting model. They write: “If two models are of the same complexity, the one with the better accuracy should be used. If two models explain the same accuracy the simpler model should be selected.”

The challenge now is to build up an experience and familiarity in applying these models and techniques developed over time in solving practical problems facing the organizations. By so doing, they can be able to select

the ones that suit their peculiarities and databases. This will facilitate some reliable and reasonable generalizations about various variables of interest being forecast by business. It can also be possible for all business to filter out and identify which methods can be most appropriate under which circumstances. Organizations can also determine what are the techniques expected degree of accuracy and predictive ability. More empirical are therefore needed in the area of business forecasting by organizations to be able to achieve this.

2.7 Forecasting and Planning

Although there is no generally accepted definition of planning (Steiner 1969), most writers tend to agree that the concept deals with some form of decision-making involving the future. Ducker (1959) refers to planning as “the conscious recognition of the futurity of present decisions”. Ackoff (1970) talks about planning as “a task that is performed in advance of taking actions”. It is clear from these definitions that forecasting is closely related to planning owing to their futuristic orientation.

As observed by Christelis (1998), the art or science of forecasting has obsessed mankind for some years. The legendary Sun Tzu noted that importance of “free knowledge”. In his manifesto on warfare written in the 4th century BC and aptly titled :*The Art of War*. Business planning is, by its very nature, concerned with the future. Forecasting is essential to all business planning. Forecasting and planning therefore are interrelated and the former is a subset of the latter. Business planning therefore can entail some forecasting. Since planning is concerned with the future, we often wish

to obtain some information about the future, so that we can prepare appropriately. We also try to anticipate what the state of affairs in one community will be in the future under certain assumptions and accordingly we try to intervene if we do not like what we see, or think that we can do better. It is also evident that greater knowledge of the future will lead to better plans today.

Researchers as noted by Icon (2005) clearly demonstrate that to succeed in business, companies must extend operational views of historical statistics to cross functional processes that incorporate forward-looking data from all participants throughout the enterprise from sales and marketing to finance and operations. In other words, the entire planning processes of the organization must be fully harmonized. In such a way that facilitates linkages and feedbacks within the overall business plan for it to succeed. Supporting this view, like this study does, Mentzer (1998) posits that the key to overcoming the planning challenges faced by manufacturing companies today is to consolidate departmental information and thereby create a common set of assumptions and shared processes and plans to improve business performance.

This process is what Icon (2005) called collaborative demand forecasting and planning which enables all the stakeholders to make their contributions to the success of business plans. An organisation plans for the long term using a strategic plan normally covering the vision and goals for the organisation usually for the next five years. To plan for the short to medium term the business typically uses a business plan identifying what the organisation must do now in order to achieve its strategic plan. To put the

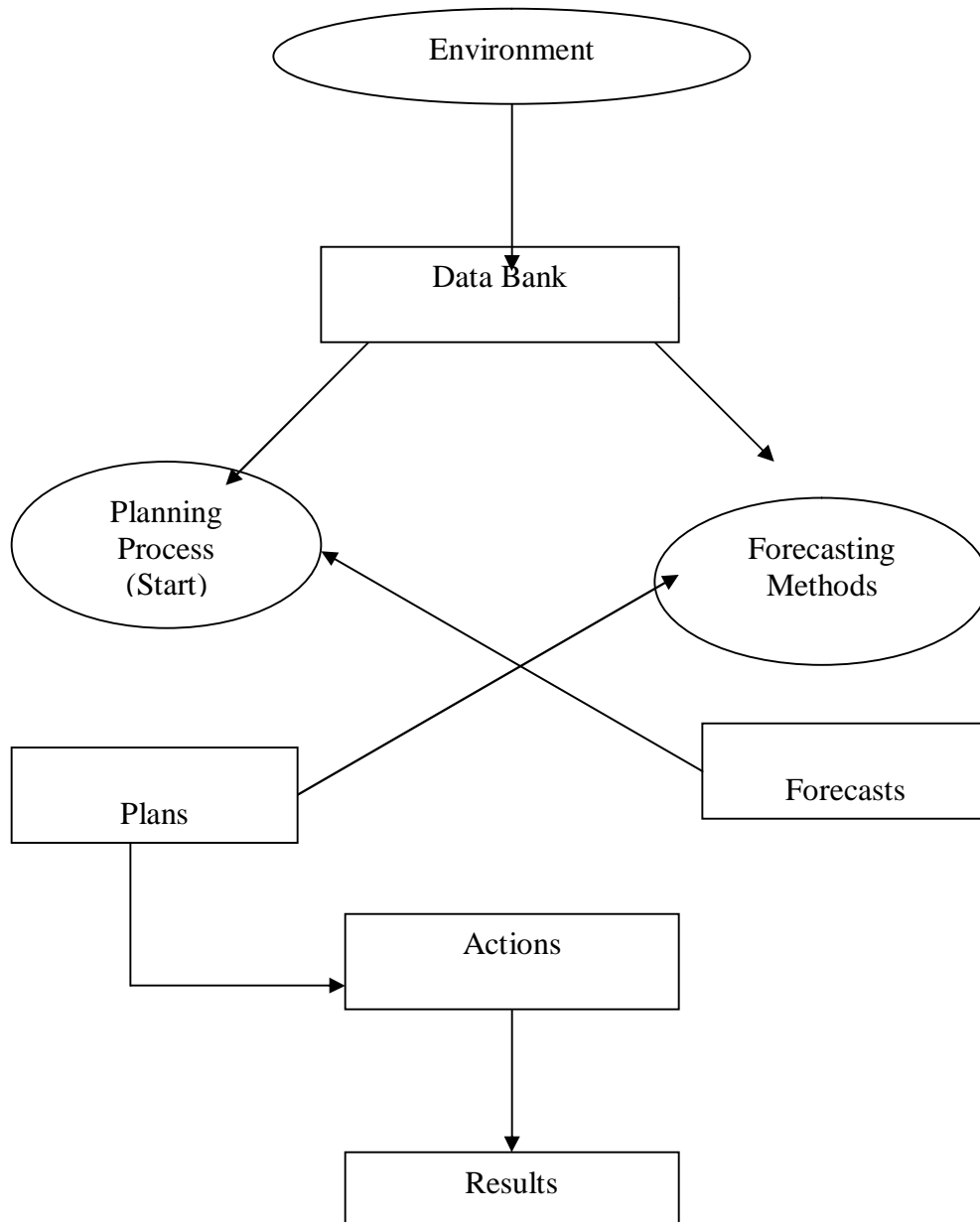
business plan into practice, the organisation must consider appropriate planning procedures. These would include identifying what tasks need to be completed, by whom, when and the necessary controls (including budgets) to ensure that anticipated results are achieved.

As remarked by Armstrong (1983) individuals and organisations have operated for hundreds of years by planning and forecasting in an intuitive manner. It was not until 1950s, that formal approaches became popular. Since then, such approaches according to Armstrong (1983) have been used by business, governments and nonprofit organizations. Advocates of formal approaches (for example Steiner (1969) claim that an organization can try to improve its effectiveness if it can forecast its environment, anticipate problems and develop appropriate plans to respond. Also, understanding its market environment can increase the importance of an reliance upon accurate demand forecasts as they can have significant impact on product availability, inventory costs and company profitability.

However, formal planning and forecasting are expensive activities; this raises question about their superiority over informal planning and forecasting. Furthermore, critics of formal planning approach claim that it introduces rigidity and hampers creativity. These critics include many observers with practical experience such as Wrapp (1967) and his colleagues. In order to demonstrate how planning and forecasting interact with one another for a houseful business we shall adopt the framework for formal planning and forecasting earlier on adopted by Armstrong (1983) which enabled him to establish proper linkages and interactions between

formal planning(strategic) and forecasting. The framework can be stated in the following figure:

Figure 2.1 Framework for Formal Planning and Forecasting



Source: Armstrong (1983)

The diagram above provides a framework for conceptualizing strategic planning within a company. It can also explain the interaction between forecasting and planning in a typical business firm. A scanning of the environment yields relevant for the 'data bank'. This data bank or information system would contain such things as government regulations, demographic indicators, industry sales, resources of the company and of its competitors and information on available technologies for production. The organisation or business must require relevant/vital information and data on these and other factors to be utilized for the purpose of effective planning and forecasting.

The left hand side of the figure examines planning. Here too, a number of planning processes can be used and are involved. The planning processes draw information from data bank (evidence on current situation) and also upon the forecasts evidence on what will happen in the future. The two-way arrow from data bank to planning processes indicates that the planning processes to a large extent dictate what information is required. The planning process produces set of plans. These then describe the objectives and alternative strategies, from which the most appropriate are selected.

The right hand side examines forecasting. According to the framework, to make a forecast for the company, it is necessary to have information about the company's proposed strategy (thus the arrow from 'plans' to 'forecasting methods'. An examination of the forecasting methods will then determine what data are required (thus the two way arrow from 'data bank' to 'forecasting methods' (Armstrong 1983). Using any of the adopted forecasting, methods a forecast can then be generated. Having done this,

most important questions that arise include: What will happen if the business firm attempts say strategy A and environment X occurs? How likely is environment X? How much confidence can we have in the forecast already generated? These forecasts are then used as inputs to planning process.

At this point, it is appropriate that we realize the distinction between forecasting and planning. We have seen from the foregoing that planning provides the strategies, given certain forecasts whereas forecasting estimates the results given certain plan. Planning relates to what a firm should do and forecasting relates to what will happen if the firm tries to implement a given strategy in a possible environment [Armstrong (1983), Robley Jr. (1980)]. Forecasting thus helps to determine the likelihood of the possible environment.

2.7.1 Situations Favoring the Use of Strategic Business Planning

As argued by Wood (1980) and Tolchinsky and King (1980) business planning is most helpful in situations that involve more complexity. Business planning is also expected to be very useful for organizations facing major strategic decision as these generally involve high task complexity, change, uncertainty, and inefficient markets. These characteristics are summarized below:

1. High complexity of the task means that there is a greater need for explicit plans to ensure that the various bits and pieces fit together. The production and marketing of an automobile, for example, is a complex task.
2. Large changes create a need for business planning because organizations are designed to deal primarily with repetitive situations. The changes could come from the environment (an economic recession), from competitors (foreign competition in automobiles), or from the firm itself (a decision to introduce a new line of automobiles). For large changes the standard bureaucratic responses would be less useful. Large changes call for business planning rather than merely reacting.
3. Uncertainty can lead to a waste of resources. Organizations must be prepared to meet different environments. Business planning can address “what if” questions so that the firm can develop ways to respond. As uncertainty increases, the need for business planning also increases. Inefficient markets call for business planning because the price system does not dictate the organization’s actions. The organization has much flexibility in how it acts. Thus, business

planning is expected to be more relevant to government organizations, non-profit organizations, regulated sectors and protected industries. Managers in competitive markets may feel that business planning is more important as competition increases. This is because poor business planning could lead to the failure of the company.

However, failure is a natural event in competitive markets. An efficient market would inform stakeholders and would help to ensure that their needs are met, no matter what an individual company does. If they plan poorly, another company will replace them. Business planning is expected to be most relevant when all four of these conditions hold. One industry that has been moving toward the above four conditions is banking. According to Wood (1980), change and uncertainty have increased in this industry during the 1970s. During this period, the use of formal strategic business planning increased from 6 percent of the banks prior to 1970 to 80 percent by the end of 1977.

From the foregoing discussion, it is clear that no matter what definition is accepted for business planning, it is clear that it concerns itself with future events. The same can be said for forecasting, which is aimed at providing predictions about the state of events in such a way that the planning process can be performed more accurately. Forecasting is of greatest use when its results can be used to take advantage of future opportunities while avoiding future threats. Mere recognition of a forthcoming event is not an end in itself or particularly valuable unless plans and actions are adapted to cope with the forecasting events so predicted. Planning can thus be performed under conditions of uncertainty, certainty or ignorance about the future. It is

in these situations involving uncertainty that forecasting provides the maximum help to planners. When certainty exists forecasting may not require much effort since predictions on future are trivial. When there is ignorance, the most that forecasting provides is clues about the future possibilities. However, even such clues cannot be provided unless some information is available on which to forecast and plan (Makridakis and Wheelwright, 1978).

2.8 Forecasting Bank Profit

Before we can discuss issues in forecasting bank profit, it would be useful to consider some definitional and theoretical issues on profit from various perspectives. This would help the study, clearly shade light on the subject matter, so that we could appreciate the essence of profit, which is the subject matter of this study.

As noted by Lipsey (1985) profits are unmistakably a potent force in life and death of all business firms. The residence of profit maximization theory and its ability to predict how the economy as a whole will react to some major changes such as the dramatic changes in oil prices and interest rates suggests that firms are at least strongly motivated by the pursuit of profits and that, other things being equal ,firms prefer more profits to less profits. If profit-maximizing theory should eventually give way to some more organizationally dominated theory the new theory will still be a profit-oriented theory. This implies then that the continuing search for profits and consistent attempt at avoiding losses is a powerful force that derives the economy even when firms do not turn out to be continual profit maximisers.

A bank management for instance which seeks to do other things than profit maximizing may be criticized on many grounds. Major restraints on the existing management are the threats of shareholders revolt or a takeover bid. This is because the maximum amount one can afford to pay or invest in any asset depends on how much or what it is expected to earn.

From the financial point of view profit is simply the positive difference that results from selling products and or services for more than the cost of producing these goods. In business usage, as explained by Brandes (1997) profit represents the excess of total revenue over total cost during a specific period. In economics, profit is the excess over the returns to capital, land and labour. Since these resources are usually measured by their opportunity costs. Economic profit can thus be negative. Similarly economic theorists generally make a distinction between two types of profits; normal profit in which the entrepreneur receives the minimum necessary amount to encourage him to open or stay in a particular business; and excess profits that which exceeds normal profit. On the other hand, the accounting profit sometimes includes an element in recognition of the risks that an investor takes. It is often uncertain because of incomplete information, whether an enterprise will succeed or not. In these cases economists treat returns to risk as part of the accounting profit, as it is also an element of the cost of capital. As noted by We (1988) economic profit does not occur in perfect competition at least not in the long run. Once risk is accounted for, he argues, long-lasting economic profit is thus viewed as an inefficiency caused by monopolies or some form of market failure. Thus, we can have economic profit such as supernormal profit (Supra-) and accounting profit (normal

profit). Some economists define further types of profit viz: abnormal (or supernormal profit), subnormal profit and monopoly profit (super profit).

There are however, commentators who see benefit in making adjustments to economic profit such as eliminating the effect of amortized goodwill or capitalizing to show its value over multiple accounting periods. It is important at this point to note that profit theorizing can hardly be said to have begun before Adam Smith's 'Wealth of Nations'. In deed, profit was only beginning to be recognized as a separate income category. Scanty attention had been given to paid income distribution in general and this was concerned with rent and interest. That is to say that only normal for the profit income is connected with modern capitalist business firms, which were still in their infancy even in the 18th century.

Following the Adam Smith era, was the Ricardian era. During this era though no consistent, coherent and complete theory of the origin of profit had emerged, a beginning had been made. The understanding of profit then as a distinct income is clear in Smith and characterizes subsequent economic analysis. Beginnings are made along several lines that find further expression in the neoclassical era, in particular the search for a "profit factor" has begun with attempt to distribute profit to abstinence. Likewise, Obrinsky (1983) contends further that the view of profit as a kind of wage is echoed in later views of profit as the reward for a kind of entrepreneurial labour, effort or risk.

Closely related to the above postulations is the work of post- Keynesian profit theorists, which sought to bring the issue of risk and uncertainty into profit definition and identification. Although Keynes's concentration on effective demand phenomena and short period of analysis tends to obscure the significance of the new perspective for profit theory, his emphasis on imperfect expectation in a world of uncertainty and risk occurring in real time, is more than just suggestive. Thus, the post- Keynesian profit theory takes off from here. The recognition of uncertainty & risk undermines the traditional concept of equilibrium.

This takes us to another important contribution in profit theory, the value theory of profit of Marx. This theory as observed by Kliman and Andrew (2001), explains that interpretations of Marx's value theory which value inputs and outputs simultaneously implies that surplus labour is not the sole source of profit even in the absence of joint production. They argued that contrary results such as the Fundamental Marxian Theorem (FMT) rely essentially on restrictive and implausible conditions that are shown to be unnecessary for reproduction in contrast they hold, the temporal single system interpretation confirms to the exploitation theory of profit under completely general conditions. Hence, despite their differences, all interpretations of Marx's value theory agree that it identifies the exploitation of workers i.e. the extraction of surplus labour, as the sole source of profit. As Kliman and Andrew (2001) observed, proponents of the various interpretations, all claims to have replicated this feature of his value theory. Yet, mathematics of their systems often tells a different story. In the standard interpretation of Marx's value theory, distinct price and value, systems exist and the inputs and outputs in each are valued simultaneously.

Another important attribute of this interpretation is that it construes wages in the price system as the price of the wage goods workers receive and wages in the value system as the value of these goods.

Yet, some versions of the FMT hold only if all producers profit rates are equal in every period. This is very particular case, if profit rates are only approximately equal or only equalized over span of time longer than one period these versions of FMT would not hold the interpretations in question also imply that when the price of the net product happens to be positive, positive profit and positive surplus labour will co-exist. The relevant issue however is not about their coexistence but about why they coexist the way they do.

The cost volume profit analysis model provides a very useful planning tool, which is extremely useful in forecasting sales, and profit levels of a given business concern given a certain cost structure (Basu and Conrad, 1994). The traditional CVP analysis has been applied largely to manufacturing concerns which have a tangible product base. However, as Basu and Conrad (1994) demonstrated, the concept itself is applicable to service enterprises such as banking, insurance and other financial service industries. Banking is an industry, which does not provide a tangible product but rather a financial service. By preserving some of the important underlying assumptions of CVP. Basu and Conrad (1994) demonstrated that the use of CVP in predicting sales and profit has value not only in the manufacturing sector, but also for those entities. Such as banks which operate in the financial service sector. They also contend that the idea of strategic planning in a bank would be well served by using the concept of breakeven should be

embraced by bank planners. However, the major obstacle to the application of the model is that it relies so much on a number of assumptions, which may be very difficult to satisfy. Despite the obstacles the authors have succeeded in rekindling a very important finance tool – CVP. It has also re-echoed the importance of profit planning in a banking environment.

Profit forecasting in commercial banks in Nigeria like their counterparts abroad consider a number of factors. These factors are taken into consideration as affecting the profits of the banks and as a result profit forecast in the banks draws largely from the quantum of information available on these parameters. A number of studies sought to identify these important parameters or factors as central in determining the forecast value of the bank profit. Fatokun (2004) for instance identified a number of factors which include; competition in the banking industry, fortunes of the bank (uncertainty and risk), political Instability, frequent changes in government policy e.g., preference for a specified sector, dividend and investment decisions made by the banks. Others include interpretation of dividend and investment decisions of banks by the stock market, Monetary policy guidelines issued by the Central Bank of Nigeria, Volatility of the foreign exchange market (FEM), Interest rate regime and General economic conditions. He argued that variation in these factors will always have its attendant consequence on the earning capacity of the banks and their overall performance.

In another related study, Wanger (2005) also identified some factors as really affecting the performance or the profitability of the Nigerian banks. According to her these factors include: Irregularity in the liquidity ratio with the central bank, absence of favorable economic/business social

environment; irregularity in the organization of seminars, symposium and other on-the-job enlightenment workshops aimed at enhancing professionalism and performance improvement. Other factors include lack of well-defined and communicated policy framework as well as inadequate span control, Inconsistent and unstable government policy on bank regulation and supervision, the effects of inflationary/deflationary trend in the economy, and the effects of risk and uncertainty in the industry with high prevalence of information asymmetry. Other important yardsticks affecting the bank profits include quality of assets from total assets, proportion of performing assets, volume of operation, volume of performing loans, changes in the interest rate regimes/policies.

One important area that has direct bearing on the profit forecasting exercise is profit efficiency. It attracted a number of studies in recent years. Profit efficiency is an econometric financial performance measure of how well actual profitability compares to a best-practice frontier. McNulty (2003) for instance compared the profit efficiency of small (under \$100 million in total assets), medium, and large (over \$1 billion) commercial banks for the period 1995 to 2001 and examined the sources of profit efficiency for each. He also considered whether banks of different sizes attain their profit efficiency in different ways. The study found that small and large banks have quite different ways of attaining high profits.

Studies on the determinants of bank's interest margin and profitability have focused on whether on a particular country (Berger, 1995; Guru et al., 2002; Barajas et al., 2001; Ben Naceur and Goaid, 2001) or on a panel of countries (Abreu and Mendes, 2002; Demerguç- Kunt and Huizingha, 1999).

As most of the studies on bank performance are conducted in the US and emerging markets, we will focus our discussion to two aspects: US evidence and emerging market studies. The empirical evidence in the US is due to Berger (1995), Neeley and Wheelock (1997) and Anghazo (1997). Berger (1995) examines the relationship between the return on equity and the capital asset ratio for a sample of US banks for the 1983-1992 periods. Using the Granger causality model, he shows that the return of equity and capital to asset ratio tend to be positively related. Neeley and Wheelock (1997) explore the profitability of a sample of insured commercial banks in the US for the 1980-1995 periods. They find that bank performance is positively related to the annual percentage changes in the state's per capita income. The main Studies on the determinants of bank's performance in emerging countries were carried out in Colombia (Barajas et al.,1999), Brasil (Afanasieff et al.,2002), Malaysia (Guru et al.,2002) and Tunisia (Ben, Naceur and Goaid, 2001). Barajas et al. (1999) document significant effects of financial liberalization on bank's interest margins for the Colombian case. Although the overall spread has not declined after financial reform, the relevance of the different factors behind the bank spreads were affected by such measures. Another change linked with the liberalization process was the increase of the coefficient of loan quality after the liberalization. They indicated that the best performing banks are those who have struggled to improve labour and capital productivity, those who have maintained a high level of deposit accounts relative to their assets and finally, those who have been able to reinforce their equity. Guru et al. (2002) attempt to identify the determinants of successful deposit banks in order to provide practical guides for improved profitability performance of these institutions. The study is based on a sample of seventeen Malaysian commercial banks over the 1986-

1995 periods. The profitability determinants were divided in two main categories, namely the internal determinants (liquidity, capital adequacy and expenses management) and the external determinants (ownership, firm size and external economic conditions). The findings of this study revealed that efficient expenses management was one of the most significant in explaining high bank profitability. Among the macro-indicators, high interest ratio was associated with low bank profitability and inflation was found to have a positive effect on bank performance.

The panel country studies were focused on European companies (Molyneux and Thornton, 1992; Abreu and Mendes, 2002), MENA countries (Bashir, 2000), and developed and developing countries (Demergüç-Kunt and Huizinga 1999, 2001). Molyneux and Thornton (1992) were the first to explore thoroughly the determinants of bank profitability on a set of countries. They used a sample of 18 European countries during the 1986-1989 period. They found a significant positive association between the return on equity and the level of interest rates in each country, bank concentration and government ownership. Abreu and Mendes (2002) investigate the determinants of bank's interest margins and profitability for some European countries in the last decade. They reported that well capitalized banks face lower expected bankruptcy costs and this advantage "translate" into better profitability. Although with a negative sign in all regressions, the unemployment rate is relevant in explaining bank profitability. The inflation rate is also relevant. Bashir (2000) examined the determinants of Islamic bank's performance across eight Middle Eastern countries for 1993-1998 period. A number of internal and external factors were used to predict profitability and efficiencies. Controlling for

macroeconomic environment, financial market situation and taxation, the results show that higher leverage and large loans to asset ratios, lead to higher profitability. The paper also reports that foreign-owned banks are more profitable than the domestic one. There is also evidence that taxation impacts negatively bank profitability. Finally, macroeconomic setting and stock market development have a positive impact on profitability.

Goddard et al (2004) investigated the profitability of European banks during the 1990s using cross-sectional time series and dynamic panel models. Models for the determinants of profitability incorporate size, diversification, risk and ownership type, as well as dynamic effects. The study established that despite intensifying competition, there is a significant persistence of abnormal profit from year to year. It also established that evidence for any consistent or systematic size-profitability relationship is weak. It also showed that the relationship between the importance of off-balance-sheet business in a bank's portfolio and profitability is positive for UK, but either neutral or negative elsewhere (Goddard et al 2004).

In another study Kosmidou et al (2005) examined the determinants of profits of Greek banks operating abroad by developing an integrated model that includes set of determinants informed by literature on the profitability of both multinational and domestic banks. Using an unbalanced panel data set for 19 Greek banks, the study showed that profitability of the parent bank and the operating experience of its host nation subsidiaries have a robust and positive impact on the profits of Greek banks operating abroad.

Kosmidou (2007) replicated the earlier study of Kosmidou et al (2005) and utilized a balanced pooled time series data set. He drew five variables from the multinational banking literature representing ownership – specific and location specific factors. The profits of the subsidiaries operating abroad were found to be related to the profits of the parent, the trade between Greece and the host country, the difference in the GDP growth between the two countries, the years of operating in the host market and the time trend. The size of the subsidiaries was also found to be related to the size of the parent bank, the trade, the GDP growth, the years of operation and the time trend.

2.9 Risk And Uncertainty In The Nigerian Banking Environment

As rightly observed by Umoh (2004), the banking industry by its nature occupy a very risky business. However, he argued that only few banks take time to understand and quantify the risks they take. Many bankers like their counterparts in other sectors of the economy do it and invest in it even when they can't measure, manage and control the risk exposures their banks face. Thus, the major challenge facing banks operators in Nigeria is the identification, qualification monitoring and control of risk exposures. There is no doubt therefore that bankers have a sense of their risks exposures, they however lack the capability to quantify such risks as they can quantify their profits in quantitative terms.

In order to understand the dimension of risk and uncertainty and how bank can react to them what makes our Nigerian environment very risky, there is need that we start with some conceptual definitions to shade more light on

the subject matters. Fischer and Jordan (2003) have attempted to capture the meaning of risk. According to them, risk in holding security or any firm of investment is generally associated with the possibility that realized returns will be less than the expected returns. This is due to the fact that perhaps certain factors must have set in to influence the variations in the returns – price or dividend (interest) and these factors constitutes elements of risk.

It is important to note that some of the factors are external to the firm and therefore cannot be controlled or are not within the control of the organizations. Other influences are internal and therefore within the control of the organizations. (Fischer and Jordan 2003). In investment or financial terminology those forces that are uncountable external and broad in their effect are called sources of systematic. On the other side, controllable, internal factors some what peculiar to industries and or firms are referred to as sources of unsystematic risk. The word risk and uncertainty are used in business literature somewhat interchangeably. Technically, their meanings are different. Risk suggests that decision maker knows the possible consequences of a decision and their relative likelihoods at the time he makes the decision. Uncertainty, on the other hand, involves a situation about which the likelihood of the possible outcomes is not known (Fischer and Jordan, 2003).

The Central Bank of Nigeria (CBN) circular No. BSD/18/2005 issued to all banks operating in Nigeria defines risk in banking as :

the possibility that the outcome of an action or event could adversely impact on set goals and objectives. Such outcomes either could result in a direct loss & earnings and/or capital or may result in the imposition of constraints on the bank's ability to meet its business objectives.

The circular also added that a bank's ability to evolve a comprehensive risk management framework (RMF) which involves identification, measurement, monitoring and controlling of risks it is imperative for its strategic positioning. The RMF should aim at ensuring that:

- a) The individuals who take or manage risk clearly understand them;
- b) The bank's risk exposure is within the limits established by the Board of Directors;
- c) Risk taking decisions are explicit, clear and in line with the business strategy and objectives set by the board.
- d) The expected payoffs compensate for the risks taken;
- e) Sufficient capital is available to cushion risks taken.

Uncertainty according to the World Bank (1995) means that a variable, say, the oil price for the coming year, is simply unpredictable. Volatility means that even if another variable such as oil production, changes from year to year, its level is still unpredictable but the frequency of the change would be what matters. Consequently, eliminating uncertainty may not eliminate volatility.

In deed the standard economic theory has had time trying to make the distinction between uncertainty or instability (or volatility) and risk. Volatility or instability is associated with something not firm or fixed, readily changing not steady in action or movement. According to this definition, oil production may not be steady through time, but its fluctuation may be known in advance, they may be predictable. This analogy applies to bank profit, which is affected by a number of variables or factors, which keep on changing within the economy, partly within the control of banks and largely outside the control of the bank. Uncertainty is associated with lack of knowledge about an outcome or result. When an event or variable is uncertain, it can not be predicted or forecast. Even if it can be forecast such forecast must be taken care of the several explanatory variables affecting it. Moreover, the event or the outcome of an activity might also be unstable, and that instability or volatility can not be anticipated either. In this sense, uncertainty encompasses volatility or volatility might be deemed as a subset of uncertainty perceived risk, to use the words of Litter and Melanthiou (2006) is a well recognized, perhaps academically somewhat overstretched, phenomenon that allegedly has a significant effect consumer decision-making behavior. It is generally viewed as consisting of the product of consequences and lack of certainty about the outcome. Traditionally , risk is viewed as distinct from uncertainty which in itself exists when there is lack of knowledge about the possible outcomes and logically therefore of the 'probabilities' that can be ascribed to them. It is not always possible that greater information accumulation results in the effective translation of uncertainty into risk since i) it assumes that information gained is relevant while ii) the process may even intensify uncertainty by exposing areas of ignorance (Litter& Melanthiou, 2006). There are several forms of perceived

risk; financial, performance; time; psychological and physical. Each sudden variations in each of these variables, is capable of changing the directions of operating parameters of business.

It is important to point out at this point that global business environment as a whole is facing an unprecedented level of uncertainty. According to financial times published in U.K. (2001), a number of reasons accounted for this increase in the level of uncertainty. They cited the preoccupation of the world with war on terrorism and recession. They cited the 1998 liquidity crisis and the crises associated with the stock market crash of 1987. Such crises are precipitated by the efforts of market participants to convert illiquid assets into cash in anticipation of loss. When confronted with uncertainty human beings being what they are invariably attempt to disengage from medium to long-term commitments in favour of safety and liquidity. On the other hand, the crises in the Middle East has been changing and taking new dimensions in places they are occurring. The nuclear row between America and North Korea is inconclusive. With this situation another row on nuclear erupted between United States of America (USA) and Iran. This has raised a lot of tension in the World considering the position of Iran in the world oil production. The imposition of sanction on Iran by the United Nations Security Council has further raised the level of uncertainty in most business areas, especially affecting countries involved. The Palestinian crises with Israel is unresolved and it is appearing that the longer it lasts, the more it divides the countries of the world regarding the capacity of the U.N. to act decisively to resolve the crisis. Another world producer of oil – Iraq has been invaded by USA in (2003) and since then the war spearheaded by USA has not ended. The war in Afghanistan is also another source of concern to

the world as an economy. The outcome of the military campaign in these countries is not known and the aftermath is unpredictable. These developments combined to make the world a very uncertain and risky place. These developments though happening outside the Nigerian business environments could exert a lot of influence on the domestic activities in Nigeria, because of trade and investment relationships with the countries.

With these crises happening across the globe the world was made an uncertain kind of environment in which activities happening could not be predicted with high degree of certainty and accuracy. That is a very fundamental problem facing business organizations. The uncertainty and risk thus became important attribute of monetary policy. Greenspan (2004) captures this scenario in the following:

The Federal reserve's experiences over the past two decades make it clear that uncertainty is not just a pervasive feature of the monetary policy landscape; it is the defining characteristic of that landscape... in practice one is never quite sure what type of uncertainty one is dealing with in real life time and it may be best to think of a continuum ranging from well-defined risks to the truly unknown.

It is because of this scenario and important attribute of the global business environment that the Federal reserve Bank formulated and implemented some policy measures to handle them (Greenspan ,2004).

In Nigeria too, the business environment as observed by Umoh (2004) is characterized by a number of elements of risk and uncertainty. As we have noted earlier, these elements are sometimes within the control of the banks and some also squarely fall outside the control of these banks operating

within the Nigerian business environments. The regulatory authorities such as CBN and NDIC focused on these issues because of the important place they continue to occupy in the determination of business returns and even the overall development of the business and investment environment as a whole. These factors range from unstable macroeconomic policies deregulation policies, unstable interest rates, the liquidity position of the banks which keeps on changing in response to changes in some macroeconomic parameters, sudden changes in consumer price indices, interest rate policy, corporate tax, changes in inflation rates. These combinations of factors together make the banking environment within which our banks operate very risky and uncertain.

Moreover, in addition to sudden changes in these factors, there is also the problem posed by truncated information, structure in the search of solution to the problem. The asymmetric flow of information within and outside the banking environment creates situation of uncertainty in bank earnings. Information critical for certain bank policies may not flow readily and with less difficulty. This creates gap in information which later increases the level of uncertainty in the attainment of several anticipated parameters.

On the other hand the bank managers for effective planning, decision-making and control need a wide range of this valuable information. Such information relates to market situation, competitors strategy, exchange and interest rates, share prices, insurance, future trends in technology, potential customers, wages and salaries government legislation relating to banking operation and general state of the economy. They also need to consider information regarding what is happening within the bank, looking at sales

against marketing information at cash flows against interest rate projections etc in general information needs managers in the banking industry are enormous and complex and extensive in nature. They are thus exposed to a large volume of information from wide spectrum of sources and selectively use this information to provide high quality banking services to their customers and to formulate longer-time strategies. Yet, much remains to be known about the kind, the quality and the quantity of information behaviour of bank managers as a distinct user group (Popoola, 2000).

However, the section 3.0 of CBN circular No. BSD/18/2005 of 2005 defines risk in the context of Nigerian banking. Accordingly, the circular identified four major risks, which are common to all banks operating in Nigeria, on the basis of which they are all expected to work out their risk management framework. These risks are credit risk, market risk, liquidity and operational risks. Banks are therefore expected to in the light of their own peculiarities design and develop risk management frameworks that are best suited for their typical operations. The credit risk include those risks that arise from the potential that are oblige is either unwilling to perform on an obligation or its ability to perform such obligation is impaired, resulting in economic loss to a bank. It encompasses opportunity costs, transaction costs and expenses associated with non-performing asset over and above the accounting loss.

The market risk is the value of on-and off-balance sheet positions of a financial institution. This would be adversely affected by the movements in market rates. It involves implicit such as interest rate risk due to mismatch of loans and deposits and a foreign exchange due to the impact of adverse movements of exchange rate on the value of foreign currency open positions.

Operation risk is the loss resulting from inadequate or failed internal processes, people and system or from external events. It is associated with human error, system failure, inadequate procedures and control. It is the risk of loosing arising from the inadequate procedures and controls. It is the risk of losing arising from the potential risk failure.

The liquidity risk has to do with the potential loss to an institution arising from either its inability to meet its obligation or to fund increases in assets as they fall due without incurring unacceptable costs or losses. Hence, beginning from 2005, banks were directed to evolve a risk management framework for the organization and implement it effectively.

As noted by Umoh (2004), the horizon of risk and uncertainty facing the Nigerian banks is wider than the four risks mentioned above. For instance, there is specific business risks, economic risk, political risks, sectoral risks, currency risk. Because of the enormity of the risk and uncertainty elements in the banking industry, the monetary and regulatory authorities introduced the risk-based supervision; to assist banks manage the situations. Regrettably, as noted by Umoh (2004), as a people Nigerian bankers have a large appetite for risk which they fail to quantify. Risk based supervision if carried out successfully, will compel all banks operators and supervisors in Nigeria to also consciously dwell on the risk side of business coin rather than concentrating on the profitability side only. Banks could be expected to implement effective risk policy measures. Risk Management systems, which bank management would have responsibility for ensuring their success would have to be worked out and implemented vigorously. While this is being done, it is necessary to anticipate and prepare for those issues that are

likely to affect the effective implementation of the approach in our jurisdictions, such as risk difference, board/management incompetence, and truncated information structure, review of unique risks and inability of the supervisors to validate risk management systems. There is also the need for development of risk and uncertainty management culture, risk measurement and monitoring functions.

Hence, in order to survive in the current environment banks need to focus on performance and results rather than tasks. It is only through effective integration of the corporate strategy, infrastructure, people and control systems that banks can develop risk-aware culture that will enable them to compete effectively and minimize the risk of financial disasters. It is when this is done that banks in Nigeria can be able to appreciate their environment the more and be able to take advantages of the behaviors of their environment as necessitated by risk and uncertainty.

2.10 Theoretical Framework

In this section our attention would be focused specifically on the theoretical framework of the forecasting models/techniques which we intend to utilize for the purpose of this study. Our concern here would be on the understanding of the operational procedures and classification of the forecasting tools under our study. We did not intend to review the entire techniques of forecasting as are available; rather we reviewed the most forecasting classifications/methodologies and highlighted their operational procedures, assumptions, as well as its enabling parameters for their operationalization. From these classifications, we adopted a framework, which we found as appropriate theoretical postulation close to explaining the techniques we adopted for assessment of their forecast accuracy in line with the objectives of the study. We shall try to throw more light on the similarities and differences of these measures as they affect our forecasting techniques and parameters. The forecasting techniques as would be reviewed here are explicit procedures for translating information about the environment and the company's proposed strategy into statements about future results.

2.10.1 Business Forecasting Models

Owing to crucial nature of forecasting in business, a number of forecasting methods have been developed over time and these have been applied in many business-forecasting practices and have been found useful. (Morden, 1997). It is important to note that these techniques cut across several yardsticks and these greatly affected their classification and typology. For example, the techniques are classifiable based on data requirement (time series and non-time series), methodology (moving and simple averages), quantitative and qualitative, the type of people doing forecast, the degree of sophistication of the methods used to analyze the data.

However, Banjoko (1994) argues that there are broadly three main forecasting techniques. These are:

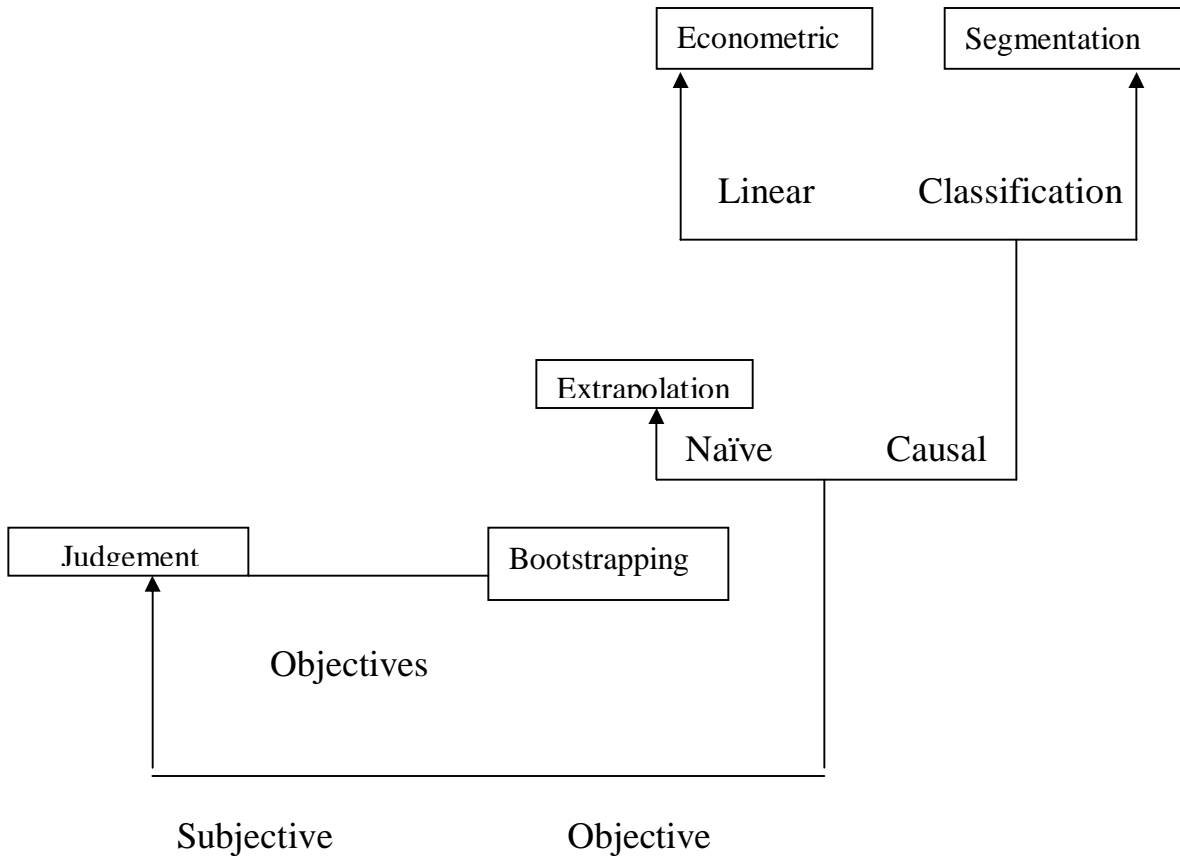
- i) The judgemental or non-statistical approach'
- ii) The time series models; and
- iii) The econometric forecasting models.

The three methods under Banjoko's (1994) classification above are similar to those of Morden (1997) cited earlier. The main distinction lies in the fact that Morden's (1997) classification seems to emphasize its dividing line on the extent and nature of data utilized by the model. On the other hand, the time series models outlined by Banjoko (1994) are similar in content to the Morden's (1997) statistical methods. The major problem with this classification to our understanding has to do with its separation of time series tools from econometric tools. In most practical situations, they are classified as falling under one arm of the same.

Another useful classification is offered by Armstrong (1983). According to him, forecasting techniques for analyzing, data has historically been organized along tree continuums. Thus, there are subjective versus objective, naïve versus causal and linear versus classification methods. He then used the following tree to demonstrate these classifications.

Figure 2.2

Forecasting Methodology Tree



SOURCE: Armstrong (1983)

According to Armstrong (1983), subjective methods are those in which the processes used to analyze the data have not been well specified. They are also called implicit, informal, clinical or intuitive methods. They are based in simple or complex processes. They rely on either subjective or objective data as inputs. Subjective methods may be supported by much formal analysis or by none. However, the critical point is that the analyst makes the forecast in his or her head. For example, executive could require to make the forecast of sales for some periods to come. They would be provided with any information they need, but at the end of the day they would produce the

final forecast by linking the information to suit the given information. These methods are similar to the subjective methods outlined under Banjoko (1994) and Morden (1997).

Armstrong (1983) explained that the objective methods are those that use well specified processes to analyze the data. The bottom line here is that the data have been so specified as well as the model so well that other analysts can replicate them and obtain identical forecasts. Under this category are found, explicit, statistical or formal methods. They may also be based on simple or complex processes. They may also use objective or subjective data. They may be supported by much formal analysis or none. However, the critical factor here is that inputs are translated into forecasts using a process that can be replicated by other analysts using similar methodology. The choice between objective and subjective method is an important one to the management.

Armstrong (1983) further demonstrated that a continuum of causality exists in forecasting models. At the naïve end, no statements are made about causality (i.e. automobile sales can be plotted against time and the trend can be projected, at the causal end, the model may include many factors (the real income per capita, the real price of gasoline, the real price of automobiles and the population cost of transportation). Causal complex methods appear to be more complex than naïve methods since the extent of data utilization is not the same. In the causal methods data are obtained on the causal relationships which are later used or adjusted so that they are relevant over the forecast horizon. Next changes in the causal variables is also forecast, which is used along with forecast of causal variables and the

relationships are then used to calculate the overall forecast. Methods that are objective and rely upon causality can be categorized according to whether they use linear or classification methods. Classification methods typically require much data. The linear method is based upon the usual way we think about causality. However, the classification method groups similar behavioral units. These groups or segments would be expected to respond in a similar fashion. For example to forecast automobile sales one segment may “family size of two, age of head of household and low income”. Another segment might contain some related or similar variables. People within each segment are expected to have similar behaviour with respect to purchase of automobile in the first and second group but with different values in other factors within the segments. To make a forecast using the classification method, forecasts would be made of the population of each segment and also of their behaviour. These are then combined to get a forecast of auto sales for each segment. By summing across segments, an overall forecast is obtained (for e.g. total industry sales).

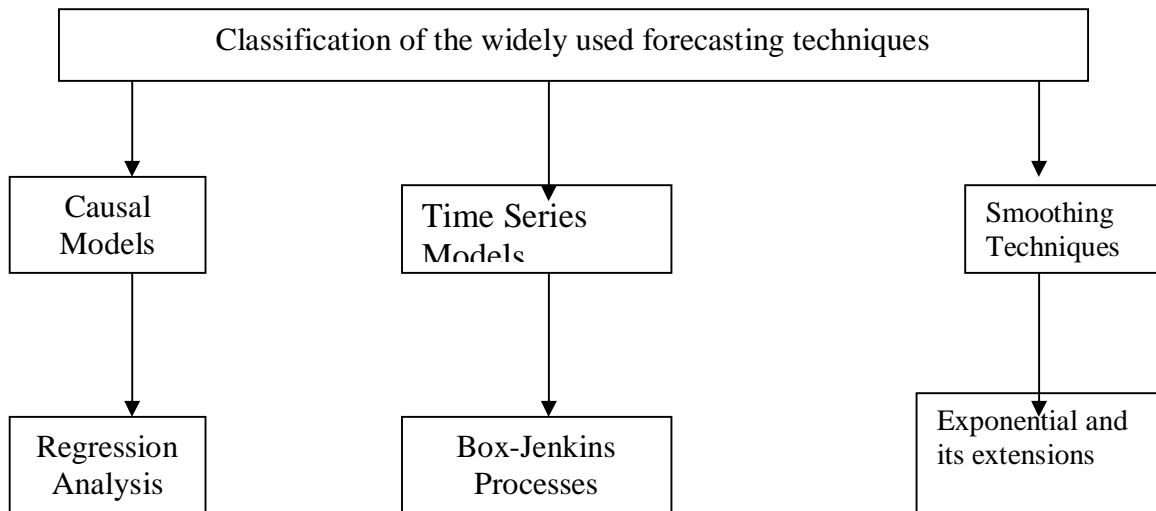
However, Arsham (2000) presented another useful classification of forecasting models. According to him the forecasting methods can be grouped into three major headings, namely,

- i) causal models
- ii) time series models
- iii) smoothing techniques

Hence, using this classification, the regression analysis falls under causal, the time series models are usually made up of Box-Jenkins processes and the smoothing techniques comprising up of exponential smoothing and its extension. The major shortcoming of the classification above is that it does

not recognize other typologies which are not necessarily quantitative in nature. As we can see from the various classification, qualitative approach has also been found very useful especially in both short term and long term forecasting. This assertion has been confirmed by empirical studies such as those of Dalrymple (1975), Wheelwright and Clarke (1976), Dalrymple (1987), Wilson and Dauback (1989) and Mentzer and Cox (1984). Arsham (2000) utilized the diagram below to present his classification:

Figure 2.3: Arshams' Classification of forecasting techniques



Source: Arsham (2000)

The major criticism of the Arsham's classification lies in its failure to recognize the qualitative classification of the models. The classification merely saw quantitative models as the only models used for forecasting and that was why it did not give it a place in its classification.

Advancing his classification, Delurgio (1998) maintained that forecasting techniques could be categorized into two broad headings: quantitative and qualitative. The techniques in quantitative category include mathematical models such as moving average, straight-line projection, exponential smoothing regression, trend-line analysis, simulation, life-cycle analysis decomposition, Box-Jenkins, expert system and neural networks. On the other hand, the techniques in qualitative category include subjective or intuitive models such as jury or executive opinion, sales force composite and customer expectations [Kress, 1985; Mentzer and Kahn 1995]. Along with qualitative and quantitative, forecasting models can be categorized as time series, causal and judgmental. A time series model uses past data as the basis for estimating future results. The models that fall into this category include decomposition moving average, exponential smoothing and Box-Jenkins. The press of causal Kress (1985) argues is that a particular outcome is directly influenced by some other predictable variable/factor. Judgmental techniques are often called subjective because they rely on intuition, opinions and probability to derive the forecast. These techniques include expert opinion Delphi-technique, sales force composite, customer expectations (customer surveys) and simulations (Kress, 1985; Wilson and Keating, 1994).

Delurgio (1998) then classifies forecasting procedures as of type qualitative or quantitative in nature. Qualitative methods are often based on neurotics and these are primarily used in financial domains. In most engineering and mathematical domains, data-dependent or quantitative models are employed for analyzing time-dependent systems. Quantitative methods in views of Singh (2006) are mostly applied using a computer and involve a variety of

statistical techniques. Examples of advanced quantitative methods used for analysing univariate time-dependent systems can be cited in the studies such as those of Azoff (1994), Teran et al (1997), and Singh (2006). Specifically, Singh (2006) added that three planning horizons for forecast exist. The short-term forecast usually covers a period of less than three months. The medium term forecast usually covers a period of three months to two years. The long-term forecast usually covers a period of more than two years. This view is shared by Makridakis and Wheelwright (1978). However, they added immediate term forecast as a forecast of less than one month duration. The short-term forecast is used for the daily operation and plans of a company and the long-term forecast is used generally for strategic planning. However, Fischer and Jordan (2003) hold that short-term forecast usually covers a period of up to three years, although frequently a much shorter period may be implied. An intermediate forecast refers to a three-to-five year period ahead. Long term forecast refers to a period of more than five years and frequently ten or more years in advance. This study accepts this interpretation because of its clearer spread among the period.

In related work, Forgarty (1989) developed a very useful classification of forecasting methods. According to him, techniques can be generally classified into two major categories. These are the qualitative and quantitative techniques. The former methodology Forgarty (1989) notes, although may sometimes involve numbers is basically not mathematical as it does not utilize any quantitative formula. The qualitative methods rely on value judgement, intuition and subjective evaluation of the respondents and practitioners. The latter which is quantitative in nature is divided into two sub-categories; the intrinsic and extrinsic forecasting techniques. The

intrinsic forecasting techniques are often referred to as time-series analysis techniques. They involve mathematical manipulation of the history of demand; sales, profits (or any other variable to be forecast) of a firm to construct a forecast. In other words, it uses the internal data on the organizational operation for the purpose of generation of forecast.

On the other hand, the extrinsic techniques attempt to relate demand, sales, profits (or any variable to be forecast) to data about another item, group of items or outside factors such as general economic conditions to create forecast for the item of interest. Examples of qualitative techniques include the qualitative opinion method, Delphi method, marketing research method management intuitive or jury of executive opinion method. Under the intrinsic techniques comes the simple average method, moving average neutrals, weighted moving average exponential smoothing methods and its extensions. The extrinsic techniques are made up of trend line (line of regression) autoregressive models, correlation coefficient among others.

The beauty of the Forgary (1989)'s classification above lies in the fact that it made a clear distinction between the methods not only on the basis of their individual frameworks but also on the basis of data intake and utilization and on the basis of the source of data input and methodology. For these reasons above, our study will adopt this classification for the purpose of processing our data. Going by the Forgary (1989)'s classification and those of Arsham (2000), Armstrong (1983), it is evident that quite a number of techniques can be identified using any of the above classification. Hence, it may not be possible for this study to attempt to review each of the techniques under the three classifications extensively.

Since we have adopted Forgarty's (1989) classification as framework for the study, we selected a handful of techniques particularly, those that were directly related to our study and reviewed them briefly at the appropriate places. This would facilitate proper understanding of our methodology as well as data analysis under each of the adopted techniques.

2.10.1.1 The Qualitative Forecasting Techniques

According to Morden (1997) the forecasting techniques can be generally classified into two main categories namely quantitative and qualitative. The major distinguishing feature between these he argues is the data utilized in developing the forecasts arising. According to him the qualitative techniques comprise of three main sub-groups – the subjective, statistical and the explanatory forecasting techniques. The subjective techniques are made up of;

- i) Sales force composite method
- ii) Juries of executive opinion method
- iii) Surveys of buyer intention.

The subjective techniques are more of qualitative in nature in the sense that they are mostly opinionated in nature. The statistical techniques utilize the manipulation of data on the past history of organizational variables using some statistical techniques. The explanatory forecasting techniques are more analytical and utilize computers to develop parameters that can be used in explaining the relationships between several variables of forecast interest. The sales force composite methods combined sales force management view on customer/territory sales or market share to be achieved during the next

forecast period. The juries of executive opinion are a combination and compilation of informed and expert opinion about market trends and future scenarios within segment/industry. The survey of buyer intention deals with compilation of expected purchases by major customers in the industry during forecast period ahead.

The Delphi Technique

The Delphi technique as observed by Makridakis and Wheelwright (1978), Rowe and Wright (1999b), Olshfski and Joseph (1991) is undoubtedly the most commonly used qualitative forecasting technique. The technique was originally developed by RAND Corporation during the 1950s, by workers of the company while involved in a U.S. Airforce Sponsored project. The aim of the project was the application of expert opinion to the selection from the point of view of a Soviet strategic planner – of an optimal U.S. industrial target system with a corresponding estimate of the number of atomic bombs required to reduce amunitions output by a prescribed amount. More generally the technique is seen as a procedure to “obtain the most reliable consensus of pinion of a group of experts” [Rowe and Wright, 1999b]. The technique seeks to obtain a reliable consensus opinion from experts that can be used as a future forecast while at the same time minimizing the undesirable aspects of group interaction. Delurgio (1998) attempted to give description and procedure of the method as follows:

The structured and independent surveys of experts yield relatively unbiased estimates of alternative futures. These experts iteratively fill out questionnaires concerning the future and thereby reveal facts that are important in influencing and predicting the future. By design the experts are segregated from each other and the questionnaires are filled out independently. The results of the first questionnaires are used to generate the next set of questions. By generating questionnaires sequentially expert opinions can be tabulated and shared with all participants in relation to what each of them feels about the likely value of a future variable. The independence of questionnaire responses eliminates much of the bias that might take place or be associated with if experts were to openly try to influence each other.

Hence, in the first round, questions are presented to experts, who must respond in writing. Their individual responses are then carefully summarized and sent back to the experts. The experts can study the results and modify their comments for the next round. Three or more rounds are made in a similar fashion when the administrators of the methods believe that the participants have adequately developed their positions, they might work as a group to further refine their answers and projects. (Morden 1997, Wilson and Keating, 1994, Makridakis and Wheelwright 1978).

Wilson and Keating (1994) summarizes the above Delphi procedure into six major steps, viz:

- i) Participating panel members are selected;
- ii) Questions asking for opinions about the variable to be forecast are distributed to panel members

- iii) Results from panel members are collected, tabulated and summarized;
- iv) Summarized results are distributed to the panel members for their review and considerations,
- v) Panel members revise their individual estimates taking into account the information received from other members (who are unknown to them).
- vi) Steps iii-v are repeated until no significant changes result and the final figures adopted as forecast.

Through this process as can be observed, there is usually movement towards centrality and that the views are likely to converge at a point which then forms the basis of forecast. Where the divergence appear to be wide such discrepancies are studied more elaborately through iteration of step vi) until they are significantly mopped off or harmonized. Rowe and Wright (1999a) argued that Delphi method is not a procedure intended to challenge statistical or model- based procedures, against which human judgment is generally shown to be inferior. Rather it is intended, they pointed out, for use in judgmental and forecasting situations in which pure model-based statistical methods are not practical or possible because of the lack of appropriate historical/economic/technical data and thus where some form of human judgmental input is necessary. Such inputs need to be used as efficiently as possible and for this purpose the Delphi technique might serve a useful role.

Indeed, there are studies which sought to compare Delphi to Nominal Group Technique (NGT) (see for example Van de Ven and Delbeck,1974). The findings suggest that NGT would seem appropriate when the job needs to be done quickly and while Delphi would be apt when experts cannot meet physically. Other studies also compared Delphi to groups in which members were required to argue both for and against their individual judgments. For example, Sniezek (1990) explains that these arguments continue so that at the end of the exercise the experts can be in a position to locate the weaknesses and the strengths of the positions they took at the panel.

Some of the strengths, of Delphi as established by these studies include:

- i) Its operational procedure is simple
- ii) Strong personalities or peer pressures have no influence on the outcome
- iii) It enjoys wider acceptance by users, it enables forces//situations that can not be adequately captured by model based techniques to be dealt with conveniently. The method is both used for short term and long term forecasting purposes.

Some of the weaknesses of the technique include the fact that:

- i) It can be biased,
- ii) It is not consistently accurate over time,
- iii) It requires years of experience for one to learn how to convert intuitive judgment into good forecasts, and
- iv) There is difficulty in assessing the degree of expertise incorporated in its forecasts.

Rower and Wright (1999b) citing the works of Stewart (1987) and Sackman (1975) defended the Delphi technique from the early attacks on its methodology by some section of scholars. They argued largely that much of the criticisms of early Delphi studies centered on their floppy execution, Delphi questionnaires were poorly worded and ambiguous and that analysis of responses was often superficial. They reported that early technique was operated by people who lacked much of required background in the social sciences and appropriate research methodology.

Despite those criticisms, the Delphi approach has undergone several modifications and today we have a number of these revised versions given different names and titles within the qualitative forecasting methodologies frameworks. For example executive opinion and management intuition methods. Indeed, there are theoretical and empirical reasons to believe that a Delphi technique applied according to 'ideal' specifications might perform better than the standard laboratory interpretations.

2.10.1.2 The Quantitative Forecasting Techniques

Following the Forgary's (1998) classification, the Quantitative techniques involve all those business-forecasting techniques, which rely solely on the use of some quantitative time series data. Under them are found statistical techniques. The statistical techniques include the moving averages, exponential smoothing techniques, time series analysis, trend extrapolation and curve-fitting. These techniques Morden (1997) explains utilize the data on past records of sales, performance, profits and using statistical techniques develop forecast to attempt to project into the future periods. The explanatory forecasting tools include operational research based models used to simulate the workings of a real life system or structure so that the planner can identify or experiment with alternative patterns or behaviours. They are thus abstractions of real systems or processes used to represent the basic variables and constant. The qualitative forecasting techniques usually comprised up of, Delphi method, scenario development, and cross-impact analysis. The most commonest and applied qualitative forecasting techniques include .Scenario development, Delphi technique and cross-impact analysis. Scenario development, Delurgio (1998) argues involves constructions of a number of alternative/ possible "future" which best describes a particular variable(s) in view and how they might appear under range of different circumstances or contingencies. Usually forecasters develop three scenarios each with its associated/assigned probability namely pessimistic, most likely and optimistic. The Delphi method combines views of a number of experts both drawn from inside and outside the organisation. The experts usually come very specialized disciplined, and are expected to

contribute to the forecast generation by studying the variables being forecast. (Morden 1997).

Intrinsic Forecasting Techniques

In line with our adopted classification of Forgarty (1989) earlier, we shall review the appropriate frameworks/models under the above classification of quantitative techniques. Because of the large number of the techniques and their modification under the classification we do not intend to review all of them – rather we shall identify three of these and review them separately. These are simple exponential smoothing, Holts double parameter and Winter’s three parameter model.

Simple (single) Exponential Smoothing Technique

Our discussion on the above may be better appreciated if we start it with the earlier and preceding two techniques which were in practice before the development of the exponential smoothing technique. These are the simple average and weighted average techniques. The simple average notes Banjoko (1994) is the earliest technique which simply suggests that in order to have an idea of what forecast for the next period will be an average of the past data covering those periods could provide a useful index in estimating the value of the next period. The simple average method, takes data for some past periods and extrapolates into the future on the basis of average.

Thus, the simple model can be stated thus,

$$Y_n = \frac{T_1 + T_2 + T_3 + \dots + T_n}{n} \quad \text{.....(1)}$$

Where:

- Y_n = the forecast value or the simple average for period n
- T = individual past demand/sales data per period
- i = 1, 2, 3 n
- n = Number of periods for which data are given for forecast purposes.

The major criticism of this approach stems from the fact that every succeeding month is as important as the previous month in the study, i.e. each has a weight of 1/n. Apparently, this may not give the desired forecast because the time series data of the months involve some irregular movements from one period to the other owing to some situational and environmental changes. Some periods also appear to attract high sales than others for example festivals. Hence, as noted by Arsham (2000) and Wilson and Keating (1994) forecasting scheme could respond more effectively to recent changes in the level of time series. Hence a method that gives prominence to more recent data would be preferred. This quest gave rise to the development of weighted moving average [Arsham, 2000].

The Weighted Moving Average Technique

The weighted moving average is an attempt to assign weight to the more recent data. We saw in the preceding technique, that equal weights are assigned via averaging the data in the weighted moving average (WMA). Weights are assigned to each period (or elements) in accordance with the age of the data. The weights attached to each of the data are summed up to equal to one. Using the generalized model, the weighted moving average technique can be stated mathematically as

$$F_{n+1} = W_n d_n + W_{n-1} d_{n-1} + W_{n-2} d_{n-2} + W_{n-3} d_{n-3} + + + \dots\dots\dots(2)$$

Where

- W_n = Weight assigned
- D_n = Actual demand or sales I month n

Subject to:

$$\sum_{I=1}^n W_i = 1$$

Source: (Banjoko, 1994)

Alternatively, weighted moving average with n-period can also be stated in the following expression

$$WMA = \frac{\sum \text{Weight for period} * \text{Value in period}}{\sum \text{Weights}} \dots\dots\dots(3)$$

Source: (Hays, 2003)

For a four year moving average for instance, the expression may alternatively appear as follows: $F_t = 0.10A_{t-4} + 0.20A_{t-3} + 0.30A_{t-2} + 0.40A_{t-1}$. It can be deduced from the foregoing that the more distant the data are, the less the forecast weight assigned. For instance, a company wishing to utilize the WMA technique could achieve relatively high accuracy if higher weights are assigned to a more recent data. The tendency being that periods that share some common or closer similarities are given similar or closer weights because sales patterns in those periods are also assumed to be similar or closely related.

The Simple (Single) Exponential Smoothing Technique

This method was developed in response to cries resulting from inadequacies of the simple and moving average techniques. The moving average methods appeared to give equal weight to amore distant or past data rather than the recent data. It has been argued that more distant or past data did not appear to give a reliable forecast owing to changes in variables affecting demand or forecast that are ever taking place in the economy. For a good forecast to be achieved a more recent data have to be utilized. Thus, exponential smoothing method was developed to take care of the inadequacies of the average methods. Chambers (1975) remarked that exponential smoothing is similar to the moving average except that more recent data points are given more weight, automatically by the technique.

The new forecast is equal to the old one plus some proportion of the past forecasting errors. Forbes et al (2005) citing Gardner (1985) stresses that exponential smoothing techniques are widely used for forecasting demand in

supply chain management applications. Their relative simplicity and robustness together with their reliance on ‘stylised facts’ of time series analysis implies that they are particularly well suited for any automated approach to forecasting. The central place of exponential smoothing technique as Forbes et al (2005) observed has been reinforced by repeated successes against more sophisticated approaches in succession of forecasting competitions. Yet, the emphasis on traditional implementations of exponential smoothing has normally been on getting good forecasts. Accurate measures of uncertainty can be very important. Safety stocks in inventory control, for example held to meet above normal levels of demand for instance should be based on reliable measures of uncertainty. The lack of statistical framework has hampered progress in this direction [Forbes et al 2005]. However, an early attempt at constructing a statistical framework for exponential smoothing was provided by Box and Jenkins (1976). They demonstrated that all linear forms of exponential smoothing could be conveniently rationalized in terms of autoregressive integrated moving average (ARIMA) models.

Exponential smoothing techniques represent simple and pragmatic approach to forecasting, whereby the forecast is constructed from an exponentially weighted average of past observations. Evidence from the literature generally suggests that the smoothing parameters, such as smoothing constant, level and seasonality, trend should be estimated from the data. (Taylor,2004). However, some researchers such as Files (1979) have argued that the parameters should be allowed to change over time in order to adapt to the latest characteristics of the time series data involved. For instance, if there has been a level shift in the time series, the exponentially weighted

average should also so that an even greater weight is put on the most recent (observation).

A variety of adaptive exponential smoothing methods have been developed to deal with this problem. However, these methods notes Taylor (2004) have been criticized for leading to unstable forecasts (see for example the work of Fildes ,1979) and indeed some empirical studies have also indicated that they are less successful than the simpler, traditional procedure of constant optimized parameters. For this reason and for the purpose of our study, we shall utilize the traditional techniques which can also be ran using packages such as OMIS, MINITAB and SPSS. Among the strengths of the exponential smoothing techniques include the fact that forecaster does not need to deal with every actual past value at every step, data collection and storage very simple and it yields high accuracy forecast. (Wilson and Keating, 1994; Forbes et al, 2005; Chambers, 1975). However, the method has been criticized for its failure to provide long term forecast, it ignores the seasonal and cyclical variations. The starting 'v' Value could be a problem especially where it has not been applied before.

However, owing to criticisms arising from the failure of the simple technique to take into considerations some parameters such as trend, reasonability in the data or starting value $-v$, a number of extensions have been made to the method to cater for these inadequacies. For instance Holts exponential smoothing (two -parameter model), seasonal exponential smoothing (Winter's three -parameter model) and quadratic exponential smoothing (Brown's one- parameter models. The simple exponential smoothing model can be written in the following manner:

$$F_{t+1} = \alpha X_t + (1 - \alpha) F_t \quad \dots\dots\dots (4)$$

Where

- F_{t+1} = Forecast value for period t+1
- α = smoothing constant ($0 < \alpha < 1$);
- α = $\frac{2}{n+1}$
- X_t = Actual value now in period t
- F_t = Forecast (smoothed) value for period t (which is also the smoothed value for period $(t-1)^2$)

Source: [Arsham, 2000; Wilson and Keating, 1994; Hays, 2003].

From the above, it can be observed that the forecaster does not need to deal with every actual past value at every step; only the exponentially smoothed value for the last period and the actual value for this period are necessary.

Alternatively, the expression above can also be written as:

$$\begin{aligned} F_{t+1} &= \alpha X_t + (1 - \alpha) F_t \\ &= \alpha X_t + F_t - \alpha F_t \\ &= F_t + \alpha (X_t - F_t) \end{aligned} \quad (5)$$

The above implies that exponential smoothing model learns from past errors at every step since the difference between $X_t - F_t$ is to be adjusted by α . These weights on the past data decline exponentially – hence the name of the model. However, if all historical observations are included in (5) or (6), we can derive an expression which gives us the relative values of the weights, hence, we can write:

$$F_{t+1} = \alpha X_t + (1-\alpha) F_t$$

$$F_t = \alpha X_{t-1} + (1-\alpha) F_{t-1}$$

$$F_{t-1} = \alpha X_{t-2} + (1-\alpha) F_{t-2}$$

and by substituting, we have

$$F_{t+1} = \alpha X_t + \alpha (1-\alpha) X_{t-1} + \alpha (1-\alpha)^2 X_{t-2} + \alpha (1-\alpha)^3 X_{t-3} + \alpha (1-\alpha)^4 X_{t-4} + \dots + \alpha (1-\alpha)^k X_{t-k} \quad (6)$$

If we take $\alpha = 0.1$ and apply it to the successive periods, it is the diminishing tendencies of weights on past data can be noticed to be $\alpha, \alpha(1-\alpha), \alpha (1-\alpha)^2$ that is 0.1, 0.90, 0.81.....

Levin et al (1986) demonstrated that simple exponential smoothing has the capacity to continuously adjust the forecasts according to the unadjusted forecast errors. Smoothing linear trend, they noted works the same way except that the errors are used to continually adjust two things: the intercept and the slope of the trend line. The smoothing equations for a linear trend compute a new trend line at the end of each period. The intercept of the new trend line is called the smoothed level (Levin, et al, 1986).

The equations for the trend and level can thus be conveniently expressed as:

$$S_t = F_t + \alpha_1 e_t \quad (7)$$

$$T_t = T_{t-1} + \alpha_2 e_{t1}$$

Where:

S_t =the smoothed level and it is the smoothed trend. The two smoothing parameters; α_1 for the level and α_2 for the trend.

Sources: [Levin et al, (1986), Asham (2000)]

However, Forbes et al (2005) citing earlier work of Brown (1959) observed that exponential smoothing in its simplest form involves successive applications of the formula.

$$L_t = \alpha y_t + (1 - \alpha) l_{t-1} \quad (8)$$

Where

Y_t is the value of a univariate time series in the period t and l_t is a 'smoothed' value representing the underlying level at the end of the period t . If this formula was applied to a semi-finite sample say $\{ y_{t-j} \}_{j=0}^{\infty}$

$$J=0, (1 - \alpha)^j y_{t-j}$$

Then the underlying level may be resolved exponentially into weighted average

$$l_t = \alpha \sum_{j=0}^{\infty} (1 - \alpha)^j y_{t-j} \quad (9)$$

The above expression, it can be noted gives the same value as similar expression advanced earlier by Levin et al (1986) which we cited as No. 7 above, provided that $0 \leq \alpha \leq 1$; the weights decline with increases in the age index j .

Holt's Two- Parameter Model

Holt's two- parameter model is the first extension of simple exponential smoothing. It was developed by Holt (1957) after whom it was named. It includes and adds a growth factor (or trend factor) to the smoothing equation as a way of adjusting for the trend. Thus, as Wilson and Keating (1994) note the model is based on three equations and two smoothing constants. The model can be stated as:

$$F_{t+1} = \alpha X_t + (1 - \alpha) (F_t + T_t) \quad (10)$$

$$T_{t+1} = \beta(F_{t+1} - F_t) + (1 - \beta) T_t \quad (11)$$

$$H_{t+m} = F_{t+1} + mT_{t+1} \quad (12)$$

Where:

F_{t+1} = Smoothed value for period $t+1$

α = Smoothing constant ($0 < \alpha < 1$)

X_t = Actual value now (in period t)

F_t = Forecast (i.e. smoothed) value for time period t which is also smoothed value for period $t-1$.

T_{t+1} = trend estimate

β = Smoothing constant for the trend estimate ($0 < \beta < 1$)

m = Number of periods ahead to be forecast (forecast horizon)

H_{t+m} = Holt's forecast Value for period $t+m$

The smoothed level of period $t-1$ is adjusted by the trend from that period. The first smoothing constant is also used to smooth the new actual and trend adjusted previous smoothed level. The second smoothing constant β is used to smooth out or average the trend in the T_{t+1} which removes some of the

random errors that would otherwise be reflected in the unsmoothed trend. (Delurgio, 1998).

Winter's Three- Parameter Exponential Smoothing

The Winter's model is the second extension of the basic smoothing model. It was developed by Winter (1960) after whom it was named. Delurgio (1998) explains that the model extends the Holts two- parameter model to the seasonal case by including a third smoothing operation (a third smoothing parameter) to adjust for seasonality. An additional equation adjusts the model for the seasonal component.

According to Wilson and Keating (1994), the four equations necessary for Winter's model are:-

$$F_t = \alpha X_t / S_{t-p} + (1 - \alpha) (F_{t-1} + T_{t-1}) \quad (13)$$

$$S_t = \beta X_t / F_t + (1 - \beta) S_{t-p} \quad (14)$$

$$T_t = \gamma (F_t - F_{t-1}) + (1 - \gamma) T_{t-1}, \quad (15)$$

$$W_{t+m} = (F_t + mT_{t-1}) S_t \quad (16)$$

Where:

F_t = Smoothed value for period t

α = smoothing constant for the data ($0 < \alpha < 1$)

X_t = Actual value now (in period t)

F_{t-1} = Average experience of series smoothed to period t-1

T_{t-1} = Trend estimate

S_t = Seasonality estimate

β = Smoothed constant for seasonality estimate ($0 < \beta < 1$)

γ = Smoothing constant for trend estimate ($0 < \gamma < 1$)

m = Number of periods in the forecast lead period

p = Number of periods in the seasonal side

W_{t+m} = Winter's forecast for m periods into the future.

Source: (Wilson and Keating, 1994).

The first equation of the model (13) as stated above updates the smoothed series for both the trend and seasonality. This equation, we notice, is slightly different from the 1st equation (10) under Holts model. In the first equation under this model, X_t is divided by S_{t-p} to adjust for the seasonality, thus the data is deseasonalised and all seasonal effects left in the data are removed. The model also smoothes the seasonality estimate (equation 14) and the trend estimate is also smoothed in the third equation (equation 15) of the model. The model is very important and useful on the fact that it takes into consideration an important parameter of forecast which is season and its varying behaviors, in addition to the two ie trend and level estimates. Wilson and Keating (1994), using the same historical data for Holt's two-parameter model and the Winters three -parameter model, demonstrated that the Winters model appeared to have lower measures of forecast errors, signifying its high accuracy compared to the former.

The models we have presented above are by no means the only extensions under exponential smoothing. Indeed, there are other extensions such as the Browns' Double -Parameter model and the Adaptive Response Exponential Smoothing. Our assessment would be restricted to the first three typologies of exponential smoothing techniques reviewed in this section.

2.11 Measures of Forecast Accuracy

Accuracy refers to the level of error between the projected level and the actual variable as well as how a particular technique or system accomplishes the outlined goals of forecast. Researchers have argued that accuracy is a necessary outcome in order for the forecasting technique or process to be successful. (Mentzer and Cox, 1984; Mentzer and Kahn 1995). A number of studies have been undertaken to answer the questions as to how valuable is it to develop an accurate forecasting model.

Armstrong (1985) for instance cited six studies specifically aimed at answering the question above. These are studies by Dunnette (1966) for personnel selection, Dawes (1971), for the selection of graduate students, Lave (1963) for weather forecasts for an agricultural product, Buffa (1975) for inventory control and Schnee (1977) and Marks (1980) for weather forecasting.

In order to be able to assess the quality performance and reliability of the forecasting techniques reviewed above, there is need to appreciate some measures of forecast accuracy as established by studies. The performance as established by the accuracy of the techniques is thus better measured using the measurement techniques established by studies.

There are many measures of forecast quality/accuracy, but most of the test that are used, observes McCracken and West (2000) can be grouped into one of the five categories: Equal forecast accuracy between two (or more) predictive models; forecast encompassing, forecast efficiency, zero forecast bias and sign predictability. This study adopts the equal forecast accuracy

approach in comparing the models. A very general test of predictive ability is one that seeks to test for equal forecast accuracy across two or more models. To construct this type of test one merely needs to select a measure of accuracy which shall be used in evaluating the two models. For instance, Edison and Cho (1993) compared the predictive ability of three forecasting models using economic measures of accuracy. In particular, the most common comparison is whether the two predictive forecasting models have the same Mean Squared Error (MSE), Mean Absolute Percentage Error (MAPE), Mean Absolute Deviation (MAD) and Theil's Inequality Coefficient (U).

A comparison of the relative accuracy of various time series methods is more difficult than that done for econometric and regression models. The difficulties actually can arise because there are many more methods to compare and because different studies have arrived at different conclusions which are usually conflicting. In a study reported by Kirby (1966) three different time series methods were compared. These were moving averages, exponential smoothing and regression. He found out that in terms of month to month forecast accuracy, the exponential smoothing methods did best. Kirby (1966) also showed that when forecast horizon was varied to six months, the moving averages and exponential smoothing gave similar results. In another study cited by Makridakis and Wheelwright (1978), Levine (1967) reported that although there was an advantage of simplicity with the moving average method, exponential smoothing offered the best potential accuracy for short and medium term forecasting. Makridakis and Wheelwright (1978) cited other studies such as those of Gross and Ray (1965), Rayne (1971) and Krampf (1972) to justify that these studies have

produced similar results to those of Kirby (1966) and Levine (1967). One important revelation from these studies is that exponential smoothing techniques have been found to be generally superior in short-term forecast situations, although it was not clear which exponential smoothing technique was used.

In another study Shuqin (2002) attempted to compare three enrolment projection methods. These are namely: regression, auto-regression and three-component model.. His application of the three models to the six colleges helped to confirm that the regression and auto-regression methods worked very well. Using the mean absolute percentage error (MAPE), his results show that a complex model may not necessarily be a better model.

On the minimum benchmark or cut-off required for evaluating a forecasting model, writers shade diverging views. Sparkes and McHugh (1984) hold the view that the accuracy measure cut-off should be set based on executive assessment of what is acceptable. Gardener (1985) also posit that alternative forecasting models could be evaluated by comparing the position of their trade-off values of errors set usually at the discretion of management as tolerable limit. McCracken and West (2000) adopted equal and uniform accuracy measure, zero forecast bias and sign predictability. Other scholars opt for general criterion and standard to be set against which performance of models could be assessed. Among these categories are Armstrong and Collopy (1992) who although agreed on a bench mark of 0.30 argued that whichever measure is adopted for evaluating forecasting models, such must be uniform across the models being evaluated. Pappalardo & Serafini (2004)

proposed 0.28 in comparing linear and non-linear forecasting models in their studies.

However, for this study, we adopt a benchmark / cut-off of 0.25, which is lower than the benchmarks, set by the above studies. This is in recognition of the inflationary trends and some elements of uncertainty in the economy of study. The study also adopts Mean Absolute Percentage Error (MAPE) as the accuracy measure to be used; for its wider popularity and suitability to our study.

Accordingly, the following measures of forecast accuracy are usually outlined in the forecasting literature:

Mean Absolute Deviation or Error (MAD)

This is given by

$$\text{M.A.D} = \frac{\sum_{t=1}^N |A_t - F_t|}{n} \quad (17)$$

Where:

A_t = Actual value,

F_t = Forecast value

n = period.

Mean Absolute Percentage error (MAPE)

This is given by:

$$\text{MAPE} = \frac{100}{n} \sum_{t=1}^n \left| \frac{A_t - F_t}{A_t} \right| = \frac{1}{n} \sum \frac{|et|}{y_t} \quad (18)$$

Mean Squared Error (MSE)

$$\frac{\sum_{t=1}^n \left[\sum (A_t - F_t)^2 \right]}{n} \quad (19)$$

Root Mean Square Error (RMSE)

$$= \sqrt{\frac{\sum e_t^2}{n}} = \sqrt{MSE} \quad (20)$$

Mean Forecast Error (MFE)

$$\sum_{t=1}^n \frac{(A_t - F_t)}{n} \quad (21)$$

Tracking signal (TS)

$$TS = \frac{\sum_{t=1}^n (A_t - F_t)}{MAD} \quad (22)$$

Theil's Inequality Coefficient (U)

$$\frac{\sqrt{\frac{1}{n} \sum (A_t - F_t)^2}}{\sqrt{\frac{1}{n} \sum f_t^2} + \sqrt{\frac{1}{n} \sum A_t^2}} \quad (23)$$

Sources: [Arsham (2000), Wilson and Keating (1994) and Rex and Michael, 1991].

Where:

A_t = Actual values of transactions

F_t = Forecast values of transactions

n = Number of forecast periods.

The accuracy of a particular model being evaluated is measured on the basis of any of these and studies have indicated that the lower this measures the better the accuracy and quality of the forecast. On the other hand, the scaling of U is such that it will always lie between 0 and 1, if $U = 0 \rightarrow A_t = F_t$ for all forecasts and there is a perfect fit. But if $U = 1$, the predictive performance is as bad as it possibly could be. Consequently Theil's U statistic can be rescaled into and decomposed into 3 proportions of inequality, bias, variance and covariance such that bias + variance + covariance = 1. According to Bowerman (2006), the three components are as follows:

Bias: This indicates systems error. It is usually close to zero. A large bias indicates a system over or under prediction.

Variance: This indicates the ability of the forecasts to replicate degree of variability in the variable to be forecast.

Covariance: This proportion measures unsystematic error. Ideally, this should have the highest proportion of inequality such that these sum equal to 1 (Bowerman, 2006).

2.12 Limitations in the Selection of Forecasting Techniques

One of the problems that economic or business forecasters often face is how to select the best forecasting method to apply from a given set of forecasting alternatives. The economic or business answer to this problem is to develop tests for comparing the predictive ability of two alternative forecasting methods, given the forecasters loss function. The literature on forecast comparism has witnessed a renaissance in recent years, and a number of authors have proposed econometric techniques for forecast comparison under general loss function (Shuqin, 2002).

However, as detailed as some of the forecasting techniques appear to be, there are still problem areas that limit the ability of a business firm to select and apply a forecasting technique rather than the other. Some of the problems that may be involved include the fact that most business top executives expect to see a lot of wonders and precision in the predictive ability of the models than what is possible. The other problem lies in the area of getting appropriate degree of cooperation between various groups, departments and units. The task of forecasting in business also requires the support and understanding of the various groups especially the direct participant to succeed. Where this is lacking the predictive ability of any identified forecasting method or its quality is limited (Sabo, 2003).

There is also the tendency especially by small business, firms not to keep a trained man or woman to handle the forecasting exercise coupled with the fact that these firms cannot hire a specialist for its forecasting purposes. The old belief that anybody is equal to the task is therefore not well founded.

The other limitations that are usually mentioned include bad personal experience with forecasts for products, investments, weather politics, economics and stock markets. Once a firm records bad experience with a forecasting exercise or method there is a tendency for it to develop cold feet or fear in the subsequent forecasting exercise and hence less and less attention and commitment is given by the firm. Sometimes a forecasting methodology may receive a flat dismissal like for example: “we just simply do not know how to forecast” and this can pose serious problem to forecasting methods and exercises [Christie, 1998]. Similarly, Morden (1997) cautions that by its very nature, the forecasting process must face limitations that arise out of its needs to confront risk and uncertainty. While enterprise has to manage existing uncertainty as best as it can, it must also try to assess the degree and nature of uncertainty it will face within its forecast horizon.

On the other hand, the task of selecting a given forecasting technique for use is not an easy one. Many issues have to be borne in mind. Thus, like Makridakis and Wheelwright (1978) noted, the effective selection of forecast methodology for a given product or variable has two prerequisites: first range of alternatives must be understood and recognized. The second prerequisite is the existence of some systematic procedure for comparing the strengths and weaknesses of each alternative methods in different situations”. They pointed out that in addition to accuracy factor consideration, other criteria such as the pattern of data (since different methods require different data), time horizon, cost of method involved and its ease of application into a given organizational situation. If the

organization cannot finance a method or it cannot apply the method due to any of the factors above, then the method becomes not worthwhile.

In the words of Morden (1997), the choice of forecasting methods will depend on a number of factors including forecasting objectives, time-scale importance of the forecast, degree of accuracy required, availability of data and access to forecasting skills and experience. Each of these factors like the ones outlined above can indeed affect the selection process of a given method.

Chambers (1975) recognized the factors above and attempted to draw a summary of the general factors business organizations consider in choosing a particular technique. According to him the choice depends on many factors – the context of the forecast, the relevance and the availability of historical data the degree of accuracy desired, the time period to be forecast, the cost (benefit) of the forecast to the company and the time available for making the analysis. These factors, he argued must always be weighed on a variety of levels so that the actual selection of forecast technique leads to the expected result. A well chosen forecasting technique will yield accurate predictions, enjoy up to date data in which management has faith, is flexible enough to meet the various company needs, and it is kept within company budget.

In another study (Shuqin (2002) citing Bowerman and O’Connel (1993) reported that several factors may influence the choice of forecasting technique. These according to him include the following:

- a) Time Frame: This is in terms of how long is the forecast to be made? The more distant the forecast horizon the more difficult it is to forecast.
- b) The Cost of Forecasting: This includes costs of developing the model and collecting and storing database to be utilized by the model.
- c) The Availability of the Data: This is in terms of the quantity and quality of data required as well as how time-consuming it is to collect the required data.
- d) The Data Pattern: This is concerned with whether there is any trend in the data distribution and what kind of trend? The ease of understanding and operation.

In a study conducted by Wheelwright and Clarke (1976), it was found that because of the relative complexity of the various methods, organizations tend to go through evolutionary stages in their adoption of different forecasting techniques. As would be expected they usually start with more simple technique, such as subjective executive estimates or simple smoothing methods, and then gradually move to more complex methods. The reason often given for this evolutionary approach is the need for the increased accuracy that more complex methods seem to provide but it was also found by Wheelwright and Clarke (1976) that the organization required certain expertise before it could effectively apply more complex methods.

Similarly, the results of Shuqin (2002) study revealed that a complex forecasting method may not yield more accurate projection numbers. This is consistent with position of Kantowitz et al (1991) who indicated that if two

theories have the same number of concepts, then the one that can explain more results is a better theory. If two theories can explain the same number of results, then one with fewer explanatory concept is to be preferred”. In the same vein Shuqin (2002) argued logically that the criterion adopted by Kantowitz et al (1991) could be borrowed in selecting forecasting model. They write: “If two models are of the same complexity, the one with the better accuracy should be used. If two models explain the same accuracy the simpler model should be selected.”

2.13 Chapter Summary

In the course of review of relevant literature in the chapter under review in our bid to understand the nature and issues in our area of study, we reviewed a substantial literature in the area. Our discussion definition and related concepts, as well as review of historical developments serve a credible and useful prelude to review of relevant literature especially our theoretical framework. We rounded up our discussion in the section with a review of issues relating to the choice/selections of forecasting techniques from the point of view of various scholars. We began with some definitional issues on forecasting as well as discuss on the forecastability of the future empirically. We noted from those discussions that a successful forecaster must utilize some computational tools and exercise some good judgment in selecting and adjusting the tools to give fair and reliable results. We have also noted that the fundamental element in any forecast exercise of the future value of any variable dependent such as the rate of inflation, population, sales and profits is some explanation of how in the past the variable in question has been linked or related to some other explanatory variable which

it is sought to forecast as given i.e. it may believe that on the basis of previous data those variables on that basis are related in any one year to the rate of increase in money supply for example over the previous periods. Since the latter is known with some certainty, it can be used to establish some forecast of the other variables which depend on it. Using an appropriate technique especially via recent development in computer technology more fascinating models have been established and these facilitated the forecasting exercises in no small measure, leading to considerable forecast accuracy. We have also observed from the literature review that the accuracy and reliability of any forecast talk rests on its extent of minimizing forecast errors and bias. Forecasts are never expected to provide 100% accuracy, although they serve to give any idea and possible behavior of the variables being forecast. In fact, a study has indicated that the only time a forecast has any real utility is when it is not totally reliable, i.e. not 100%. As a rider to this, we argued that a forecast can still be 100% accurate (although not often) and still be useful.

The review also revealed that prior to 1950s there was little or no systematic area, though a handful of business forecasting methods were developed and available in statistical literature. However, it was also shown that the widespread application of these models was seriously hampered by lack of timely data to run the models. We have also noted that for an organization to grow from height to height it must have a well focused forecasting process that enables it to acquire some information on several items of interest, which will later enable it to perform a reliable forecast. The need for accurate forecasting has been evidenced by the fact that in the long-run, an organization will just discover that it requires a careful business/sales

forecast. It is also clear that forecast is essential to several other business areas of its application. These include investments, earning, expenses control, production control, planning expansion and developing proper personnel policies. Thus, as reported in the literature, forecasting found application in many facets of business organizations operation.

Apart from the lessons learnt from the review of empirical studies on forecasting, quite a number of lessons could also be learned in our review of the relationship between forecasting and planning typologies of forecasting techniques limitations and selection of forecasting techniques as well as in the area of our theoretical framework.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the design of the study and describes the various ways by which data and other information are obtained, used and combined for the purpose of this study. Under this chapter, the concern of the study was primarily with the methods that were utilized for the purpose of collecting appropriate data as well as the methods of analyzing such data so that our results could be established. Thus, this research design involved four main tasks on the basis of our research hypotheses which we formulated under sub-section 1.6 and in line with the Statement of the Problem and the Objectives of the study in Chapter One. The methodology would be focused along the four hypotheses centered on establishing the degree of association between actual profit and forecast profits of the sampled banks, establishing whether or not the techniques under study could forecast bank profits, establishing whether or not a significant difference exists between forecast errors distributions under the selected exponential smoothing techniques and finally establishing whether or not a significant difference exist between bank managers qualification and their ability to apply the formal forecasting techniques .

Hence, the scheme of the chapter is as follows: Section 3.2 we introduced basic research design and in 3..3, we explained methods of data collection and in section 3.4,data analysis techniques were presented. Section 3.5 discussed the validity of data analysis instruments and Section 3.6 highlighted the pilot study for the research. Section 3.7 explained the

validity and reliability of primary data collection techniques and Section 3.8 summarized the Chapter

3.2 Research Design

This research design was intended to specify the methods and procedures for acquiring the required information needed to structure and focus the study along its intended research objectives. Theoretically, three classes of design are identified. These are descriptive, exploratory and experimental designs. The descriptive research method is concerned with the collection of data for the purpose of describing, interpreting and analyzing the existing conditions. The central object is the discovery of meaning. The descriptive research thus gives a true picture of a situation. The exploratory approach on the other side according to Imoisili (1996) is usually designed to assist in identifying and locating relevant variables needed to test a given hypothesis. Under the exploratory approach, the researcher is usually uncertain about the nature of the variables under study and as such studies usually adopt flexible methods so that it could provide the designed results. The experimental design requires the utilization of data for the purpose of establishing the relationship between established phenomena. (Adogbo and Ojo,2003). Since the ultimate goal of any scientific research is the deduction of generalization that provide the basis for making prediction, the design for this studies were largely experimental and exploratory. This study adopted the descriptive approach for its suitability to the objectives of the study.

3.3 Method of Data Collection

The major concern of this study is the application of the exponential techniques in forecasting of bank profits in Nigeria. The data collection method adopted here, has taken into consideration the very essential and most important attributes of the data itself. The required secondary data were expected to be a time series one which would facilitate the application of the appropriate techniques for easy data analysis.

3.3.1 Sources of Data

In order to test the hypotheses of this study, relevant data were collected from the selected banks. For the purpose of this research both primary and secondary data were required to facilitate proper analysis. Primary data were collected through questionnaire and interview on some aspects of the research. Secondary data, which were largely published annual accounts of these banks, were collected for the purpose of utilization into the appropriate forecasting models. For the purpose of this study, we utilized the earnings before interest and taxes (EBIT) ,as the measure of profit in each of the selected banks for the period of study i.e. 1996-2005 inclusive.

This period was specifically chosen because some important changes and reforms that took place within it were largely directed on the banking industry. Thus, the study adopted the period between tail end of the last era i.e. 1996 with the conviction that the banks would have stabilized after the deregulation policy and the beginning of the new era i.e. tail end of 2005 which marked the beginning of the bank consolidation/capitalization policy

of the Central Bank of Nigeria . Hence, we utilized the secondary data from the sampled banks for this period for the purpose of our study.

The adoption of secondary data for the study was necessitated by three main reasons .First, the nature of the secondary data capable of fitting into our chosen forecasting techniques. The published annual accounts provide a convenient time series data required for the study. Second, the questionnaire or interview alone could not give us this data as accurate as what could be obtained from the published accounts. Third, the study strongly held the view that published accounts must have been audited by a recognized and legally registered and liable audit firm and certified by the Nigerian Stock Exchange, before such are published and therefore they appear to the study to be more of statement of facts, reliable and accurate.

3.3.2 Population of the Study

The population of this study is made up of all commercial banks quoted on the Nigerian Stock Exchange prior to the implementation of consolidation/capitalization policy in the year 2005. Bello (2004) citing the Nigerian Deposit Insurance Corporation (NDIC) report reported that the number of commercial banks quoted on the Nigerian Stock Exchange operating in Nigeria as at 31 December 2002 stood at 31. This number comprises of both new entrant to the industry (Bond Bank) since the license of Savannah Bank was cancelled. Consequently, the capitalization policy saw the number of banks reduced to just 25, through the shutdown, acquisitions and mergers. However, since the study would concentrate on the pre-consolidation period (1996-2005), the study utilized the 31 pre-consolidation commercial banks as the population for the study.

3.3.3 Sampling Procedure and Technique

For the purpose of this study, we drew the sample from the 31 banks quoted on the stock exchange as at 31st Dec, 2002. A sample of ten (10) banks was drawn from these 31 banks by means of simple random sampling procedure. This gives a sampling fraction of 32%, which was considered adequate for a study of this nature. The Earning Before Interest and Taxation (EBIT) for the ten year period (1996-2005) in respect of the sampled banks were extracted from published accounts for the purpose of application and analysis as a time series and secondary data for the study.

Since these banks were not homogenous in all respects, they were classified into specific groups for easy analysis. For the purpose of this study, the banks under study were classified into three categories namely type A, type B & type C on the basis of the sizes of their total deposits as at 30th June, 2005. Type A was made up of four banks whose total deposits were ~~₦~~51bn and above, type B consisted of 3 banks whose total deposits were between ~~₦~~ 26bn and ~~₦~~50bn and type C consisted of 3 banks whose total deposits were between ~~₦~~1bn and ~~₦~~25bn. The choice of four banks in the type A group was based on their size of deposits, which is a principal factor that can influence profit generation.

In order to determine the appropriate sample size for the study, we considered three important criteria namely the level of precision (margin of sampling error), the confidence interval and the degree of the variability in the attributes of the sample measured. We adopted a 95% confidence interval and 6% margin of sampling error, on an estimated population size of

310 i.e. 10 staff in each of the 31 quoted banks under study. The study also utilized the sample size formula;
$$n = \frac{N}{[1 + N(e)^2]} \quad (3.1)$$

Where n=desired sample size, N=estimated population size, e= Margin of sampling error.

Source: Israel (2006).

Substituting these values into the formula for the sample size, we obtained an appropriate sample size to be 146.50. Since this is just the minimum size required, we rounded the sample size off to 150 respondents; sending a total of fifteen (15) to each bank, which included some senior staff at the branch levels and top management at Head offices of the bank.

The primary data for the study were collected using random sampling procedure applied on two categories of respondents following the results of sample size determination formula 3.1 above. The two categories were created for the study and each was administered with the same set of questionnaire. The proportion of the strata are 2:1 for top management staff at each of the corporate Headquarters of the banks and the management staff at the branch offices of the selected banks. The reason being that the task of forecasting in these banks at the overall level lied with the top management, which was usually assisted by the branch management in the area of data input. Consequently, of the 150 respondents chosen for the study, 100 were drawn from top management staff in charge of profit planning in the sampled banks at their various head offices (ten from each bank branch). The remaining 50 (five from each bank branch) respondents were drawn from the senior management staff of the sampled banks at branch levels. Each of the

bank branches randomly selected was represented by five respondents drawn randomly from the branches of banks under study.

An important characteristic/feature of the two strata of the respondents is that both are experienced management staff either at the branch level or at the head offices that is responsible for the preparation of forecast at the branch level or its collation and preparation at the corporate Headquarters level. These two categories of respondents, to the best of our knowledge appeared to have more insight and knowledge in their bank forecasting processes and procedures compared to other staff that were not in any way involved with the forecasting procedures of the banks.

Owing to the peculiar nature of this study and in order to further enhance the validity of the questionnaire, both open-ended and closed-ended questions were utilized. This allowed for sourcing of correct information and guiding the respondents on the track of the study.

3.4 Method of Data Analysis

The methodology adopted for the data analysis was guided by the very nature of the research problem and the hypotheses to be tested. Hypothesis 1, Hypothesis 2 and Hypothesis 3 were tested using the time series data collected from published accounts of the banks and Hypothesis 4 was tested using the nominal data collected from the questionnaire. The hypothesis testing utilized the cross-tabulated values of Question 1 and Question 11 as per Appendix B attached.

Hypothesis 1

The first hypothesis aimed at establishing the existence or otherwise of correlation between the actual and forecast profits of the banks. Where a significant correlation was established between the dependent variable (forecast profit) and the independent variable (actual profit), it could be used to establish the degree of association between the two and by so doing we should be in a position to have an idea of the forecasting relationship between the variables and the forecast ability of profits using the actual profit data. Using this relationship, we could establish the evidence for model consistency as well as how significantly related was the dependent (forecast profit) to independent (actual profit) under a given model situation.

The correlation coefficient is calculated using the formula:

$$r = \frac{n \sum xy - \sum x \sum y}{\sqrt{n \sum x^2 - (\sum x)^2} \sqrt{n \sum y^2 - (\sum y)^2}} \quad (3.2)$$

Where:

n = number of periods being considered

x = actual profit (Independent variable)

y = forecast profit (dependent variable)

The value of r lies between -1 to +1 inclusive. If the value of r is equal to one (1) or minus one (-1), there is a perfect correlation in same or opposite directions respectively. If the value of r is equal to zero, then there is no correlation between the two variables. Ibanga (1992) adopted the following criteria for interpreting the value of r which he conveniently put in table 3.1 below:

Table 3.1: Interpretation procedure of correlation coefficient

Vale of r	Interpretation
Between 0 and ± 0.25	Zero or weak correlation
Between ± 0.25 and ± 0.50	Moderately weak correlation
Between ± 0.50 and ± 0.75	Moderately strong correlation
Between ± 0.76 and ± 1.00	Strong to perfect correlation

Source: Ibanga (1992).

For the purpose of this study, we adopted these criteria for interpreting r . In order to form and establish the significance of the computed r , we used the t -test for the significant difference of correlation and this enabled the substantiation of the computed r under each data of study. According to Gupta (1996), in order to further substantiate the results of correlation (value of r), there is need to perform a t -test for the significance of an observed correlation coefficient. This test is performed using:

$$t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}} \quad (3.3)$$

Where:

r = coefficient of correlation

n = number of periods

This study performed this test using level of significance of $\alpha = 0.05$ and the degree of freedom of $n-2$. The critical value for the t -test was obtained from tabulated values for the purpose of acceptance or rejection of the hypothesis. We would reject the null hypothesis where the calculated value is greater than critical value and we would accept the null hypothesis if our calculated value is less than critical value.

Hypothesis 2

This hypothesis sought to determine the forecast accuracy and for the purpose of this, the study adopted the Mean Absolute Percentage Error (MAPE). This is in line with Armstrong (1989) findings that models are better compared using single criterion. This would enable the study to assess the accuracy of each of the techniques under study against the bank secondary data for the purpose of generalization. The computational procedures and formulae for these have been presented in chapter two under the theoretical framework and were run using OMIS & MINITAB softwares. In line with the position the study took earlier, the minimum cut-off or bench mark would be 0.25 measure of MAPE under each of the models to be evaluated. The interpretation criterion would be based on the magnitude of MAPE. The lower the values of this for a model, the better and more accurate the forecast is. Hence, the null hypothesis H_0 would be rejected where the computed MAPE under a model is less than 0.25 and it would be accepted where the computed MAPE is greater than 0.25.

Hypothesis 3

Hypothesis 3 sought to compare the three selected models of exponential smoothing using the sampled data to establish the presence or otherwise a significant difference in forecast error. The main object here, was to establish in addition to hypotheses 1 and 2, whether a significant difference existed between these errors as obtained from the three versions of exponential smoothing i.e. Simple, Holt's and Winter's exponential smoothing techniques. The difference between this approach and that presented under hypothesis 1, is that here our concern was with the magnitude of errors generated from the three models simultaneously and based on this; it will be easy to compare the models and deduce which of these accounts for high errors and variation. For the purpose of this hypothesis testing, unadjusted forecast errors as given by Mean Absolute Percentage Error (MAPE) was utilized. This was necessary for the researcher to know which technique had worked well for which bank and whether in general terms, any technique was favored by any banking situation and data.

For the purpose of testing this hypothesis, One-way classification of ANOVA test was used. This parametric test was appropriate because some values in the errors were positive and yet others negative and the test had the ability to be run under this situation. In addition, where data for a given period was missing or rate of response varied, the test also had a way of adjusting for these for the purpose of arriving at significant difference. The One-way ANOVA classification was performed using its test statistic, as defined in its computational procedures as outlined in table 3.2 below:

Table 3.2 Computational Procedure for One-Way Classification of ANOVA

Sources of Variation	Sum of Squares	Degrees of Freedom	Mean Square	Computer F
Column means (Within the group)	SSC	k-1	$S_1^2 = \frac{SSC}{k-1}$	$F = \frac{S_1^2}{S_1^2}$
Error (between the group)	SSE	k(n-1)	$S_1^2 = \frac{SSC}{k(n-1)}$	
Total	SST	Nk-1		

Source: Walpole (1982)

Where:

SST = Total sum of squares

$$\sum_{i=1}^k \sum_{j=1}^{n_i} X_{ij}^2 - \frac{T^2}{N} \quad (3.4)$$

SCC = Sum of squares for column means

$$\sum_{i=1}^k \frac{T_i^2}{n_i} - \frac{T^2}{N} \quad (3.5)$$

SSE = Error sum of squares

$$= SST - SSC \quad (3.6)$$

k = Number of samples

n = Number of elements in the sample

N = Number of elements in the population

We used the above computational procedures in conducting the ANOVA test needed for comparing the forecast errors generated under different techniques and relating them for the purpose of testing this hypothesis statistically. For the purpose of testing this hypothesis, we utilized level of significance of $\alpha=0.05$. We also used the Excel software to run the data for the purpose of testing the hypothesis. We rejected the null hypothesis, where the calculated value was greater than critical value and we accepted the null hypothesis when calculated value was less than critical value.

Scheffe's Post-hoc Test

In situations where null hypothesis was rejected, we noticed that there was indeed a significant difference that existed which led to that decision. Another interesting question that we needed to answer was, which among these pairs of mean differences are significant or are they all significant? In order to establish the significance of the established mean difference in cases where null hypothesis was rejected, Scheffe's test was applied on the ANOVA data for the study. This was because Scheffe's test could also be used to establish which specific sample mean (error distribution) differs from which other specific sample means (error distribution) and the extent of their variation could also be deduced. Where no significant difference was established, Scheffe's test was not necessary. The Scheffe's test was performed using the statistic:

$$F_{\text{scheffe}} = F_{ij} = \frac{(\bar{X}_i - \bar{X}_j)^2}{MS_w \left(\frac{1}{n_i} + \frac{1}{n_j} \right) (k - 1)} \quad (3.7)$$

where,

\bar{X}_i = Mean of sample i

\bar{X}_j = Mean of Sample j

n_i = Sample size of group i

n_j = Sample size of group j

MS_w = Mean sum of squares for within the group.

k = number of samples

The value of i and j under this test was chosen in accordance with the number of samples available for pairing two at a time. The scheffe's F calculated above was compared with the tabulated or critical F obtained for $F_{0.05}(v_1, v_2)$, using $k-1$ and $N-k$ degrees of freedom at $\alpha=0.05$ level of significance.

Hypothesis 4

The fourth hypothesis tested the relationship between bank manager's academic qualification and their familiarity with forecasting techniques. In doing this, we subjected the questions on the academic qualifications of bank managers and that of their familiarity with the formal forecasting techniques to cross tabulation so that the Chi-square statistic was used to test the relationship between the two variables (described by nominal or ordinal data). This was because the Chi-square statistic could estimate the measure of discrepancy/relationship between two related variables. The χ^2 statistic is defined by the following expression:

$$\chi^2 = \frac{(o_1 - e_1)^2}{e_1} + \frac{(o_2 - e_2)^2}{e_2} + \frac{(o_3 - e_3)^2}{e_3} + \dots + \sum_{j=1}^k \frac{(o_j - e_j)^2}{e_j} \quad (3.8)$$

Where,

o_j = Observed frequency.

e_j = expected frequency.

Where this calculated value was greater than the tabulated or critical value we rejected the null hypothesis and it was accepted if the calculated value was less than critical value. The test was conducted at an $\alpha = 0.05$, level of significance

3.5 Justification of the Data Analysis Instruments

In the course of this study, four different techniques or instruments were used to test the four different null hypotheses (H_0). This was necessary because each of the null hypotheses (H_0) stood on its own and required a separate instrument for testing it. The correlation technique was adopted to test the first hypothesis because forecast profit and actual profits represented time series data and the association between these two, could serve a very useful purpose in assessing the strength of the association using correlation coefficient. The result of correlation obtained would help the study to anticipate the likely trend in the dependent variable given the actual trend in the independent variable. This technique was most suitable here because it could give correlation for up to any specified number of period provided the values of dependent (forecast) and independent (actual) are given. It could also highlight the direction and significance of bi-variate relationship.

The second hypothesis sought to find whether or not exponential smoothing techniques could help in forecasting of bank profits. The study considered measure of forecast accuracy as appropriate because the accuracy of the forecast explained its usefulness. Using the two measures of forecast accuracy, the study computed these measures for each model to establish the usefulness of the forecasting technique. There were a number of measures of forecast accuracy, however the study utilized Mean Absolute Percentage Error (MAPE) for its consistency and relative accuracy and suitability. The study also utilized the responses in the questionnaire to complement these two measures.

The third hypothesis sought to establish the significant difference between forecast error distribution under the simple exponential smoothing and those

of the modified versions under study. Owing to the fact that the study had more than two groups of errors (MAPE) to handle for the significant difference of means, the study considered the ANOVA technique most appropriate because of its ability to handle more than two samples or groups, unlike the t-test or Mann-Whitney U test that are restricted to two samples. The ANOVA test helped the study to establish whether or a not significant difference existed in forecast errors of the three models of exponential smoothing.

The justification for the use of Scheffe's post hoc test lies on the fact that it is flexible, it has robustness with regard to data snooping procedure, and it is based on F sampling distribution (ANOVA). The test was also popular owing to its robustness with normality assumptions and ability to perform even under heterogeneity of variance. It also enabled the study to avoid the problems of cumbersome requirements of Turkey's HSD test that the number in each sample group treatment must be equal.

The fourth hypothesis sought to test the relationship between bank managers academic qualification and their familiarity with forecasting techniques. The Chi-square statistic was considered appropriate because of its ability to test discrepancy, dependence and relationship of nominal or categorical data.

3.6 Pilot Study

Prior to undertaking a more rigorous fieldwork, a pilot study was conducted in June 2006 using Kaduna area offices of five banks. The respondents to the first draft of the questionnaire were drawn from top management staff of the banks involved who were directly involved in the profit planning and forecasting of their banks.

For the purpose of this pilot study, 20 copies of the draft questionnaire were administered on five banks namely; First Bank of Nigeria Plc, Guaranty Trust Bank Plc, UBA Plc, First Inland Bank Plc and Zennith Bank Plc. The questionnaires were restricted to branch managers and area managers. These categories of respondents were selected specifically because of their direct relationship and contact with the profit planning at their various banks. The responses received from the questionnaire led to the redesign and restructuring of some questions and modification of the language used to minimize respondents collaboration, possible bias and to enhance better understanding of the issues involved in the questionnaire. The preliminary responses to the draft questionnaire enhanced the study's resolve to proceed with the research as the responses indicated movement towards what was expected at some questions and against some expectation. Using the split-half procedure the study established the reliability coefficient of the questionnaire at 0.78. The procedure for the computation is presented in the next section.

From the responses to the questionnaire, it was obvious that each of the banks had been performing profit forecasting. It was also discovered that

most banks held monthly profit report sessions at their zonal offices or corporate headquarters. It was also discovered that most of the banks utilized only qualitative techniques to forecast their future profits.

3.7 Validity, Reliability & Limitations of Primary Data Instrument

The study utilized a qualitative evaluation method to analyze the data obtained from the Questionnaire. We utilized the cardinal scales and percentages where appropriate to show the trend of the responses and to find answers to the questions raised. A frequency distribution of the responses was constructed using SPSS to show the summary of the responses as and where appropriate.

However, in order to test for validity and reliability of the primary data collection instrument (ie questionnaire) the study adopted split-half reliability test to measure the reliability of the instrument. This method was based on the equivalence of performance of the respondents to the questionnaire. Questionnaires administered during the pilot study were labeled as ‘odd’ and ‘even’ and each category was given scores according to the responses on each question, (the close-ended). The two halves, ‘odd’ and ‘even’ was then assigned scores, consistent with SPSS coding procedure and then correlated with one another using Spearman’s rank order correlation as follows:

$$\text{rho} = 1 - \frac{6 \sum D^2}{n(n^2 - 1)} \quad (3.9)$$

rho = Spearman rank order correlation coefficient

D = deviation of ranks

n = number of periods.

The rho obtained using the formula above was then used in computing the split-half reliability coefficient or coefficient of internal consistency, for this is $r^{1/2}$ the half of the respondents. Hence, the reliability of the total responses is computed by using Spearman- Brown formula defined as:

$$r \frac{11}{22} = 2 \frac{r^2}{1+r^2} \quad (3.10)$$

Where, $r^{1/2}$ is the split half reliability coefficient. The higher the coefficient, the more reliable the questionnaire is and the lower this ratio, the less reliable the questionnaire, as a method of data collection. Using the methodology adopted above and running the pilot study data in SPSS, we obtained the results as summarized in the output table below:

Table 3.3: *Computation of reliability coefficient*

Correlations	First half	Second Half
Spearman's rho Firsthalf correlation.	1.0000	0.634**
Coefficient	0.0	0.041
Sig (2-tailed)	10	10
N.		
Second half Correlation Coefficient	0.634**	1.000
Sig (2-tailed)	0.041	0.0
N	10	10

**Correlation is Significant at the 0.05 level (2-tailed)

Source: Questionnaire, 2006.

From the table 3.3, it can be seen that Spearman's rho is 0.634, the correlation being significant at 0.05. Using this coefficient, the coefficient

of reliability was computed using the formula 3.9 using to be 0.78 i.e. 78%. This reliability coefficient implied that there was high consistency in our data instrument. The reliability of the secondary data instrument had been taken care of by the first hypothesis of this study

3.8 Chapter Summary

This section dwelt on the methodological designs, which the current study adopted. We utilized stratified sampling procedure to draw a sample of ten (10) banks that were quoted on the exchange. The study also used the sizes of bank deposits to form the three strata of banks classified as type A, type B and type C. The procedure for this was described earlier under sampling procedure and technique (Section 3.3.3) .Questionnaires consisting of both open-ended and close-ended items were administered on the sampled banks. Finally, consistent with each of the hypotheses formulated for the study, four different and appropriate techniques were utilized to test the hypotheses. These included the correlation analysis, which was later subjected to the t-test for the significant difference of correlation, Mean Absolute Percentage Error (MAPE) -measure of forecast accuracy, Analysis of Variance (ANOVA), Scheffe's Post -hoc test and Chi-square test. Qualitative evaluation /descriptive methods were utilized for analyzing the primary data (questionnaire).

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.1 Introduction

This chapter presents and analyses the data which were collected for the study. As outlined under chapter three, two major sources of data were utilized; the primary data obtained from questionnaire and the secondary data obtained from published annual accounts of the banks contained in our sample. The primary data for the study was sourced using one set of questionnaire, which was administered on management staff involved in profit planning and forecasting in each of the ten sampled banks. The primary data were intended to provide some explanation/information, which could not be obtained directly from the published secondary data. This chapter is therefore the linchpin of this research work as the entire data collected for the study was presented and analyzed under it. Thereafter the hypotheses were tested and necessary recommendations were offered based on the empirical evidence and findings.

This study adopted and utilized the descriptive approach to analyze the primary data for its suitability to the study. This enabled the study to get answers to some useful and related questions and enabled some inferences regarding the relationships between the issues under study and several implications drawn from the interpretations.

Using the sampling technique adopted in this study, the ten (10) banks that emerged were grouped into three categories namely; type A; type B and type

C. The procedure for the selection was outlined under section 3.3.3 . Type A is made up of four banks; Guaranty Trust Bank Plc, UBA Plc, First Bank of Nigeria Plc, and Zenith Bank Plc. The banks that fell under type B are Access Bank Plc, Ecobank Plc and Wema Bank Plc. The remaining three banks were classified as type C and these comprise of Inland Bank Plc, Manny Bank Plc and Omega Bank Plc. The banks under types A, B, and C made up the ten banks that were used in the study.

The secondary data were collected from the published accounts of these banks and were run using the models under the study. The output of this exercise with the secondary data was combined with that of the primary data for the purpose of hypotheses testing, at the appropriate points.

Four hypotheses were formulated for this study. The first hypothesis (H_{01}) states that there is no significant correlation between actual profits and forecast profits of banks in Nigeria. The second hypothesis (H_{02}) stresses that exponential smoothing techniques cannot forecast profits of banks in Nigeria. The third hypothesis (H_{03}) states that there is no significant difference between forecast error distribution of simple exponential smoothing and those of the modified exponential smoothing techniques. The fourth hypothesis (H_{04}) states that there is no significant relationship between bank manager's academic qualification and their familiarity with the forecasting techniques .Each of these hypotheses was tested using a different technique as appropriate as outlined earlier under the methodology.

Consequently, this chapter is broken into sections. Section 4.1 introduced the chapter and explains what it is out to achieve. Section 4.2 briefly

discussed the administration of the questionnaire and outcome there from. In the same vein, section 4.3 presented the analysis of responses to the Questionnaire and section 4.4 analyzed and presented the secondary data and results from running the data into the models of the study. Based on 4.3, section 4.4 concentrated on testing the Hypotheses and thereafter the results were analyzed and presented. Section 4.5 discussed some key findings and implications of the study and section 4.6 summarized the findings and the chapter.

4.2 Analysis of Responses to the Research Questionnaire

The table below summarizes the Questionnaire responses obtained from the total administered for the study:

Table 4.1: Summary of Responses to the Questionnaire

	Total	Number Returned	Percentage	None Response	Percentage
Branches	50	39	78%	11	22%
Head offices	100	87	87%	13	13%
Total	150	126	84%	24	16%

Source: Questionnaire, 2006.

From Table 4.1, a total of 150 copies of questionnaire were sent out to selected banks in the sample. A total of 15 copies of questionnaire were dispatched to each of the banks under study. Specifically, 10 copies of questionnaire were administered on the top management officers concerned with forecasting and profit planning at each of the head offices of the ten banks. Five copies of questionnaire were also administered on the top management of the branch in each of the 10 banks under study.

From the table, 126 copies of the questionnaire out of 150 administered, representing 84% were returned, while the remaining 24 copies of questionnaire representing 16% were not returned up to the time of compiling this report. The branches returned a total of 39 copies of the questionnaire representing 78% of the total and the head offices returned a total of 87 copies of questionnaire which represents 87% of the total. This implies that 84% of the copies of questionnaire that were administered and returned were used for analyzing the data and for the interpretation and inferences. This high response rate was due to the fact that majority of the respondents are located in one head office and as such getting them in one location at the respective head offices did not provide much difficulties as anticipated. This is revealed by Table 4.2 which presents the return of the copies of questionnaires by banks:-

Table 4.2: Summary of Questionnaire Responses By Bank

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid First Bank of Nig	13	10.3	10.3	10.3
Guaranty T Bank	14	11.1	11.1	21.4
UBA	13	10.3	10.3	31.7
Zennith Bank	12	9.5	9.5	41.3
Access Bank	11	8.7	8.7	50.0
Eco Bank	12	9.5	9.5	59.5
Wema Bank	12	9.5	9.5	69.0
Inland Bank	12	9.5	9.5	78.6
Manny Bank	14	11.1	11.1	89.7
Omega Bank	13	10.3	10.3	100.0
Total	126	100.0	100.0	

Source: Questionnaire, 2006.

From the analysis of the questionnaire, 60 of the respondents out of 126 respondents representing 47.6% fell between the ages of 41 – 50 years of age, while 53 respondents representing 42.1% fell between the age of 31 – 40 years, with those of ages 21 – 30 years and 51 – 60 years representing 7.1% and 2.4% respectively. This revelation is not difficult to appreciate considering the fact that most of the respondents are at high level management who must have gained a lot of experience in the industry, while still serving. Male respondents represented 83% while female respondents constituted only 17% of the total respondents.

The data also revealed that holders of first degrees or its equivalent accounted for 44% i.e. (56) and holders of second degree or its equivalent represented 49%. The Diploma holders accounted for 5%, while holders of

other professional certificates accounted for the remaining 2%. The questionnaire also reveals that 57 respondents representing 45% had at least 16 years of working experience, while 37 respondents representing 29% had working experience of between 11 and 15 years. Less than five years working experience is accounted for by 6.3%, while 5 – 10 years of working experience was accounted for by 24 respondents i.e. 19%.

Majority of the respondents also agreed that their banks are performing profit forecasting. The number of respondents stood at 98%, leaving the remaining 2% for the other options.

Table 4.3 Responses on the accuracy of the forecast performed

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not accurate at all	3	2.4	2.5	2.5
	Poor	3	2.4	2.5	5.0
	Moderately accurate	78	61.9	65.0	70.0
	Very accurate	36	28.6	30.0	100.0
	Total	120	95.2	100.0	
Missing	NR	6	4.8		
Total		126	100.0		

Source: Questionnaire, 2006

Table 4.3 indicates that 78 of the respondents representing 62% agreed that their existing forecasting mechanism leads to a forecast which is moderately accurate and 36 (29%) respondents believed that their forecast is very accurate. Two percent (2%) each agreed that the accuracy of their forecasting process is either not accurate at all or poor. However, a total of 6

respondents did not respond to this section and these represented 5% of the total. This shows that majority of the respondents agreed that their existing forecasting policies, which are based mostly on qualitative methods yield moderately accurate forecast for the management to utilize.

This finding is consistent with that of Sunday (2005) who found out that majority of non statistical approaches that are used by Nigerian banks in forecasting manpower requirements lead to moderately accurate forecast. However, this finding also conflicts with the earlier finding by Fildes (1985) who located 20 studies on Long-range forecasting. Going by his coding, 15 of such studies showed econometric models to be more accurate with 3 ties and 2 showing econometric models to be of less accuracy than other methods. However, studies such as those of Sparkes and McHugh (1984) seem to provide support for this finding, by affirming that executive assessments have an acceptable level of accuracy. Fildes (1985) also judged multiple regression followed by survey and opinion polling to be most accurate.

On the procedures followed by the banks under study in preparing their forecast profits, it is obvious from the responses that all the banks use one form of qualitative procedure or the other, majority of the respondents agreed that the managements of the various banks take into consideration the previous years performance (profit and loss), the profits of similar banks (peers), evaluation of National Economic forecast, expected business performance, level of deposit capital employed, micro loans given out, last performance key indicators in working out a given percentage or mark up that is considered reasonable for arriving at next years profits.

The managements also review their bank performance for the preceding periods by looking at the previous earning or loss, estimated growth and some limitations in achieving that growth rate before they arrive at what figure should constitute the forecast profit for the next period. In doing so, the bank management also assesses its historical operation data, forecast its accounts activity, examines fee-based income and costs/interests accruable during the period before apportioning the shares to be burned by the branches in meeting the agreed profit target. Management also considers returns on assets against the projected interest rates on deposits, liability and other non-interest expenses.

In achieving the projected profits, each branch is given its profit and loss projection which are appropriated monthly through the Management Profitability Report (MPR) to serve as guide to branch profit. Any deviation from the target is usually identified and addressed at the MPR meetings which are held monthly or quarterly, as the case of the bank may be.

Majority of the respondents also agreed that at the beginning of each financial year, branches are issued circulars to prepare their budget for the year. They are guided by some documents which are tailored towards achieving uniformity and accuracy in the budget. These documents include Management Control Document (MCD), Management Planning Document (MPD) and Annual Profit Report (APR). Our enquiry reveals that forms are designed to capture and provide some useful information needed for proper budgeting at the branch and head office levels. On the basis of these, branches generate their forecast and send to headquarters through the MPR meetings for vetting and review. At each of these sessions questions are

raised and the branch managers are expected to provide convincing explanation for their submission to be agreed on. Once agreed upon, the entire submission from the branches must also be approved at another high level sitting between management and the board. At this meeting, a growth percentage rate is agreed on and it will be shared proportionately to branches as Strategic Business Units (SBU) to meet as target for a specified period.

The practice in most of the banks, to our understanding, is basically bottom-up approach whereby forecast inputs originate from units and moves to groups and divisions to the executive and board for approval. This approach also takes into consideration anticipated customer size, deposits, other variables and based on the estimates, a percentage is built on each levels budget which is pursued vigorously. The branches and management at the corporate level assess their effort and successes in deposit mobilization, new products developments, various charges and commissions interest on loans and advances less expenses, taking into consideration government and monetary policies and general economic situation in the country.

Interestingly, majority of the respondents who answered in the affirmative to the question 8, answered question 9 as if they are answering questions 8. This confirms that they are still using the same methods as outlined in the above analysis. From the summary of their responses we did not see any significant deviation from the other method which they have described under question 8 above. Consequently, their responses did not vary much on the accuracy of the alternative forecasting methods. Majority agreed that the forecast is moderately accurate i.e. 43%. However, 40% of the respondents i.e. 50 respondents did not respond to this question. This is on the ground

that they answered in the affirmative on the preceding question (See appendix C). This finding is consistent with that of Mentzer and Cox (1984) who found out that majority of firms under his study appeared to use more of subjective or qualitative approaches in their forecast.

Responses on the familiarity with forecasting techniques are aimed at identifying the respondents' familiarity with some common forecasting techniques. It is important at this point to point out that the frequencies received by each of the techniques are scored by the respondents simultaneously by ticking the appropriate table as indicated. It was possible for a respondent to answer varying options for the different techniques due to limitation of SPSS to detach responses from one another, we present the tables as if the question was addressed to a particular technique. That depends on the nature of ticking by the respondents. Nevertheless, the tables could still be used to show the general familiarity with the techniques by the respondents.

Table 4.4: Respondents familiarity with Delphi technique of forecasting

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Familiar	44	34.9	34.9	34.9
	Familiar	66	52.4	52.4	87.3
	Fairly familiar	5	4.0	4.0	91.3
	Not Familiar	11	8.7	8.7	100.0
	Total	126	100.0	100.0	

Source: Questionnaire, 2006.

From table 4.4, at least 44 respondents representing 35% believed that they are very familiar with the Delphi technique of forecasting and 66 indicated that they are familiar with it representing 52% and 5 respondents explained that they are fairly familiar with it and 11 representing 9% indicated that they are not familiar with it at all. This shows that majority of the respondents expressed familiarity with the Delphi technique of forecasting. This finding is consistent with earlier finding of Rowe and Wright (1999), Olfshski and Joseph (1991), Vande Ven and Delbecq (1974).

Table 4.5: Respondents familiarity with Executive opinion technique of forecasting

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Familiar	59	46.8	46.8	46.8
	Familiar	67	53.2	53.2	100.0
	Total	126	100.0	100.0	

Source: Questionnaire, 2006.

From the table above, at least 59 respondents, representing 47% agreed that they are very familiar with the executive opinion technique and 67 respondents (53%) agreed that they are familiar with the method. This shows that majority of the respondents expressed familiarity with the executive opinion. Comparatively, the executive opinion technique appears to be more popular among the respondents in relation to the Delphi method. This might not be unconnected with the fact that the researcher tried to

explain the procedures of the two methods to most respondents and most of them construed them as essentially the same in their applications.

This finding is consistent with the earlier findings of Dalrymple (1987) who found out that the most popular techniques were sales force composite and jury of executive opinion methods. The finding is in contrast with other findings such as those of Wilson and Daubek (1989) who found increasing familiarity and application of computer based forecasting and Fildes and Lusk (1984) who found some increasing application and familiarity with quantitative techniques, such as exponential smoothing.

Table 4.6: Respondents familiarity with Exponential Smoothing technique of forecasting

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Very Familiar	3	2.4	2.4	2.4
Familiar	13	10.3	10.3	12.7
Fairly familiar	43	34.1	34.1	46.8
Not Familiar	67	53.2	53.2	100.0
Total	126	100.0	100.0	

Source: Questionnaire, 2006.

Table 4.6 could be used to explain the respondents' familiarity with the exponential smoothing techniques of forecasting. It can be seen that only 3 respondents are very familiar with the technique which accounts for just 2.4% of the total respondents in the study. A total of 67 respondents representing 53.2% are not familiar with it and a total of 43 respondents i.e. 34.1% expressed fair familiarity with it. However, 13 respondents

representing 10.3% are not familiar with the technique at all. This implies that majority of the respondents are not familiar with the exponential smoothing technique although only 2.4% of them can be said to be very familiar with the technique. This finding is contradicts those of Fildes and Lusk (1984) and Mentzer and Kahn (1995) who demonstrated some evidence that forecasting executives were more satisfied with exponential smoothing indicating hat exponential smoothing was more successful than what it was ten years ago. Perhaps the major reason for the variation is due to differences in economic and environmental factors of countries where such studies were conducted and those of Nigeria where this study is being conducted.

Table 4.7: Respondents familiarity with other techniques of forecasting

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Familiar	8	6.3	7.4	7.4
	Familiar	2	1.6	1.9	9.3
	Fairly familiar	20	15.9	18.5	27.8
	Not Familiar	78	61.9	72.2	100.0
	Total	108	85.7	100.0	
Missing	NR	18	14.3		
Total		126	100.0		

Source: Questionnaire, 2006.

Table 4.7 seeks to identify the respondents' familiarity with techniques other than the three common ones presented earlier. Eight (8) respondents representing (6.3%) are very familiar with other methods. Two respondents representing (1.6%) are familiar with other methods and 20 respondents 16% are fairly familiar with the methods. However, 78 respondents representing 62% agreed that they are not familiar with any other methods. Yet, a total of 18 respondents did not respond to this questions and the responses are accordingly adjusted and presented under valid percent column in the table. This finding implies that majority of the respondents are not familiar with the forecasting techniques other than the ones used in their organizations. Again this finding confirms that of Sunday (2005) who established more familiarity with non-statistical methods in forecasting human resources requirement in Nigerian banks.

The finding also confirms that of Abu-Abdissamad (2000) who found out that ratio analysis was about the only quantitative technique used by Nigerian Commercial banks in evaluating loan proposal. He established that other popular methods in finance literature such as MDA, Logit, and LGP were not used at all. Among the few respondents that are either familiar or very familiar with other techniques, they mentioned techniques such as regression analysis, time series analysis, data tracking or some computer application packages specifically on banking as some of the techniques that they are familiar with, which are used in forecasting. On the accuracy of these techniques, majority of the respondents agreed that they are moderately accurate.

Cross tabulation of these responses on familiarity with the technique in the SPSS reveals some other interesting relationships on issues under study. The familiarity of the respondents with the forecasting techniques was cross tabulated with qualification and later with the years of working experience. The following table reveals of the first cross tabulation.

Table 4.8: Responses on qualifications of respondents * Respondents familiarity with the forecasting techniques Cross tabulation

Responses on qualifications of respondents * Respondents familiarity with the forecasting techniques Crosstabulation

			Respondents familiarity with the forecasting techniques				Total
			Delphi Method	Executive Opinion	Exponential Smoothing	Others	
Responses on qualifications of respondents	Diploma	Count	1	1	0	2	4
		% within Respondents familiarity with the forecasting techniques	3.6%	1.8%	.0%	18.2%	3.4%
	B.Sc	Count	9	25	14	3	51
		% within Respondents familiarity with the forecasting techniques	32.1%	43.9%	70.0%	27.3%	44.0%
	MBA	Count	17	30	6	5	58
		% within Respondents familiarity with the forecasting techniques	60.7%	52.6%	30.0%	45.5%	50.0%
	Others	Count	1	1	0	1	3
		% within Respondents familiarity with the forecasting techniques	3.6%	1.8%	.0%	9.1%	2.6%
Total		Count	28	57	20	11	116
		% within Respondents familiarity with the forecasting techniques	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Questionnaire, 2006.

The table 4.8 indicates the level of familiarity with the forecasting techniques and attempts to relate it to the respondent's qualification. It can be used to show the relationship between these two variables. From the table, it can be seen that a large concentration of familiarity with the

techniques actually lies in the holders of B.Sc or its equivalent and holders of second-degree MBA or its equivalent in related area. These categories of respondents account for high percentages for all the techniques. Interestingly, holders of second degree also appear from the cross tabulation to have higher familiarity with the techniques compared to the holders of first degree. For instance 32.1% for Delphi technique against 60.7% for second degree and first-degree holders respectively. The second-degree holders also recorded 52.6% of familiarity with executive opinion technique in relation to 43.9% recorded in the same technique by the first-degree holders. This implies that there is a relationship between respondent's academic qualification and familiarity with forecasting techniques. This finding confirms the earlier finding of Abu-Abdissamad (2000) who in a related study on quantitative techniques used by Nigerian commercial banks in evaluating loan proposal, found a significant relationship between qualification of managers and their ability to adopt to quantitative techniques for evaluating loan proposals.

Further cross tabulation also reveals another important finding for the study on the relationship between years of working experience and the familiarity with the techniques. This is presented in table 4.9 below.

Table 4.9: Responses on respondents years of working experience *

Respondents familiarity with the forecasting techniques Crosstabulation

Responses on respondents years of working experience * Respondents familiarity with the forecasting techniques Crosstabulation

			Respondents familiarity with the forecasting techniques				Total
			Delphi Method	Executive Opinion	Exponential Smoothing	Others	
Responses on respondents years of working experience	Less than 5 years	Count	2	5	0	1	8
		% within Respondents familiarity with the forecasting techniques	7.1%	8.8%	.0%	9.1%	6.9%
	5-10 Years	Count	6	14	1	0	21
		% within Respondents familiarity with the forecasting techniques	21.4%	24.6%	5.0%	.0%	18.1%
	11-15 Years	Count	5	16	11	3	35
		% within Respondents familiarity with the forecasting techniques	17.9%	28.1%	55.0%	27.3%	30.2%
	16 Years above	Count	15	22	8	7	52
		% within Respondents familiarity with the forecasting techniques	53.6%	38.6%	40.0%	63.6%	44.8%
Total		Count	28	57	20	11	116
		% within Respondents familiarity with the forecasting techniques	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Questionnaire, 2006.

Table 4.9 shows that the high percentage of the respondents with high years of working experience has high familiarity with the techniques compared to people with low years of working experience. Furthermore, the table shows that the high the years of working experience, the high the familiarity with the techniques.

Table 4.10 : Responses on the usefulness of Exponential Smoothing in profit forecasting among those who are familiar with it

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very useful	22	17.5	37.3	37.3
	Fairly useful	30	23.8	50.8	88.1
	Poor	3	2.4	5.1	93.2
	Not useful	4	3.2	6.8	100.0
	Total	59	46.8	100.0	
Missing	NR	67	53.2		
Total		126	100.0		

Source: Questionnaire, 2006.

Table 4.10 could be used to explain the responses of the respondents on the usefulness of the exponential smoothing technique in forecasting bank profit. The table shows that 22 respondents out of those who had earlier on expressed familiarity with this technique represented by 37.3% agreed that exponential smoothing technique is very useful in forecasting exercise. 30 respondents of them (50.8%) also agreed that it is fairly useful and 3 respondents each representing 5.1% agreed that it is poor. Similarly, four respondents (6.8%) agreed that it is not useful. However, 67 respondents 53.2% withheld their comments on the usefulness of the technique. This was perhaps because they had expressed earlier as we presented under table 4.6 above that they were not familiar with it and as such they did not want pass judgment on what they were not familiar with in line with the instruction in the questionnaire. Consequently, the remaining frequencies

were validated to the appropriate percentages and presented under valid percent in the table.

Table 4.11: Responses on aspect of operation considered in profit forecasting

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Volume of operations	53	42.1	44.2	44.2
	Level of market capitalization	10	7.9	8.3	52.5
	Peer group ranking	24	19.0	20.0	72.5
	All of the above	33	26.2	27.5	100.0
	Total	120	95.2	100.0	
Missing	NR	6	4.8		
Total		126	100.0		

Source: Questionnaire, 2006.

Table 4.11 indicated that 53 of the respondents 42.1% agreed that the volume of their operations is the most important factor considered in their profit planning. Level of market capitation is represented by 10 respondents, which is 19%. Also, 33 respondents representing 26% agree that all of the above factors are usually taken into consideration in preparing profit forecast by their banks. 6 respondents however did not respond to this question and the valid responses have been adjusted accordingly as presented in the table above. This finding is consistent with that of Fatokun (2004), who

conducted study on quantitative procedures for estimating cost of ordinary share capital of quoted Nigerian banks.

Table 4.12: Responses on the satisfaction of respondents with existing profit forecasting procedure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not applicable	1	0.8	0.8	0.8
	Not satisfied	10	7.9	8.1	8.9
	Satisfied	92	73.0	74.8	83.7
	Very satisfied	20	15.9	16.3	100.0
	Total	123	97.6	100.0	
Missing	NR	3	2.4		
Total		126	100.0		

Source: Questionnaire, 2006.

Table 4.12 indicated that 20 respondents are very satisfied with the existing procedure of profit forecasting which accounts for 16%. While 92 respondents are satisfied with their profit forecasting procedure and this represents 73% of the respondents and 10 respondents representing 8% indicated that they are not satisfied with the existing procedure. They mentioned the possible causes of their dissatisfaction and these are specifically presented under their suggestions for improving the system and procedure. This finding is not unexpected considering the caliber and ranks of the respondents who are strictly management staff either at the branch or at the headquarters level.

Table 4.13: Responses on the problems hindering effective profit forecasting

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Economy related	66	52.4	52.8	52.8
	Industry based	12	9.5	9.6	62.4
	Lack of techniques	14	11.1	11.2	73.6
	All of the above	25	19.8	20.0	93.6
	Others	8	6.3	6.4	100.0
	Total	125	99.2	100.0	
Missing	NR	1	.8		
Total		126	100.0		

Source: Questionnaire, 2006.

Table 4.13 indicated that that 66 respondents representing 52% are of the view that the problems hindering effective profit forecasting are largely economy related, while 12 representing 10% are of the view that the problems are industry based. Meanwhile, 14 respondents representing 11% are of the view that the problem has to do with lack of techniques for forecasting and 25 respondents i.e. 20% hold that it is the combination of the entire above category of problems that constitute the problems hindering effective profit forecasting by banks. This implies that a number of problems which hinder effective profit forecasting stem up from the

economy itself which includes issues such as inflation, growth rate, economic and monetary policies.

When asked to suggest various ways by which forecasting process can be improved generally in their banks, majority of the respondents expressed their candid opinion on how they thought their forecasting process could be improved. Majority of the respondents focused on operational issues affecting their forecasting as well as those that affect their forecasting process indirectly. They hold the view that forecast should not precede annual government budget, because government budget usually consists of a lot of policy issues which if not carefully studied can lead to serious distortion in the subsequent budgets and projection of the entire banking industry. They also suggested for a more stable economic, monetary, fiscal and industrial policies.

A cross section of the respondents made a case for harmonization of industrial and economic policies so that they do not contradict one another. Another section made a case for realistic and achievable targets, which sought data and inputs from all the stakeholders instead of only top management, based on more scientific approaches, which seek to model bank operation and other relationships necessary for forecast implementation.

Another section of the respondents called for optimization of information technology to identify modern tools and try them with a view to selecting the best under each bank's situation. They also called for proactive and direct involvement of all stakeholders and the field staff for their input. A section

of the respondents also made a strong case consistent government and monetary policies, adding that no matter the method, it will rely on these policies to succeed. They also called for regular training of practitioners on modern techniques so that they can learn from the experience of the banks in advanced countries.

Responding on the factors affecting profits, which must be given attention for any successful forecasting exercise, the respondents mentioned a lot of factors and these are summarized. Specifically, they mentioned factors such as staff cost, and overhead, effective management of deposit, deposit mobilization and volume of transaction, uncontrolled expenses, bad loan, loan losses, prices and competition. They identified other factors such as low interest rate, high running cost, incompetent management general macro economic condition increase in generation of risk assets inappropriate forecast bases and unnecessary expenditures outside the budgetary provisions. They also argued that delay in approving credit requirement and embarking on unnecessary projects and purchases of inconsequential properties for official use could add to the running costs of the banks which could wipe away the anticipated level of profit. These views also confirm the works of Fatokun (2004).

Table 4.14: Responses on the frequency with which Management Profitability Report (MRP) meetings are held

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Quarterly	33	26.2	27.0	27.0
	Once a month	51	40.5	41.8	68.9
	Once a year	10	7.9	8.2	77.0
	Not too often	15	11.9	12.3	89.3
	Never	13	10.3	10.7	100.0
	Total	122	96.8	100.0	
Missing	NR	4	3.2		
Total		126	100.0		

Source: Questionnaire, 2006.

Table 4.14 revealed that banks under study conduct their Management Profitability Report (MPR), for the purpose of profit planning and forecasting. 26% agreed that they attend the MPR meeting on quarterly basis. 51% replied that they attend it on monthly basis. Other respondents reported that they attend it once in a year and 12% agreed that they attend it but not too often. However, 13 respondents representing 10% replied that they never attended it. It might be possible that these might be among the newly posted executive directors having direct control with the planning sections who are yet attend since their posting. Four (4) respondents, (3%) did not answer this question and this has been posted for regeneration of valid responses as can be seen in the table.

Table 4.15: Responses on the frequency at which staff are sent for forecasting workshops/training

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Once in 3 years	4	3.2	3.3	3.3
	Once a Year	18	14.3	14.8	18.0
	Frequently	27	21.4	22.1	40.2
	Not too often	38	30.2	31.1	71.3
	Never	35	27.8	28.7	100.0
	Total	122	96.8	100.0	
Missing	NR	4	3.2		
Total		126	100.0		

Source: Questionnaire, 2006.

Table 4.15 indicated the extent and frequency of professional forecasting training received, not necessarily on-the-job by the respondents. It also shows that only 4 respondents representing 3% were sponsored by banks for professional training on forecasting. 18 replied that they are sent for training once in a year and 27 agreed that they attend it frequently. However, 38 respondents replied that they attend it not too often, and 35 respondents representing 28% agreed that they have never been sent for any forecasting workshop or training outside their banks. This implies that majority of the banks forecasting officials are not sent for formal professional forecasting training other than the on-the-job training.

4.3 Analysis Of Secondary Data

In addition to the primary data presented in the preceding section, this study also extracted secondary data from books of accounts as published by the banks under study. The secondary data involved the time series in the form of earning before interest and taxation (EBIT) of the banks under study for a period 1996-2005. Since these are published by the Nigerian Stock Exchange, in its annual 'fact book' and the extracted EBIT figures were rounded off to two decimal places and for the purpose of running them into the models of the study, the figures were converted to a common basis i.e. nearest ₦ billion for easy analysis. This is useful since some banks in the sample did not earn up to billions in their EBIT and this facilitated inter-bank comparison of the models. The study utilized the interpolation approach to deduce the level of EBIT for two periods whose data were missing from the published account. These periods are the years 1997 for first bank, and 2002 for Omega Bank Plc. The researcher gathered that there was a change of accounting period for the two banks and the figures were moved to the next period. Since the models under study would cease to function in case of any break in the data, we utilized the method of interpolation to fill the missing gap for the two banks affected so that the software could accept the time series data for the purpose of running it successfully. This practice is common especially in handling time series data for projection and budgeting where the accounting framework demands inputs that are not available as frequently required. We examined the data series and trend for the two of any extreme values affected and adopted the average method to fill the missing gap. This procedure was also adopted by Wiener (1942), Gregory and Lin (2005) in their studies.

Consequently, the following table presents the EBIT time series data in respect of the ten (10) sampled banks for period of ten years (10) used for the study:

TABLE 4.16: Showing the Earnings Before Interest and Taxation (EBIT) of 10 Sampled Banks (1996-2005)

	“000”	“000”	“000”	“000”	“000”	“000”	“000”	“000”	“000”	“000”
Year	ZENNITH BANK PLC	FIRST BANK OF NIG	GT BANK PLC	UBA PLC	ACCESS BANK NIG	WEMA BANK PLC	ECOBANK PLC	FIRST INLAND BANK PLC	MANNY BANK PLC	OMEGA BANK PLC
1996	896,750.00	1,385,000.00	1,010,042.00	1,348,000.00	17,902.00	251,316.00	435,148.00	50,437.00	(55,049.00)	50,420.00
1997	918,450.00	No inf.	1,030,895.00	1,020,000.00	41,251.00	264,602.00	781,301.00	161,048.00	30,964.00	122,276.00
1998	1,256,962.00	2,835,000.00	835,004.00	1,065,000.00	28,236.00	351,038.00	815,578.00	161,048.00	209,756.00	183,941.00
1999	1,529,491.00	4,288,000.00	933,064.00	1,929,000.00	108,187.00	489,303.00	24,673,000.00	264,750.00	27,038.00	261,407.00
2000	1,863,214.00	5,767,000.00	1,360,927.00	4,006,000.00	166,594.00	303,875.00	28,787,000.00	127,786.00	380,851.00	381,886.00
2001	2,802,580.00	6,715,000.00	2,053,323.00	1,682,000.00	116,081.00	800,067.00	25,538,000.00	282,869.00	361,248.00	623,932.00
2002	3,999,368.00	6,172,000.00	3,107,315.00	2,472,000.00	810,640.00	2,293,667.00	30,275,000.00	598,393.00	399,641.00	No inf.
2003	5,440,471.00	14,420,000.00	4,144,919.00	5,128,000.00	810,639.00	2,286,027.00	48,462,000.00	477,942.00	197,727.00	382,000.00
2004	6,404,885.00	14,853,000.00	4,833,256.00	6,010,000.00	951,750.00	1,420,019.00	60,315,000.00	527,094.00	213,420.00	154,000.00
2005	9,164,787.00	16,608,000.00	6,527,537.00	4,653,000.00	751,033.00	1,001,623.00	73,729,000.00	187,532.00	146,819.00	754,000.00
Type	A	A	A	A	B	B	B	C	C	C

Source: Annual accounts of the banks & Stock Exchange Fact Books

4.4 Hypotheses Testing

In this section, we performed hypotheses testing in line with the methodology for the study.

HYPOTHESIS 1

This hypothesis states that:-

H₀: There is no significant correlation between actual and forecast profits of commercial banks in Nigeria.

In order to test this hypothesis, we utilized the data on table 4.16 above into the three exponential smoothing models under study using data for 10 banks for a ten year period as specified under methodology. Using Decisionpro grid search, we obtained values of α , β and γ as 0.18, 0.25 and 0.45 respectively. We also used the average of the first four years as the initial value, so that the first and second models that require this can be initialized. We obtained the forecast value of EBIT for each of the ten banks for ten year period using each of the three models and correlated the actual profit with the forecast profit under each using each of the three models. (See appendix D).

The following table summarizes the SPSS output under each model:

Table 4.17: Table 4.17 (a): Correlations of Actual Bank Profits Vs Forecast Profits (Single -Parameter Model)

		Actual Bank Profits	Forecast Profits (Single Parameter Model)
Actual Bank Profits	Pearson Correlation	1	.370(**)
	Sig. (2-tailed)		.056
	N	99	99
Forecast Profits (Single Parameter Model)	Pearson Correlation	.370(**)	1
	Sig. (2-tailed)	.056	
	N	99	100

** Correlation is significant at the 0.05 level (2-tailed).

Source: Computed from secondary data.

Table 4.17 (b): Correlations of Actual Bank Profits Vs Forecast Profits

		Actual Bank Profits	Forecast Profits (Holt's Two-Parameter Model)
Actual Bank Profits	Pearson Correlation	1	.432(**)
	Sig. (2-tailed)		.056
	N	99	99
Forecast Profits (Holt's Two-Parameter Model)	Pearson Correlation	.432(**)	1
	Sig. (2-tailed)	.056	
	N	99	100

(Holt's Two-Parameter Model)

** Correlation is significant at the 0.05 level (2-tailed).

Source: Computed from secondary data.

Table 4.17 (c): Correlations of Actual Bank Profits Vs Forecast Profits (Winter's Three-Parameter Model)

		Actual Bank Profits	Forecast Profits (Winter's Three-Parameter Model)
Actual Bank Profits	Pearson Correlation	1	.482(**)
	Sig. (2-tailed)		.056
	N	99	99
Forecast Profits (Winter's Three-Parameter Model)	Pearson Correlation	.482(**)	1
	Sig. (2-tailed)	.056	
	N	99	100

** Correlation is significant at the 0.05 level (2-tailed).

Source: Computed from secondary data

From the tables above the correlation coefficients under the three models as presented in table 4.17 (a) – 4.17(c) are 0.370, 0.432, and 0.482 respectively. In line with our interpretation procedure, there was a moderately weak correlation in each case. Hence, there is a moderately weak correlation between actual and forecast profit of banks under study.

Applying t-test for the significant difference of correlation at $\alpha=0.05$ for the data under each of the three models, we obtained $t=1.41$, 1.67 and 1.84 for Single, Holt's and Winter's exponential smoothing models respectively. At $\alpha=0.05$, the critical value is $t_{0.05}^{99} = t_{0.05/2} = 1.96$ i.e. at 99 degrees of freedom with 0.05 significance level. This is because $n > 30$ and t is equated to be a normal distribution. It can be noticed that the calculated value under

each case is less than 1.96. Hence, the null hypothesis H_0 is accepted and H_1 rejected.

The Implication of this finding is that moderately weak association/correlation implies a moderately weak model consistency under each case. This implies that each forecast data under each of the three models is moderately correlated with the actual data from which it is derived. This finding also suggests the model significance under each case, meaning that each of the three models has a specific measure of accuracy, with the Winter's model having the highest model significance (correlation) and high tendency to provide accurate forecast using the given secondary data. It is followed by Holt's two-parameter model and lastly by the single parameter model. The finding also suggests the anticipated hierarchy of accuracy using any measure of forecast accuracy. This finding confirms works of McCracken and West (2000) who utilized correlation as a good tool for testing for model efficiency and consistency and that of Armstrong and Collopy (1992) who compared eleven (11) models for consistency, accuracy and reliability, using correlation as a tool.

The low correlation coefficient obtained is suggestive of the inability of the forecast to be strongly associated with the forecast generated from the same data. It is also indicative of the level of uncertainty and risky nature of the Nigerian Business environment. We noted from the literature on some empirical works done in the area that changes in several macroeconomic variables and other equally important factors, which determine bank profit could have been responsible for this. They keep on changing so frequently to the extent that the bank profits also keep going up and down depending on

the favorableness or otherwise of the combined effects of these factors. These sudden and frequent changes in these variables owing to the level of uncertainty in the environment have caused serious jump/fall in the earnings levels of the banks.

HYPOTHESIS 2

H_0 : Exponential smoothing techniques cannot forecast commercial bank profits in Nigeria.

In order to test this hypothesis, the following table presents summary of computed measures of accuracy for each of the three models under study:-

Table 4.18: Summary Of Computed Measures Of Forecast Accuracy (MAPE) See next page

S/No	Model	Measure of Forecast Accuracy	Simple (Single) Exponential Smoothing Model (1)	Holt's Two- Parameter Model (2)	Winter' Three- Parameter Model (3)	Remarks
	Name of Bank	Mean Absolute Percentage Error (MAPE)	Smoothing Parameter: $\alpha=0.18$	Smoothing Parameter(s): $\alpha=0.18;\beta=0.25$	Smoothing Parameter(s): $\alpha=0.18; \beta=0.25;\gamma=0.45$	Reject H_0
1)	First Bank of Nig Plc	MAPE	43.87%	41.24%	19%	1
2)	Guaranty Trust Bank Plc	MAPE	38.81%	36.85%	32.0%	-
3)	Zennith Bank Plc	MAPE	44.38%	42.27%	28%	-
4)	UBA Plc	MAPE	38.09%	36.43%	18%	1
5)	Access Bank Plc	MAPE	55.32%	51.21%	48.0%	-
6)	Wema Bank Plc	MAPE	36.21%	36.61%	44%	-
7)	Ecobank Plc	MAPE	171.05 %	157.13%	34%	-
8)	Inland Bank Plc	MAPE	42.53%	44.64%	48.0%	-
9)	Manny Bank Plc	MAPE	65.77%	67.80%	92.9%	-
10)	Omega Bank Plc	MAPE	49.40%	49.87%	48.01%	-
	Remarks	Reject H_0	-	-	2	

Source: Computed from time series data in table 4.16

The 4.18 above shows the various measures of forecast accuracy computed using Operation Management Software (OMIS) and MINITAB as per appendix D attached. It could be observed from the table that each of the three models recorded a specific measure of forecast error as revealed by their respective Mean Absolute Percentage Error (MAPE) on the bank data for which they were applied for the period of study. However, in order to decide to accept or reject the Hypothesis 2, we considered table 4.18 and utilized a cut-off of 0.25 Mean Absolute Percentage Error (MAPE); consistent with the adopted position in the literature review and methodology for the study.

Examining table 4.18 horizontally and vertically, we noted that each of the three models has recorded some measures of forecast accuracy on the various bank data on which they were applied. The single -parameter model for instance has recorded Mean Absolute Percentage Error (MAPE) of 43.87% for First Bank of Nigeria, 38.81% for Guaranty Trust Bank Plc and 44.38% for Zennith Bank Plc. Other measures of MAPE for the model for the remaining banks were computed and recorded against them. The Holt's two-parameter model also recorded a MAPE of 41.24% for instance for first bank, 36.85% for Guaranty Trust Bank, 36.43 for UBA, 51.21% for Access Bank Plc. Under the Winter's three -parameter model, the banks also recorded some values of MAPE. For example the First bank Plc recorded 19%, and Guaranty Trust Bank recorded 32%, Zennith Bank also recorded 28%.

It could be observed from the table that in all the thirty sample points as obtained from the product of 3 models and 10 banks under study; we noticed that in 28/30 places, none of the models satisfied the minimum cut off MAPE of 25%. However, the Winter's three -parameter model satisfied the condition of this cut-

off in two places (2/30). These two places (banks) are in the case of first bank plc and UBA plc, which recorded 19% and 18% respectively. Because of ratio of 28/30, we did not have sufficient evidence to reject the null hypothesis. Hence, the null hypothesis, which states that exponential smoothing techniques cannot forecast commercial bank profits in Nigeria, is hereby accepted.

These findings confirm the earlier findings under the first hypothesis tested earlier, which indicated moderate association or correlation in each of the models under study. This finding is also consistent with the revelation of the first hypothesis that the models were actually differentiated in terms of the degree of the association recorded under each of them. Closer inspection of table 4.18 also revealed another scenario. For example, the single -parameter model recorded an average error of 58.54%, the Holts two -parameter model recorded 56.40%, while the Winters three-parameter model recorded 40.93%. This shows that the tendency for forecast error for the data under study largely rested with single- parameter model, followed by two- parameter model and lastly the Winters three parameter model according to the order of their average errors. These findings confirm those of Mentzer and Kahn (1995), Forbes et al (2005), it has also confirmed the original conceptual and philosophical propositions of Winter (1960).

HYPOTHESIS 3

H_0 : There is no significant difference between forecast error distribution of simple exponential smoothing and those of modified exponential smoothing techniques.

In order to test this hypothesis we utilized the following table on SPSS output applied on mean absolute percentage errors (MAPE) on table 4.18 above.

Table 4.19: ANOVA output

ANOVA					
MAPE					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1847.450	2	923.730	3.591	.035
Within Groups	6944.460	27	1146.091		
Total	8791.91	29			

Source: Table 4.18 above

In order to test this hypothesis, we recognized and utilized error distributions of the three techniques under study as computed under appendix D and summarized in table 4.18 for each of the banks under study. We also recognized the error under each model as forming forecast error distribution. On these three error forecast error distributions, we computed ANOVA using SPSS software and table 4.19 shows the output derived from this. From the table the calculated value of the F-ratio is 3.59 and the critical value at 0.05 level of significance $\alpha=0.05$, with 2 and 27 degrees of freedom is 3.35. Alternatively, at a level of significance of $\alpha=0.05$, the P-value computed is 0.035, meaning that the result is significant. Hence, we

reject the null hypothesis and accept the alternate hypothesis. This implies that there is significant difference between forecast error distribution of simple exponential smoothing model and those of the modified exponential smoothing techniques. This finding implies that as far as error distributions of the three models under study are concerned, they were statistically different from each other. To say that the error distribution are statistically significantly different is to also confirm the earlier findings under hypothesis 2 ,where each model recorded some definite measures of forecast error with the modified version of the techniques having tendency for high accuracy. This finding also reveals that each of the three models has a specific level of error, which may be lower or higher than that of the other two models if applied on different bank data.

The implication of this finding is that banks are free to select and test any of the three models or more combinations using their internal data and peculiar situations and identify the models which could give them relatively lower or smaller forecast error, study them and as appropriate modify them to suit their peculiarities and situations, taking into consideration the model fitness or significance and other related forecast requirements. This finding is consistent with that of Armstrong and Collopy (1992).

Scheffe's Post Hoc Test

Table 4.20 Scheffe's Post Hoc Test

Multiple Comparisons						
Dependent Variable: MAPE						
Scheffe						
(I) Forecasting Model	(J) Forecasting Model	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Single- Parameter Model	Holt's Two-Parameter Model	2.13900	15.13996	.690	-37.0740	41.3520
	Winter's Three-Parameter Model	17.61300	15.13996	.035	-21.6000	56.8260
Holt's Two-Parameter Model	Single- Parameter Model	-2.13900	15.13996	.699	-41.3520	37.0740
	Winter's Three-Parameter Model	15.47400	15.13996	.599	-23.7390	54.6870
Winter's Three-Parameter Model	Single- Parameter Model	-17.61300	15.13996	.035	-56.8260	21.6000
	Holt's Two-Parameter Model	-15.47400	15.13996	.599	-54.6870	23.7390

Source: Table 4.19

Following the rejection of the null hypothesis, the study also conducted a Scheffe's post-hoc test for multiple comparisons. Since hypothesis 3 established the existence of the significant difference between the forecast errors under the three models, the Scheffe's test would assist us to identify the direction of the differences among the forecast errors. In other words, since F-ratio is significant, we used Scheffe's test to determine which specific mean forecast errors distribution differ from which others. This enabled us to determine which of the variations in mean errors is most significant. Inspecting table 4.20, we noticed a multiple comparisons between each of the errors. In the first part of the table, the single -parameter model (1) was compared with Holts two- parameter (2) and Winters three -parameter model (3) in turn. In the second part of the table ,the Holts two- parameter models was compared with the single -parameter model and

Winter's three -parameter model. In the third part Winters model was compared with single model and Holts two- parameter model. The table further shows that at a level of significance of 5% yielding a confidence interval of 95%, the P-value for the significance of single -parameter model Vs Holt's two-parameter model is 0.690, the P-value for Model 1 Vs model 3 is 0.035, that of Model 2 Vs Model 1 is 0.699. Furthermore, the P-value for Model 2 Vs Model 3 is 0.599 ; that of Model 3 Vs Model 1 is 0.035 while Model 3 Vs model 2 is 0.599 .

This shows that the P-value is only significant for errors of model 1 and model 3. This is because it satisfies the condition ($P < \alpha$) i.e. $0.035 < 0.05$. For this reason, we concluded that the significant difference in error distribution is more pronounced or wider between the simple exponential smoothing model (single parameter model) and the Winters three- parameter model. The former occupies the left position of the continuum and the latter occupies the right position of the continuum. This finding could also help us to conclude further that generally speaking the Winters three parameter model has the highest tendency for accuracy followed by the Holts two parameter model and lastly by the single model. Hence, for the data under this study, it also confirmed that the higher the explanatory variables and parameters of a model the higher the tendency for accuracy for the data under study.

The empirical evidence from this finding suggests that in addition to smoothening for trend, level and seasonality the banks could benefit more from the quantitative forecasting techniques by identifying more explanatory parameters of profits (i.e. its determinants) and anticipating their levels of behavior and incorporating them appropriately into their forecasting model. This requires careful study of their

behaviours in an attempt to anticipate or forecast them with some minimum level of forecast error.

HYPOTHESIS 4

H₀: There is no significant relationship between bank manager's academic qualification and their ability to apply formal forecasting techniques.

In testing this hypothesis, we utilized the primary data earlier presented on table 4.8 above, which is cross tabulated using SPSS on the basis of the two criteria i.e. academic qualification and the familiarity with the forecasting techniques.

Performing Chi-square test on the cross tabulated values; the following SPSS output tables are generated and presented below:

Table 4.21: Showing Chi-square test statistic

Chi-Square Test			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	17.702	9	0.039
Likelihood Ratio	14.747	9	0.048
Linear-by-Linear Association	2.531	1	0.012
N of Valid Cases	116		

Source: Questionnaire, 2006.

Using table 4.20 above, the hypothesis can be tested from the table; the computed value of Chi-square statistic derived from the cross tabulated values of managers familiarity with the forecasting techniques and their academic qualification is 17.70. The critical value at 0.05 level of significance with 9 degrees of freedom is $\chi^2_{0.05}^{(9)} = 16.92$. This implies that the computed value is greater than the critical value (tabulated value) and hence we reject the null H_0 and accept alternate hypothesis (H_1). This finding implies that there is a significant relationship between managers academic qualification and their ability to apply the formal forecasting techniques.

Alternatively, the P-value of 0.039 is less than the level of significance of 0.05, which leads to the same conclusion. The likelihood ratio of 14.747 is also significant at a P-value of 0.048 and the linear-by-linear ratio of 2.531 is significant at a P-value of 0.012. This finding also implied that the managers with high academic qualification have the high tendency to appreciate and apply forecasting techniques in their bank profit forecasts. On the other side managers with lower academic qualification have lower tendency to appreciate or apply formal techniques. This finding confirms the earlier finding on primary data presented on table 4.8 under analysis of questionnaire. It also confirms similar findings by Abu-Abdissamad (2000) who found significant relationship between qualification of managers and their ability to apply and adopt qualitative techniques used by banks in evaluating commercial bank's loan proposals in Nigeria. It is also consistent with the findings of Mentzer and Kahn (1995) in their study.

4.4 Discussion Of Findings

Under this section, the study set to discuss some of the important findings of the research. The data for the study was collected from two major sources, the primary data and the secondary data. From the analysis of the primary data, a number of findings were made and for the purpose of this section, we limited the discussion to the most important ones among them. The first major finding from the primary data established that virtually all the respondents admitted that their banks performed one form of profit forecast or the other. Closely related to this finding is the finding that the executive opinion method (quantitative) is the most widely used tool or method used by the banks under study in their profit forecasts. Following the executive opinion method closely, is the Delphi method (i.e. in terms of popularity but not in terms of application. On the familiarity with the exponential smoothing techniques, majority of the respondents expressed low familiarity with it in the area of business forecasting.

However, on the accuracy of the forecast performed using their existing forecasting framework majority of the respondents judged their methods as capable of yielding moderately accurate results. However, when requested to provide evidence of such assessment for the researcher to measure and compare their forecast with what actually happened or was published in their statements, majority of the respondents declined to tender the documents on the ground that such documents were classified as very sensitive documents of their banks. Even the very few that proposed to tender copies of such documents on condition of anonymity and that such information should not be published, did not eventually fulfill their pledges up to the time of compiling this study.

In the same vein, majority of the respondents who expressed their familiarity with the exponential smoothing techniques agreed that the tool is fairly useful in forecasting exercise under condition of stability in the macroeconomic activities. The questionnaires analyzed also revealed that respondents were not familiar with other techniques of business forecasting apart from the common typologies, which were mentioned to them. It was also established that most of the respondents agreed that quite a number of factors were considered in profit forecasting. Majority favour volume of operations, followed by the combinations of market capitalization, peer group ranking, and many others. It is also evident from interaction with the respondents that other factors such as quality of assets quality and volume of performing loans could also be very central to bank profit determination. The proportion of assets that is performing is also very important to be considered. A large number of the respondents indicated that they were satisfied with the existing profit forecasting. However, despite these finding some respondents still indicated their dissatisfaction with the existing framework of forecast in their banks on the grounds that at times no definite framework or methodology was put in place, it was also what management wanted the lower contributing units to bring that they brought in most cases. bring. In some cases even the figures were fixed at the bank higher level to be implemented by the lower level, without giving regard to the views of the lower levels, which contribute finally to the group forecast.

Further analysis revealed that among the problems hindering effective profit forecasting economy related problems are most critical. These are followed by industry based. The economy related problems include the factors such as competition, economic and political stability, monetary policy guidelines, volatility and uncertainty in the economic direction volatility of exchange rates and the bank

expenses, management style of the various banks. The direction as well as frequent changes in these variables largely affects the ability of the banks to make a reliable and accurate forecast.

The study also utilized the secondary data in the form of earnings before interest and taxation (EBIT) for the ten years period for each of the banks under study since there were 10 banks under study and each has an EBIT time series of data of 10-year period, giving 100 data periods. The first hypothesis established a moderately weak correlation. This confirmed low model consistency. Each of the three values of the coefficient of correlation indicated a low model fitness making the study to conclude that the models recorded specific values of association, which was found to be insignificant. This result was confirmed by the t-test for the significant difference of correlation, which was also found not significant and hence we upheld the earlier conclusion above.

The second hypothesis sought to test whether exponential smoothing could forecast bank profit in Nigeria. Having computed the MAPE using each of the three models under study and comparing them with the adopted cut-off of 0.25 we noticed that all the computed measures with the exception of two cases, did not meet up the cut-off requirement. Hence, we accepted the null hypothesis. A further examination of the statistics under table 4.18 also reveals that the single - parameter model has highest tendency for error followed by the Holt's two-parameter model and Winters' three -parameter model respectively.

These findings confirm what is contained under table 4.16 showing EBITs for the banks under study. The various fluctuations in terms of earnings/loss are seen in the table. For instance, the fluctuations are seen in virtually all the banks with the

banks classified as type C having the highest fluctuations followed by type B banks and lastly type A banks. As an example, between 1996 – 1997, the EBIT of Manny Bank (type C) rose from (N55,05m) to N30.96m. The EBIT for the same bank suddenly jumped to N209,96m in 1998 from N30.96m that was posted in 1997. At Omega Bank, the EBIT rose in 1996 from N50.42m to N122.28m in 1997. It jumped to N382m in 2003 only to fall back to N154m by 2004. Similarly, In Wema Bank Plc, the EBIT in 2000, was N303.88m and this rose to N800.07m by 2001. By 2002 it also jumped to 2.29b. At Ecobank the EBIT rose in 1998 from N815.58m to N24,67m in 1999. The EBIT of First Bank Plc rose from N4.83b in 2004 to N6.53b in 2005. At Guaranty Trust Bank, we noticed that EBIT at 1997 N1.03b fell to N0.853b in 1998 and by 2004; it rose to N4.833b and N6.527b by 2005. In Access Bank Plc, the EBIT rose from N28.24m in 1998 to N108.19m in 1999. Between 2001 to 2002, the EBIT skyrocketed from N116.08m to N0.810b.

These trends could be observed in virtually all the banks which some banks experiencing more severe fluctuations of earnings as we have presented earlier. The margin of fluctuation on the average is wider in type C banks followed by type B banks. The type A banks appeared to have more stable earnings. Another important finding of this study is that Banks in type A classification appeared to have lower measure of accuracy when their data are subjected to the Winters three-parameter model. Banks in type B and type C did not exhibit any tendency or inclination towards any of the two other models.

The occurrence of these fluctuations led to the inability of our forecasting tools to forecast the EBIT of banks under study with some appreciable measures of accuracy. It is important at this point for us to raise some issues regarding this development. As we have outlined earlier, there are number of factors which could

pave way for this development. These included the level of uncertainty and volatility in the Nigerian banking industry. Several macroeconomic factors keep up changing abruptly. The variables include the interest rates, lending rates and deposit rates. Changes in inflation rates changes in proportion of performing loans in assets, changes in the management expenses profile changes in capital and deposit adequacy and commissions' portfolio changes in monetary policies and volatility in the environment. Unless banks have been in a position to anticipate the movements of these important parameters, it would be difficult for any statistical business forecasting tool to provide accurate forecast under this condition. This finding contrasts with study of Forbe's et al (2005) and Mentzer and Khan (1995) who conducted studies in relatively more stable economies where behaviours and movements of quite a number of determining variables could be anticipated with some significant degrees of accuracy.

According to some bank executives, the period of deregulation which was supposed to have brought an end to sudden fluctuations in these important rates, could not effectively guarantee stability because through Bankers Tariff Committee, some banks were in the habit of exerting pressures for review of some rates especially when they perceived interest to be derived by their banks from the review. These led to charging varying interest rates during deregulation anyhow. The prudential guidelines, which started in the 1990s, also added impetus to this development. Under it, banks were requested to classify all non-performing loans for a period of one year as loss. With the large portion of these non-performing loans, especially in the early 1990s, the earnings capacity of the affected banks was threatened and eventually quite a number of these were later reported as distressed. These scenarios pushed the banks under severe and steep competition trying to

won customers of different sizes to their banks thereby creating a lose-win syndrome.

The study found adequate evidence to reject Hypothesis 3 because the differences in mean error distributions were found to be significant. Evidence from post hoc test that followed the rejection of Hypothesis 3, indicated that the significant difference in mean error distribution actually lied between single -parameter model and Winter's three -parameter model. It was established that Winters model having higher explanatory variables appears to have lower MAPE and for this reasons, we concluded that the higher the explanatory variables of the model the higher the expected measure of its forecast accuracy.

Finally, we also found empirical evidence to reject the hypothesis of no relationship between managers' familiarity with the forecasting techniques and their ability to apply formal forecasting techniques. A careful examination of the cross tabulation of these two variables revealed that managers with high qualification tended to be more familiar with application of the formal forecasting techniques than managers, with lower academic training. The implication here lies in the need for a more training in forecasting for bank executives in addition to other academic and professional training programmes.

4.5 Chapter Summary

The main thrust of this chapter has been presenting and analyzing data collected for the purpose of making inference through hypothesis testing. The first section i.e. section 4.1 introduced the chapter and section 4.2 discussed the administration of the questionnaire and analysis of the responses to the questionnaire. Section 4.3 presented the analysis of the secondary data and hypothesis testing, while Section 4.4 discussed some important findings and conclusions of the study and section 4.5 summarized the chapter.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter summarized the study, drew some conclusion, and offered useful recommendations for stakeholders to implement for the betterment of the forecasting practice in the Nigerian banking system. In addition, the chapter also identified and presented potential areas where research efforts are to be directed in the subsequent researches.

5.2 Summary of the Study

This study marked a pioneering attempt at exploring the application of business forecasting techniques for forecasting of bank profits in Nigeria. The study was necessitated by the increasing concern by business organizations to project, forecast and anticipate reliably some important parameters, affecting their operations vis- a -vis the developments internationally. This is in recognition of the fact that inability of the business firms to adequately anticipate and forecast several of their operating parameters as a very important factor in explaining their non-performance, while it is expected that banks in Nigeria like their counterparts abroad have their internal forecasting and budgeting procedures, the procedures followed in Nigeria have tended to be based on subjective and intuitive procedures and in most cases they are carried out by a minute faction of their organizations. This is in contrast to what studies have established abroad, where banks developed a number of models to assist them in making predictions regarding several of

parameters of interest. They utilized more robust forecast techniques, based on traditional linear and other non-linear statistical models, which they developed from testing and retesting their identified models, leading to a lot of refinement, which paved the way for development/identification of the techniques suiting their peculiarities. Significant achievements have been recorded in this area in countries where the exploration of some of these models took place.

Hence, this study set out to achieve a number of objectives. Some of these objectives include determining the extent to which the exponential smoothing techniques could be used in forecasting bank profits in Nigeria, determining the major issues and considerations critical in selecting and applying a forecasting technique, creating awareness on the existence of the useful forecasting techniques for bank managers and business executives to appreciate and apply. The study also set out to identify major obstacles hindering the effective application of forecasting techniques to bank profits in Nigeria and offer some useful recommendations.

In order to provide the conceptual and theoretical background to the study undertook extensive review of literature in related area in chapter two. This was in a bid to enhance understanding of the nature and issues directly affecting our study. Our discussion on the related concepts and previous works by scholars in the area serve a credible and useful prelude review to review of relevant literature and theoretical framework. A lot of lessons have been learnt from the review of literature and the theoretical framework.

Consistent with the nature of the problem, the study adopted a methodology necessary in achieving the objectives of the study. This was presented in chapter three. The study utilized random sampling to sample 10 banks in Nigeria for the

purpose of the study. The period covered by the study is 1996 – 2005. Primary data were collected through questionnaire administered to 150 respondents drawn from top executives of the sampled bank. The questionnaires for the study were analyzed using the SPSS software for inferences and useful conclusions. The sampling technique also classified the banks into three types on the basis of size of their deposits. This classification helped the study greatly in identifying the suitability of each of the models to the each of the ten banks and which of the models favored particular classes of banks.

The secondary data in the form of earning before interest and taxation (EBIT) as published by the sampled banks in their annual accounts and reports were also extracted for the purpose of the study. The research tested four null hypotheses. The first hypothesis sought to establish the significance of the correlation between actual profits and forecast profits using three models of exponential smoothing. These models are namely, the simple exponential smoothing, the Holts two-parameter model and the Winter's three-parameter model. In the course of this study, we utilized Operation Management Information System (OMIS) and MINITAB softwares to generate a 10- year forecast of EBIT for each of the 10 banks, for each of the three exponential smoothing typologies. The first hypothesis also established low model consistency and significance for each of the models, implying that the correlation was moderately low.

The second hypothesis sought to test whether exponential smoothing could forecast bank profit in Nigeria. The study computed the MAPE using each of the three models under study and comparing them with the adopted cut-off, it was noticed that all the computed measures with the exception of two cases, did not meet up the cut-off requirement. Careful examination of the statistics also reveals

that the single -parameter model has highest tendency for error followed by the Holt's two-parameter model and Winters three parameter model respectively. The various fluctuations in terms of earnings/loss are seen in the table. These trends could be traced be observed in virtually all the banks which some banks experiencing more severe fluctuations of earnings as we have presented earlier. We observed that the margin of fluctuation on the average is wider in type C banks followed by type B banks. The type A banks appeared to have more stable earnings.

Another important finding of this study was that Banks in type A classification appeared to have lower measure of accuracy when their data are subjected to the Winters three- parameter model. Banks in type B and type C did not exhibit any tendency or inclination towards any of the two other models.

The presence of fluctuations led to the inability of our forecasting tools to forecast the EBIT of banks under study with some appreciable measures of accuracy. A number of factors could pave way for this development. These included the level of uncertainty and volatility in the Nigerian banking industry. Several macroeconomic factors keep up changing suddenly. The variables include the interest rates, lending rates and deposit rates. Changes in inflation rates changes in proportion of performing loans in assets, changes in the management expenses profile changes in capital and deposit adequacy and commissions' portfolio changes in monetary policies and volatility in the environment. Unless banks have been in a position to anticipate the movements of these important parameters, it would be difficult for any statistical business-forecasting model to provide accurate forecast under this condition.

The study also rejected Hypothesis 3 because the differences in mean error distributions were found to be significant. Evidence from post hoc test that followed the rejection of Hypothesis 3, indicated that the significant difference in mean error distribution actually lied between single -parameter model and Winter's three -parameter model. It was established that Winters model having higher explanatory variables appears to have lower MAPE and for this reasons, we concluded that the higher the explanatory variables of the model the higher the expected measure of its forecast accuracy.

Finally, the study also rejected the hypothesis which states no relationship between managers' familiarity with the forecasting techniques and their ability to apply formal forecasting techniques. A careful examination of the cross tabulation of these two variables revealed that managers with high qualification tended to be more familiar with application of the formal forecasting techniques than mangers, with lower academic training. The implication here lies in the need for a more training in forecasting for bank executives in addition to other academic and professional training programmes.

5.3 Conclusions

The previous section analyzed the data collected and the hypotheses formulated for the study were also tested. Section 4.2 analyzed the primary data collected from via field questionnaires used for the study. In the course of the data analysis, it was found out that a significant number of forecasting managers agreed that the existing practice of forecasting used by their organization led to moderately accurate results. This implies that the forecast may sometimes deviate from what is expected and at sometimes, though seldom over shoot the particular target forecast.

The executive's opinion method was found to be the most popular of all the forecasting techniques used by bank managements in Nigeria today. This was followed by the Delphi method, which is closely related to it. Exponential smoothing techniques appeared to less familiarity compared to the first two techniques. The familiarity with the techniques largely rested with the forecasting executives with higher educational qualification and working experience. The exponential smoothing technique was also found to be useful in forecasting bank profits. Our analysis of the secondary data also confirms this view as advanced by the respondents.

One important finding of this study is that value of operation significantly affects the profit forecast. The respondents believed that the volume of operation, irrespective of the other variables determinants to a larger extent determine the success of the forecasting scheme. Other determinants such as economy related as well as industry related should also be well appreciated and given the appropriate position in the forecasting process. The question of volume of operation could

comprise of size of the deposits size of income generating activities, size of loans and levels of lending as well as borrowing rates. Other factors include, high pay package not commensurate with the staff input, improper and inadequate collection of revenue items and high cost incurred on unbudgeted items or improper management expenses. The emergence of bad loans, fraud, low interest rate, new products and services being continuously introduced by competitors and low loan repayment rate. Low risk assets creation also affected the capacity and ability of banks to achieve estimated profit. Similarly, it was also found out that excessive management spending on unnecessary projects or inconsequential properties for official use, inconsistent economic and political policies, and poor market focus could also affect bank earnings forecast.

The study also found out that economy related problems and combination of industry-based problems, lack of appropriate techniques and know how, lack of timely approval of credit requirement, bank budget not being preceded by national budgets are some of the factors, which hinder effective forecasting process in Nigerian banks. Empirical evidence also established a moderately weak correlation between the actual profits and forecast profit of banks under study. We also established that none of the models could accurately bank profit under the conditions of uncertainty and volatility. Interestingly, the accuracy of the two-parameter models itself though higher than that of single parameter model is found to be less than that of three-parameter model. This made us to make an important deduction, which could be very useful for empirical analysis. The study deduced that the higher the explanatory variables of a given model, the high its tendency for minimizing the forecast accuracy and achieving forecast target.

The study also found a significant difference in mean error distributions .Evidence from post hoc test that followed the rejection of Hypothesis 3 confirmed that the significant difference in mean error distribution actually lied between single - parameter model and Winter's three -parameter model. It was established that Winters model having higher explanatory variables appears to have lower MAPE and for this reasons, we concluded that the higher the explanatory variables of the model, the higher the expected measure of its forecast accuracy.

Finally, the study also found that there is a significant relationship between forecasting managers academic qualification and their familiarity with the formal forecasting techniques. The implication of this finding is that the high the forecasting managers academic qualification, the high we would also expect him/her to appreciate the techniques and apply them appropriately to their organizational situations. Cross-tabulation of the data also revealed a similar relationship between manager's academic qualification and their level of working experience.

5.4 Recommendations

In line with the research findings and conclusions of this study, the following recommendations are hereby offered:-

- i Management of banks should try to identify the various forecasting techniques and applications and test them for suitability to their peculiar situations before implementing the techniques that turn out with the least forecasting error.
- ii. Bank management should set up competent researches; side by side with in-house machinery to identify study and monitor important parameters affecting its earnings and cause research to be mounted on how such could be modeled into its selected technique to achieve minimum forecast errors.
- iii. There is need for various bank managements to improve their process of data collection, storage and processing for planning and budgeting as well as forecasting in banks. The database should be for various parameters of planning & forecasting interest to the banks.
- iv Government and monetary and financial authorities should work together in fostering macroeconomic stability in Nigeria economic environment. This can be enhanced by evolving consistent economic policies for a reasonable period.

- v There is need for bank management to give high priority to research, training and development so that bank-planning staff can be acquainted with the latest developments and techniques that can improve their performance. The study therefore calls for sponsoring of professional training on forecasting using latest software to complement the working experience of the staff involved. Sponsoring staff for advanced academic programmes could also greatly assist the bank staff in appreciating the models and applying them to their specific areas of needs.
- vi Bank management should view risk ,volatility & uncertainty in the banking environment as an enterprise wide activity that deserves adequate attention. They should also intensify efforts at increasing the proportion of their performing assets & loans bases as important determinant of profits.
- vii. It is also recommended that only people with requisite experience and qualification be posted to banks planning units. The bank management should respect the views of the units.
- viii. Bank annual budgets should henceforth be preceded by the National Budget. This could enable the banks to base their plans according to realistic policies and achievable targets and assumptions as announced by the policy makers for the period ahead.
- ix. Bank Management should endeavor to play down peer group ranking and base their plans on realistic and achievable targets and assumptions. Failure to do this can only leave the banks with wide unnecessary gaps in forecasting created.

- x. Bank management should tailor bank expenses to the budgeted items so that variation in budget could be controlled or managed.

5.5 Suggestions For Further Studies

This study marked a pioneering effort at evaluating the viability of applying exponential smoothing techniques in forecasting bank profits in Nigeria. However, based on the foregoing analysis and conclusion, it is suggested that further researches in the following areas could bridge some identified research gaps in the same area not covered by this study. Accordingly, the following areas of further research are suggested:-

- i. There is need for the development of a model based on the actual determinants of profit by the banks with full management support so that the utility of this model can be compared with that of those established by previous studies.
- ii. A study aimed at assessing or evaluating the accuracy of the qualitative approaches in practice is also recommended. This could assist in establishing the genuity or other wise of the manager's satisfaction with the existing forecasting procedures in their banks.

BIBLIOGRAPHY

- Abu-Abdissamad (2000) An Evaluation of Quantitative Procedures for Commercial loans in Nigeria, being a PhD thesis submitted to the Postgraduate school, Ahmadu Bello University, Zaria.
- Adetoro, S.A. (1986). Research Techniques for Projects, Proposal, Reports, theses and dissertations. Gaskiya Corporation Ltd., Zaria.
- Adogbo, M.P. and Ojo. C.E. (2003). Research Methods in the Humanities, Malthouse Press Ltd Lagos ,Nigeria.
- Agada, S. (1993): “NDIC Battling Distress” Business Times, Vol. 18, No. 21 May.
- Agbadudu ,A.B. (1996). Statistics for Business and the Social Sciences, Uri Publishing Ltd, Benin City, Nigeria
- Anderson, C. (1983). Imaginations and Expectations. 2ned edition, John Wiley and Sons, U.S.A. Approach. West Publishing Company, St. Paul, New York.
- Armstrong, J. S (1987): “An Application of Econometric Models to International Marketing”. Journal of Marketing Research, 7 pp. 487-492.
- Armstrong, J.C and Collopy, F. (1992): “Error measures for generalizing about forecasting methods :Empirical Comparism”, International Journal of Forecasting, Volume, Vol 8 p69-80
- Armstrong, J.C. (1986). Forecasting from Crystal Ball to Computer. 2nd edition, New York, John Wiley and Sons, U.S.A.
- Armstrong, J.C. (1987). Forecasting Methods for Conflict Situations. In George W. (ed.). Judgemental Forecasting, John Wiley and Sons Lt., U.S.A.
- Armstrong, J.S. (1983): Strategic Planning and Forecasting Fundamentals in the Strategic Management Handbook, Kenneth Albert (ed.). McGraw-Hill New York, p. 2-32.

- Armstrong, J.S. (1985). On Calculating the Value of the Improved Forecast Accuracy, John Wiley and Sons, New York.
- Armstrong, J.S. (1989): “Combining Forecasts: The End of the Beginning or the Beginning of the End?” International Journal of Forecasting, Vol, 5, pp. 585-588.
- Armstrong, J.S. (2005); Quantitative Aids: Forecasting. John Wiley and Sons, 2nd edition, New York, USA
- Armstrong, J.S. Brochie, R.J. and Shelby H.M. (1987): ‘Forecasting methods for marketing: Review of empirical research’. International Journal of Forecasting, Vol. 3, pp. 335-76.
- Arsham, H. (2000): Time-critical Decision-making for Business Administration, Europe Mirror Site for Asia, Middle East and U.S.A.
- Ashley M.S. and A.G. Haladane (1995). “Money as an indicator”. Bank of England Working Paper Series, No. 35.
- Azoff, M.E. (1994). Neural Network Time Series Forecasting of Financial Markets, John Wiley and Sons, Ltd., U.S.A.
- Ballard, R.W. and Watts, R.C. (1972): “The time-series of Annual Accounting Earnings” Journal of Accounting Research, (Autumn), Vol. 253, No. 71.
- Ballard, Raymond (2001): Neural Networks for Macro-Economic Forecasting: A Complimentary Approach to Linear Regression Analysis. Canada Department of Finance, pp. 1-40.
- Banjoko, S.A. (1994). Production and Operation Management, Wisdom Publishers Ltd, Ibadan, Nigeria, 1st ed.
- Barajas, A. R. Steiner, and N. Salazar. (2001): “Interest spreads in banking in Colombia 1974- 96”, IMF Staff Papers, Vol. 46: 196-224.

- Barr, R.S, Seiford, L.M. Siems, T.F. (1994): “Forecasting Bank Failure: A Non- parametric Frontier Estimation Approach” Annals of Operation Research. No. 38
- Bashir, A. (2000): Assessing the Performance of Islamic Banks: Some Evidence from the Middle East, Paper presented at the ERF 8th meeting in Jordan.
- Basu, O.N. and Conrad E.J. (1994): “Cost-volume Profit Analysis: Uses and Complexities” Journal of Bank Cost and Management Accounting 24 (II)
- Bates, J.M. and C.W.J. Granger (1969): “The Combinations of Forecasts”. Operations Research Quarterly, Vol. 20, pp. 451-68.
- Becker, Lawrence, J. (1978): “Joint Effect of Feedback and Goal Setting on Performance: A Field Study of Residential Energy Conservation” Journal of Applied Psychology, Vol, 63, 1978, pp. 428-433.
- Bello, M.S.(2004): Income Smoothing and the Quality of Earnings Among Nigerian Banks. Being a Text of PhD Proposal Defense submitted to the Department of Accounting, A.B.U. Zaria.
- Ben, Naceur S. and M. Goaid. (2001) “The determinants of the Tunisian deposit banks’ performance”, Applied Financial Economics, Vol.11:317-19.
- Berger, A. (1995) “The relationship between capital and earnings in banking”, Journal of Money, Credit and Banking, Vol.27:404-31
- Bhasker, K.N. and R.C. Morris (1984) “The Accuracy of brokers profit forecast in the U.K.” Accounting and Business Research, (Spring) Vol. 113, No. 24
- Bliemel, F.W. (1973). “Theil’s Forecast Accuracy Coefficient: A Classification”. Journal of Marketing Research, Vol 10 Pp444-446.
- Blyther, C. (2001):Causes of Business Failure, QBS Business online, <http://www.qgbsonline.com>
- Bowman, O. (2006): Forecasting and time-series: An Applied Approach, Third edition, Duxbury Press Belmont, C.A.

- Box, G. and Jenkins G. (1976): Time-series Analysis: Forecasting and Control, Rev. (ed.) San Francisco, Holden-Dary.
- Boylan J.E. and Johnson F.R. (2003): “Optimally and Robustness of Combinations of Moving Averages” Journal of the Operational Research Society, Vol. 54, No. 1, pp. 109-115.
- Brandes, S. D. (1997): Warhogs: A History of Profits In America, Lexington University Press of Kentucky
- Brandt, J.A. and Bessler, D.A. (1983): “Price Forecasting and Evaluation: An Application in Agriculture” Journal of Forecasting, Vol. 2, pp. 237-248.
- Brown, R.G. (1959): Statistical Forecasting for Inventory. McGraw-Hill, New York, U.S.A.
- Burita Ladislav (2004): Application of Forecasting Methods Within the Department of Defence, Czechoslovakia, Army Press, Czechis.
- Burns, A.F. and Mitchel ,W.C. (1946): Measuring Business Cycles. National Bureau of Economic Research, New York.
- Callen, J.L. et al (1996): “Neural Network Forecasting of Quarterly Accounting Earnings”. International Journal of Forecasting, Vol. 14, No. 2 pp. 439-574.
- Chaffield, C. (1996): The Analysis of Time-series: An Introduction. 5th edition, Chapman and Hall, U.K.
- Chamber, C.J. (1975). “How to Choose the Right Forecasting Techniques” Harvard Business Review, Heinemann, London.
- Chant, P.D. (1980). “On the predictability of Corporate Earnings per share behaviour” Journal of Finance, Vol. 13, No. 21, (March).
- Christelis, C. (1998): Forecasting: Why Some Mangers Outperform Statisticians at Forecasting Technology. Surveys International Inc, Canada.

- Clemen, R. (1989): “Combining Forecasts: A Review and Annotated Bibliography” International Journal of Forecasting, Vol. 5, No. 4, p. 549.
Co. Inc, New York.
- Cornish S. (1981): “Full Employment in Australia the Genesis of a White Paper”.
ANU Research Paper in Economic History, No. 1.
- Cornish, E. (1977): The Study of the Future, World Future Society, Washington,
DC p. 93-95.
- Cox, G. (1969): An Appraisal of American Business Forecasts, University of
Chicago Press, U.S.A.
- Dalrymple, D.J. (1975). “Sales Forecasting Methods and Accuracy”. Business
Horizon, Indiana University, U.S.A. Dec. pp. 69-73
- Dalrymple, D.J. (1987): “Sales forecasting practices: results from United States
survey”. International Journal of Forecasting, Vol. 3, pp. 379-91.
- Delurgio, S.A. (1998): Forecasting Principles and Applications: The McGraw-Hill
Company, U.S.A.
- Demerguç-Kunt, A. and H. Huizinga. (1999):“Determinants of commercial bank
interest margins and profitability: Some international evidence”, World
Bank Economic Review, Vol.13: 379-408
- Dilworth, J.B. and Lawrence, P.E. (1982): Study Guide for Production and
Operations Management, 4th edition.
- Drew, A and Frith, M. (1999): “Forecasting at the Reserve Bank of New Zealand”
Reserve Banks of New Zealand Bulletin Vol 61, No. 4 New Zealand.
- Ebodaghe, J.U. (1993): “Context and Indices of Distress in Banks: A Practical
Approach in Definition of Distress Banks” NDIC Quarterly, Vol. 3, No. 2.
- Edison, H.J. and Cho, D. (1993). “A Utility Based Comparison of Some Models of
Exchange Rate Volatility”. Journal of International Economics Volume 35,
pp. 23-45.

- Egeli B.(2003): “Stock Market Prediction Using Artificial Neural Networks”.
Journal of IMKB. Vol. 5, No. 17. pp. 98-120.
- Fatokun, S (2004): “Estimating the Cost of Ordinary Share Capital to Quoted Nigerian Banks” Journal of Social Science., Vol. 9, No.1 pp.37-41 Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria.
- Financial Times (2001): The banker: The world is facing an unprecedented level of Uncertainty, No. 1 Southark Bridge London, SE19HL, United Kingdom.
- Fildes, H. and Lusk T (1984): “The Choice of a Forecasting model” Oinega, Vol. 12, No. 5, pp. 427-35.
- Fischer, D.E. and Jordan R.J. (2003): Security analysis and portfolio management,6th edition Pearson Education (Singapore) pte, Ltd, Indian Branch
- Forbes, C.S., Snyder, R.D., Shami, R.G. (2005). Bayesian Exponential Smoothing. Being research work partially supported by an Australian Research Council Small Grant, Department of Econometrics and Business Statistics, Monarsh University, Australia.
- Forgarty, D.W. (1989): Production and operation Management, South Western Publishing Company, Cincinnati, Ohio, U.S.A.
- Garcia, H.L. (2004). Business Application of Artificial Neural Networks - A Proposed Study. Texas, A & M International University Press, p. 98.
- Gardner, E.S. (1985): “Exponential Smoothing: The State of the Art”. Journal of Forecasting, Vol. 4, pp. 1-28.
- Goddard, J. Molyneux, P. and Wilson J. O. (2004): “The Profitability of European Banks: A Cross-sectional and dynamic panel analysis”. The Manchester School, Vol. 72 (3) pp. 363-381
- Granger, C.W. and Terasvista (1993): Modeling non-linear relationships: Advanced texts in Econometrics, Oxford University Press, New York.

- Granger, C.W.(1999): Empirical Modeling in Economics: Specification and Evaluation, Cambridge University Press, New York.
- Greenspan, A. (2004): Risk and Uncertainty in Monetary Policy being text of remarks by Chairman Federal Reserve Board, presented at the meetings of the American Economic Association San Diego California, Jan 3. USA.
- Gregory, C.C and Lin, A (2005): “Best Linear unbiased estimator, interpolation. distribution and extrapolation of time series by related series” Review of Economics and Statistics, Vol 53 No4 P.372.
- Griffith, J.R. and Wellman, B.T. (1979). “Forecasting Bed needs and recommending facilities plans for community hospitals: A Review of Past Performance”. Medical Care, 17 p. 292-303.
- Guo Shuqin (2002): Three enrolment forecasting models: Issues in enrolment projection for community schools. Being a conference paper presented at 40th RP Conference, May 1-3, 2002. Pacific Grove, California
- Gupta, C.B. (1994). An Introduction to Statistical Methods, 19th edition, Vikas
- Guru, B., J. Staunton and Balashanmugam (2002):Determinants of commercial Bank Profitability in Malaysia, University Multimedia working papers.
- Harovitz, J.H. (1979). “Strategic Control: A New Task for Top Management,” Long-Range Planning, Vol. 12, Pp. 2-7.
- Hawkins, J. (2006): Economic Forecasting: History and Procedures, Domestic Economic Division, Australian Government Treasury.
- Hays, J.M. (2003): “Forecasting Computer Usage” Journal of Statistics Education, Vol. 11, No. 1, University of St. Thomas.
- Herold, David, M. (1972): “Long Range Planning and Organizational Performance: A Cross Validation Study”. Academy of Management Journal, Vol. 15, pp. 91-102.

- Higgins, C. (1970): A Model for National Income Forecasting. A paper presented to ACT Branch of Economic Society of Australia.
- Holt, C.C. (1957). “Forecasting Seasonal and Trends by Exponentially Weighted Moving Averages” Office of Naval Research Memorandum, No. 52.
- Hyndman, et al (2003) : “Prediction Intervals for Exponential Smoothing Using two New Classes of State Space Models” Journal of Forecasting, Vol. 24, No. I. Pages 17-37.
- Ibanga, U.A. (1992). Statistics for Social Sciences, Centre for Development Studies, University of Jos, Nigeria.
- IBF (2006): Institute of Business Forecasting, New York, USA.
- Ibrahim, A.C. (1997): Imperative of Forecasting in Nigerian Manufacturing Industry: A Case Study of John Holt Agricultural Engineers, Zaria. Being unpublished B.Sc. Business Administration Project, Ahmadu Bello University, Zaria.
- Icon, P. (2005): Collaborative Demand Forecasting and Planning: www.con.scm.com
- Imoisili, I.C. (1996). Social Research Methods for Nigerian Students, Malthouse press Ltd, Lagos.
- Janet, X.G., Goran Runesan, K.C. Lam (2004): Forecasting Hong Kong House Prices: An artificial Neural Network Vs Log linear regression approach. Being a text of Conference paper for the dept of Building and construction, University of Newcastle, Austria.
- John A.P. & Richard R.B.(1998): Strategic Management Strategy Formulation and Implementation, 3rd edition, Richard D. Irwin Inc. USA.
- Jones, E.T. (1971). Conducting Political Research, Harper and Row Publishers, New York, USA.

- Jordi, Pons-Novell (2003): “Strategic bias, Herding Behavior and Economic Forecasts”. Journal of Forecasting, Vol. 22, No. 67,
- Joseph, II E (1992). “Quality approaches to long-range Forecasts” Futuristic: A Quarterly Journal of Futures Research, Vol. 16, Nos. 3 and 4, p. 4,
Journal of Marketing Research, Volume 10, pp. 444-446.
- Kantowitz, B. Roediger H. and Elmes D. (1991). Experimental Psychology: Understanding Psychological Research, West Publishing Company, New York, U.S.A.
- Kirby, R.M. (1966). “A Comparison of Short and Medium Range Statistical Forecasting Methods”. Management Science, No. 4, pp. 202-210.
- Kliman, J & Andrew S (2001): Simultaneous valuation vs. the exploitation theory of profit being a text of paper presented at Conference of Socialist Economists (Spring 2001) Capital & Class 97-112 no. 73 (Spring 2001): p. 97-112
- Kosmidou, K. (2007): “Domestic and Multinational Determinant of foreign bank profits: The Case of Greek Banks Operating Abroad”. Journal of Multinational Financial Management Vol. 17 pp/1-15.
- Kosimidou, K, Pasiouras, F, Tsaklanganos A. (2005) “Factors influencing the profits and size of Greek banks operating abroad: A pooled time series study”. Taylor and Francis Journal volume 10, pp. 731-738
- Kress, P.A. (1985. Technological Forecasting, John Wiley and Sons, Ltd., New York, U..S.A.
- Labo, G. (1991): “Alternative Methods of Combining Security Analysts and Statistical Forecasts of Annual Corporate Earnings”. International Journal of Forecasting. pp. 57-63.

- Larreche, J.C. and Moinpour, R.. (1983): “Management Judgement in Marketing: The Concept of Expertise” Journal of Marketing Research, Vol. 20, pp. 110-121.
- Laxton, D. Rose. D and R. Tetlow (1994): “Monetary Policy uncertainty and the presentation of linearity” Technical Report No. 63 Ottawa Bank of Canada
- Lebbert A.F (1945): “Forecasting the National Product” American Economic Review. Vol. XXV (1) pp. 59-80.
- Levin, R.I. Rubin, D.S. Stinson, J.P. (1986). Quantitative Approaches to Management, 6th edition, McGraw-Hill Book Company, New York, U.S.A.
- Laxton, D and R. Tetlow (1992): “A simple Multivariate Filter for the estimation of potential output” Technical Report No. 59, Ottawa, Bank of Canada.
- Lim, R. (1963). Scientific Management for Small Business. Oceana Publications Inc. Dobbs Ferry, New York.
- Lipsey, R. G. (1985): An Introduction to Positive Economics, 6th edition EnglishLanguage Book Society/Weidenfeld and Nicolson, Ontario, USA.
- Litter, D and Melanthiou, D (2006): The Uncertainty of risk or the risk of Uncertainty: Consumer decisions on the adoption of a new banking service; The University of Manchester.
- Lock, A. (1987): Integrating Group Judgements in Subjective Forecasts, in Wright G. and Ayton, P. (Eds). Judgemental Forecasting, Wiley, Chichester.
- Louis, J.R. (1963) : Production Analysis and Control, International Textbook Company, USA.
- Lyman, A.K. and Carlo, E.G. (1998): Introduction to Business Enterprises, 4th edition. McGraw-Hill International Book Company.
- Mahmoud, E. (1989): “Combining Forecasts: Some Managerial Issues” International Journal of Forecasting, Vol. 5, No. 4, p. 599.

- Maishanu, M.M.(2003) :Strategic management and corporate survival: An evaluation of turnaround strategies in the Nigerian Commercial Sub-sector . Being a text of PhD Thesis submitted to Postgraduate School, Usmanu Danfodiyo, University, Sokoto.
- Maiturare, M.N. (2000) :The Effects of Financial Deregulation on the Performance of Commercial Banks in Nigeria ,Being a text of Ph.D Research Proposal presented to the Department of Business Administration, A.B.U. Zaria, June.
- Makridakis, S. and Wheelwright, C. (1978): Forecasting Methods and Applications. John Wiley and Sons, Santa Barbara.
- Martin, M (1999): “Best Practices in Macro economic forecasting: Key Issues for Discussion” Debt Relief International October, 1999
- McCracken, M.W. and West, K.D. (2000): Inference about Predictive Ability, being a research paper published by University of Wisconsin and National Science Foundation, U.S.A.
- Mentzer J.T. and Cox J.E. (1984); “Familiarity, Application, and Performance of Sales Forecasting Techniques” Journal of Forecasting, Volume 3, No. 1, pp. 27-36.
- Mentzer, J.T. (1998): Business Planning, Weybright and Tatly, New York, USA.
- Mentzer, J.T. and Kahn, B.K. (1995). “Forecasting Technique Familiarity, Satisfaction, Usage and Application” Journal of Forecasting, Vol. 14, pp. 465-476.
- Mercellino, M. (2002): Instability and Non-linear in the European Monetary Union (EMU) IGIER Working paper number 211.
- Mohn, N.C. (1989). Practical Guidelines for Forecasters, Being a text of the address delivered at the 4th Annual Conference of the International Association of Business Forecasting, Philadelphia, September 27-28.

- Molyneux, P. and J. Thornton.(1992):“The determinants of European bank profitability”, Journal of Banking and Finance, Vol. 16: 1173-1178.
- Montgomery, D.B. (1975): “New Product Distribution: An Analysis of Supermarket Buyer Decisions”Journal of Marketing Research, Vol. 12, pp. 255-64.
- Morden, T. (1993): Business Strategy text and Cases. McGraw-Hill Books Company, London.
- Morden, T. (1997): Business Strategy Text and Cases. McGraw-Hill International Book Company, London.
- Muzuno ,K. (1998): “Application of Neural Networks to Technical Analysis of Stock Market Predictions” Studies in Informatics and Control. No. 3, pp. 111-120.
- Naert, P.A. and Leeflang, P. (1978): Building Implementable Marketing Models,, Martinus Nijhoff Press, Boston.
- Nellman, H.R. (1939): “The Distribution of Selling Effort Among Geographical Areas” Journal of Marketing, 3, pp. 225-239
New York.
- Obrinsky, Mark (1983) Profit Theory and Capitalism; University of Pennsylvania Press, Philadelphia.
- Ojo, A.T. (1986). Overview of Financial System: An Appraisal in the Context of Nigeria’s Economic Development, Top Holden Nigeria Ltd., Ibadan.
- Olemak, A. (2000): From dialogue to decision. Being a text of paper presented to the 64th National Meeting of the American Institute of Chemical Engineers, U.S.A.
- Olshfski, D. and Joseph, A. (1991): “Assessing training needs of executives using the delphi technique” Public Productivity and Management Review, Vol. 14(3).P. 297-301.

- Olugun, S.O. (1994): “Bank Failure in Nigeria: Genesis, Effects and Remedies”.
Central Bank of Nigeria Economic and Financial Review, Vol. 32, No. 3, p.
312-322.
- Onuiwa, B.C. (1994): “The Causes of Distress in the Banking Sector” The
Nigerian Accountant, Vol. 27, No. 4, pages 27-30.
- Pagan, A. (2003):Report on modeling and forecasting at the Bank of
England, Department of Economics, Oxford University, London.
- Pappalardo, C. and Serafini R. (2004): Inflation forecasts and EU enlargement
evaluating linear and non-linear forecast combination methods, being a
Research paper of the Institute for studies (ISAE) and economic analysis in
conjunction with European Central Bank (ECB)
- Phua, M. (2000): Neural Networks with Genetic Algorithms for Stock Prediction,
being a paper presented at 5th Conference of the Association of Asian Pacific
Operations, Research Societies, 5th - 7th July, Singapore.
- Pohl, F. (1993). “The Uses of the Future” The Futurist, March-April.
Policies”, Reserve Bank Bulletin, pp. 1-9, Australia.
- Poloz, S.D, D. Rose, R. Tetlow (1994) “The bank of Canada’s new quarterly
Projection model- An Introduction”: Bank of Canada Review, Autumn.
- Popoola, S.O. (2000): “Scanning the environment for competitive advantage: A
study of Corporate banking” Libri, Vol. 50 pp.210 – 216, Germany
- Pratt, M.P. (2004): Predicting Presidential Elections: An Evaluation of Forecasting.
An unpublished M.A. Political Science thesis submitted to the Faculty of
Virginia Polytechnic Institute Advanced State University, U.S.A.
- Rex, S.T and. Michael, Y.H. (1991). Basic Business Statistics An Intuitive
approach, John Wiley and Sons Inc. Santa Barbara.
- Riggs, L.R. (1976): Production Systems: Planning, Analysis and Control, (2nd
edition). John Wiley and Sons Inc. Santa Barbara.

- Riggs, W.E. (1983): “The Delphi method: an Experimental Evaluation”.
Technological Forecasting and Social Change, Vol. 23, p. 89-94.
- Robb D.J. and Silver E.A. (2002): Using Composite Moving average to Forecast Sales, Second revision, working paper number 2002-14. Department of Management Science and Information Systems, the University of Auckland, New Zealand.
- Robin, L. (1973):Strategic Management for a Small Scale Business. Oceana Publications Inc. Dobbs Ferry, New York, USA
- Robley, Jr. W.D. (1980): “Long Range Planning in Large United States Banks”,
Long-range Planning, Vol. 13, p. 91-98.
- Rothermiel, T.W. (1982): “Forecasting Resurrected” Harvard Business Review,
March-April.
- Rowe, G. and Wright G. (1999b): “The Delphi Technique as a Forecasting Tool: Issues and Analysis” International Journal of Forecasting, Vol. 23, p. 385-394.
- Rowe, G. and Wright, G. (1999a): “The Delphi technique as a forecasting tool: Issues and Analysis” International Journal of Forecasting, Vol. 15 pp. 353-375.
- Russel, H.M. (1966): Business Cycle Theories in Business Forecasting in Practice: Principles and Cases. 1st edition, John Wiley and Sons, Inc. New York.
- Sabo, B. (2002): “An application of exponential smoothing technique in forecasting business performance: A case study of selected commercial banks in Nigeria” The Nigerian Journal of Administrative Studies. Vol. I, No. I; page 95-115.
- Sabo, B. (2003): “An Evaluation of the Weighted Moving Average as a tool for Predicting the Transactions of the Nigerian Stock Exchange (1970-2001)”.
The Nigerian Journal of Administrative Studies, Vol. I, No. II page, 1-10.

- Sexton, D. (1998): Towards Global Optimisation of Neural Networks, A Comparison of the Genetic Algorithm and Bank Propaganda. Decision Support Systems, 22, pp. 171-185.
- Shuqin, G. (2002): Three enrolment forecasting models: Issues in enrolment projection for community schools. Being a conference paper presented at 40th RP Conference, May 1-3, 2002. Pacific Grove, California.
- Singh, S. (2006): Future Probing of Time-Series, Department of Computer Science, Exeter, EX4, 4PT, U.K.
- Skrivankova, V. (1999): Stochastic Methods in Finance: Evaluating Predictions, ERCIM News No. 38, July.
- Somerset, N.J.(2004):Forecasting in the Pharmaceutical Industry. Doubletree Executive Meeting Centre, New York.
- Sparkes, J.R. and McHugh, A.K. (1984). “Awareness and use of Forecasting Techniques in British Industry” Journal of Forecasting. Vol. 3, pp. 37-42.
- Steiner, G (1979). Strategic Planning. Free Press, New York,
- Stekler, H.O. (2002): The Rationality and Efficiency of Individual’s Forecasts in a Comparison to Economic Forecasting, In Clement, P.H. (Eds.) Blackwell, Oxford.
- Stevens, R.G. (1999): “Economic Forecasting and its Role in Making Monetary Policy” Reserve Bank of Australia Bulletin, vol. 36, No. 5, p. 6-12.
- Stock, J.H. and Watson M.W. (1999): “A Companion of linear and non-linear Univariate models of forecasting macroeconomic time series” in Engle R and White R. (eds) cointegration, causalities and forecasting: A festschrifts in honour of Chive W.T. Granger, Oxford, Oxford University Press P.1-44.
- Sunday, U.G. (2005): An Empirical Assessment of the effectiveness of basic manpower forecasting models in the banking industry - A case study of

- Zenith Bank Plc, Being an Unpublished MBA Project submitted to the Postgraduate School, A.B.U. Zaria.
- Swan, T. (1945). “The Principle of Effective Demand: A Real Life Model”. Economic Record, Vol. 65, No. 191, p. 378-98.
- Taylor, J.W. (2004). “Smooth Transition Exponential Smoothing” Journal of Forecasting, Vol. 23, pp. 385-394.
- Teran, A. Saito, P. and Stewart, K. (1997): An Assessment of Group Process in Qualitative Forecasting, Lexington Books, Lexington, M.A.
- The American Heritage Dictum of the English Language (2000): 4th edition, Houghton Mifflin Company, U.S.A.
- Umoh, P.N. (2004) “Risk-based Supervision and some implementation Issues” NDIC, Quarterly Vol. 14, No.1 pp. 25-34 March
- Van de Ven, A.H. and Delbecq, A.L. (1974): “The Effectiveness of Nominal, Delphi and Interacting Group Decision Making Process” Academy of Management Journal, Vol. 17(4). Pp. 605-621.
- Walker, E. (1929): “Business Forecasting”. The Australian Quarterly, Vol. 3, p. 101-9
- Walkzak, C. (1999): Business Application of Artificial Neural Network in the Financial, Manufacturing, Marketing, Telecommunications ,Biomedical and other domains, Lexington Books, Lexington, M.A.
- Wallis, K.F.(2004): “An Assessment Of Bank Of England And National Institute Inflation Forecast Uncertainties” National Institute Economic Review, No 189, July
- Walonnick, D.S. (2004): An Overview of Forecasting Methodology. Starpack, Thomas Avenue, Minneapolis.
- Walpole, R.E. (1982. Introduction to Statistics, 3rd Edition, Macmillan Publishing Co. Inc, New York.

- Wanger, D. W. (2005): Analysis of the Impact of Customer Relationship on the Performance of Commercial Banks in Nigeria – A Case study of Eagle Bank Ltd.
- We, S. Y. (1988) Production Entrepreneurship and Profits, Kent Publishers Ltd, China
- Weiner, N. (1942): Extrapolation, interpolation and smoothing of stationary series, MIT Press, Cambridge, London
- Wheelwright, S.C. and Clarke, D.G. (1976): “Corporate Forecasting: Promise and Reality” Harvard Business Review, Nov-Dec.
- Wilson, J.H. and Delbeck, H. (1989): “Marketing Managers Evaluating Forecasting Models”. Journal of Business Forecasting, Spring, p. 19-22.
- Wilson, J.H. and Keating B. (1994): Business Forecasting. 2nd Edition. The McGraw-Hill and Company, USA.
- Winters, P.R. (1960): “Forecasting Sales by Exponentially Weighted Moving Average” Management Science, Vol. 6, (1960). Pp. 324-42.
- Wong, E.F. (1995). Towards Global Optimisation of Neural Networks: A Comparison of Genetic Algorithm and Back Propagation In Proceedings of International Joint Conference of Neural Networks, Australia, p. 1-6.
- Wood, D. Robley, Jr. (1980) “Long Range Planning in Large United States Banks” Long-Range Planning, Vol. 13, pp. 91-98.
- World Bank (1995): “Macroeconomic risk Management in Nigeria: Dealing with external Shocks” Findings: Africa Region No. 30, pp. 1.
- Wright, G. ,Rowe, G. and Golger, F. (1991). “The Delphi Technique: A Re-evaluation of Research and Theory” Technological Forecasting and Social Change. Vol. 39(3). PP. 235-251.

- Young, G.S. (2005). Combining Forecasts for Superior Prediction. Being a text of a research paper for the National Centre of Atmospheric Research, Boulder, Colorado.
- Zarnowitz, V. (1992): Business Cycles: Theory, history, indicators and forecasting. The University of Chicago Press.
- Zeng T. and Swanson R.N. (1998): Predictive evaluation of econometric forecasting models in Community future markets .A research paper of the dept of Economics, Penn State University, USA
- Zerby, J. (1969). “An Econometric Model of Monetary, Interaction in Australia”. Australian Economic Papers, 18 Dec. Pp 154-77.

APPENDIX A

QUESTIONNAIRE FOR MANAGEMENT & SENIOR STAFF

Dear Respondent,

I am a postgraduate student of PhD Degree in the Department of Business Administration in Ahmadu Bello University, Zaria. I am conducting a research on the application of forecasting techniques in banking operations in Nigeria. We are aware that your bank is one of the banks operating in Nigeria which also at periodic intervals prepares some budget and estimates based on which the future profits of your bank are projected. The study seeks to find out whether or not some formal forecasting techniques could be applied alternatively to forecasting of future profits of banks in Nigeria.

In order to achieve the objectives of the study, we require some information from you as a practitioner so that we can test the application of the techniques. Your bank is one of the sampled banks for the study and as such you are very important to this research because you represent thousands who are not in our sample.

The information you would provide will be treated as strictly confidential to be used only for a research purposes. Hence, your name or address will in no way be revealed or published in the reported findings. The result will only appear in the form of statistical reports and summarized figures.

Please read the questions below carefully and answer them as honestly as you can by ticking as appropriate or freely expressing your views in the questionnaire or interview as may be required. Thank you for your cooperation.

Yours Faithfully,

SABO, Bello

APPENDIX B
QUESTIONNAIRE ON APPLICATION OF FORECASTING TECHNIQUES
BY BANKS IN NIGERIA

SECTION A: BIODATA

(Please tick (√) as appropriate).

1. Age:

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21-30	31-40	41-50	51 and above

2. Gender

<input type="checkbox"/>	<input type="checkbox"/>
Male	Female

3. Highest qualification obtained

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diploma/its equivalent	B.Sc/ its equivalent	MBA/ its equivalent
Others <input type="checkbox"/>		

4 Name of your Bank

4.6 (Before consolidation) -----

4.4 (After consolidation) -----

5. Working Experience

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Less than 5 years	5-10 years	10-15 years	above 15 years

- 5.1 Please indicate section of the bank under which you are currently working:
- Finance [] Strategic Planning [] Corporate Accounts []
 Others []

SECTION B: FORECAST DATA

6. Does your bank perform any profit forecasting exercise?
 [] [] []
 Yes No Do not know
7. If your answer to question 6 is yes, how do you assess the accuracy of such forecasts usually?

[] [] [] []
 Very accurate Moderately accurate Poor Not accurate at all

8. If your answer to question 6 is yes, briefly explain the procedures that are followed by your bank in obtaining profit forecasts?

9. If your answer to question 6 is no, which management procedures do you use in projecting your profits? -----

10. How do you assess the accuracy of this forecast technique in question 9?

[] [] [] []
 Very accurate moderately accurate Poor Not accurate at all

11 Indicate your level of familiarity with the following forecasting techniques:

Method/Familiarity	Very familiar	Familiar	Fairly Familiar	Not Familiar
Delphi Technique				
Executive Opinion				
Exponential Smoothing				
Others (Indicate)				

12. How do you assess the usefulness of the techniques you are familiar with in Question 11 above in forecasting bank profit?

[] [] [] []
 Very useful Fairly useful Poor Not useful at all

13. Which factors do you normally consider in forecasting (projecting) your profits for the coming period?

a) Volume of operations [] b) Level of market capitalization [] c) Peer group ranking [] d) All of the above
 e) Others [].....

14. How satisfied are you with the present profit forecasting procedures used by your bank?

[] [] [] []
 Very satisfied Satisfied Not Satisfied Not applicable

15. What in your opinion are some of the problems hindering effective forecasting of your bank profits?
 a) Economy-related [] b) Industry- based [] c) Lack of techniques [] d) All of the above
 e) Others [].....
16. Please, suggest ways of improving forecasting process in your bank generally?-----

17. What factors do you think affect profits in your bank which must be taken into consideration?

18. How often do you attend Performance review sessions/Management profitability report (MPR)?
 a) Quarterly [] b) Once a month [] c) Once a year []
 d) Not too often e) Never
19. How many times have you attended off the job training on profit planning, projecting or forecasting?
 a) Once in 3 years [] b) Once a year [] c) Frequently [] d) Not too often
 e) Never []

Thank you for the cooperation.