

FORECASTING TECHNIQUES:
PRACTICES BY LEBANESE MANAGERS

By
Omar Bahu
August, 1994

RT
LOI
C.1

**FORECASTING TECHNIQUES:
PRACTICES BY LEBANESE MANAGERS**

**A research Topic
Presented to Business School
Beirut University College**

**In Partial Fulfillment
of the Requirements for the Degree
Master of Science in
Business Management**

**By
Omar Bahlu
August, 1994**

BEIRUT UNIVERSITY COLLEGE
BEIRUT, LEBANON

APPROVAL OF RESEARCH TOPIC

Omar Bahlu

870422

August, 1994

Master of Science in Business Management

Forecasting Techniques: Practices by Lebanese Managers

The following professors, nominated to serve as the advisors of the above mentioned candidate, have approved his research work

Dr. Abdullah Al Dah

Name of First Advisor


Signature

5/9/94

Date

Dr. Nouri Beyrouti


Advisor

Sep 5. 94

Date

ACKNOWLEDGMENTS

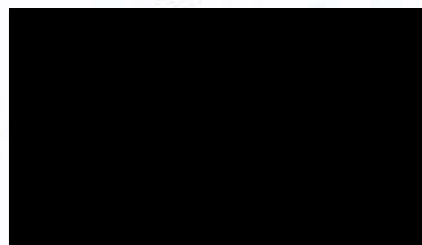
I would like to extend my appreciations to
Professor Abdullah El-Dah for his support and guidance.

Also, I would like to thank Dr. Nouri Beyrouti for
his valuable suggestions.

BEIRUT UNIVERSITY COLLEGE
"RESEARCH PROJECT RELEASE FORM"

I, OMAR I. BAHLU

AUTHORIZE THE BEIRUT UNIVERSITY COLLEGE
TO SUPPLY COPIES OF MY RESEARCH PROJECT TO
LIBRARIES OR INDIVIDUALS UPON REQUEST.



AUGUST, 1994

TO MY WIFE, ULFAT ...

TABLE OF CONTENTS

	<u>page</u>
CHAPTER ONE	
INTRODUCTION	1
A. <i>Type of Forecasting</i>	2
B. <i>Need and Purpose of the Study</i>	3
C. <i>Research Questions</i>	5
D. <i>Data Source</i>	5
E. <i>The Study Outline</i>	5
CHAPTER TWO	
REVIEW OF LITERATURE	7
A. <i>Judgmental Forecasting</i>	7
1. <i>Brainstorming</i>	7
2. <i>Sales Force Estimate</i>	7
3. <i>Jury of Executive Opinion</i>	8
4. <i>Customers Expectations</i>	8
5. <i>Delphi Technique</i>	8
6. <i>Program Evaluation and Review Technique (PERT)</i>	9
B. <i>Quantitative Methods</i>	10
1. <i>Factors Affecting Forecasting</i>	10
a. <i>Pattern of Data</i>	10
b. <i>Time Horizon</i>	13
c. <i>Cost of Forecasting Methods</i>	13
d. <i>Ease of Application</i>	15
2. <i>Time Series Analysis</i>	17
a. <i>Naive Models</i>	17
b. <i>Moving Average</i>	18
c. <i>Double Moving Average Model</i>	19
d. <i>Simple Exponential Smoothing</i>	20
e. <i>Trend Projection</i>	21
3. <i>Causal Forecasting Models</i>	22
4. <i>Forecasting Accuracy</i>	23
C. <i>Forecasting Methods in Practice</i>	26

	<u>page</u>
CHAPTER THREE	
RESEARCH METHODOLOGY	31
A. <i>Population and Sample Selected</i>	31
B. <i>Survey Instrument</i>	31
C. <i>Conceptual Frame Work for Analyzing the Data</i>	33
D. <i>Limitations of the Study</i>	34
CHAPTER FOUR	
RESEARCH FINDINGS	35
A. <i>General Respondents Characteristics</i>	35
1. <i>Age</i>	36
2. <i>Sex</i>	37
3. <i>Education</i>	37
4. <i>Type of Organization</i>	38
5. <i>Years of Experience (on the Job)</i>	39
6. <i>Years of Experience (Previous Job)</i>	40
7. <i>Title of Present Job</i>	40
8. <i>Number of Employees</i>	41
9. <i>Capital Intensity</i>	42
B. <i>Familiarity</i>	42
C. <i>Usage</i>	47
D. <i>Satisfaction</i>	53
E. <i>Lebanese Managers' Attitude</i>	54
CHAPTER FIVE	
CONCLUSION	57
<i>Appendix A</i>	
<i>Questionnaire Sample</i>	61
BIBLIOGRAPHY	68

LIST OF FIGURES

	<u>page</u>
Figure 1 Data Patterns	12
Figure 2 Relative importance of data patterns for different time horizons	14
Figure 3 Cost of Quantitative forecasting methods	16

LIST OF TABLES

	<u>page</u>
Table (2-1) Familiarity with forecasting methods (as a percentage of those responding)	26
Table (2-2) Satisfaction with forecasting methods (as a percentage of those responding)	27
Table (2-3) Forecast horizon	28
Table (2-4) Percentage of respondents for different application areas where forecasts are used	29
Table (2-5) Regular Usage of sales forecasting techniques by industrial and consumer firms	30
Table (4-1) Frequency distribution of respondents of age	36
Table (4-2) Frequency distribution of respondents by gender	37
Table (4-3) Frequency distribution of respondents by education	37
Table (4-4) Frequency distribution of respondents by type of organization	38
Table (4-5) Frequency distribution of respondents by years of experience	39
Table (4-6) Frequency distribution of respondents by previous experience	40
Table (4-7) Frequency distribution of organizations by number of employees	41
Table (4-8) Frequency distribution of organizations by capital intensity	42
Table (4-9) Degree of familiarity (%)	42
Table (4-10) Familiarity (Lebanese managers vs. U.S. managers)	43

	<u>page</u>
Table (4-11)	
Extent of Use (%)	47
Table (4-12)	
Sales by marketing strategy	50
Table (4-13)	
Sales by budgeting	50
Table (4-14)	
Market share by marketing strategy	51
Table (4-15)	
Production by inventory control	52
Table (4-16)	
Market share by time horizon	52
Table (4-17)	
Degree of satisfaction (%)	53
Table (4-18)	
Satisfaction (Lebanese managers vs. U.S. managers)	54
Table (4-19)	
Managers' attitude	55

ABSTRACT

The present time is witnessing fundamental changes at all levels of businesses, and managers are more concerned about examining the impact of the future over their decisions than ever before.

Forecasting techniques are of immense importance to management for achieving an efficient organizational performance, and a tool for reducing the level of uncertainty surrounding the business environment. The genuine purpose of the study is to examine the extent of familiarity, usage, and satisfaction of forecasting techniques by Lebanese managers. In addition, a comparison between the United States and Lebanese managers will be made to assess in evaluating the differences or similarities between them.

The study will determine the factors being forecasted, the application areas, and time horizon of forecasting methods used by Lebanese managers. Moreover, a general assessment to the managers' attitude will relatively answer whether managers are helping or hindering the implementation of forecasting. To reach the overall purpose and to elaborate more on forecasting techniques, a library search is conducted, and a statistical analysis is used in order to describe and explain the factors which are basic in formulating a general perspective on the subject.

CHAPTER ONE

INTRODUCTION

The rapid changes in the business environment and the increased uncertainty of the future, dictate that forecasting is an essential tool for optimal decision making. The importance of forecasting stems from the fact that the future will be different from the present; thus, business organizations are faced with an inevitable need for examining the impact of uncertainty over their future decisions. One means for assessment of future uncertainty is through the usage of forecasting that allows an organization to take advantage of opportunities and avoid pitfalls through timely decision making.

Webster's dictionary defines forecasting as an activity "to calculate or predict some future event or condition, usually as a result of rational study or analysis of pertinent data."¹

Before the 1950s, systematic forecasting methods were not relatively available, and the usage of methods related to this field was limited to executive departments of the government and economists. This limitation was due to the hard computation required and the insufficient timely data. Fortunately, the introduction of "Exponential Smoothing Techniques" during that decade gained gradual spread among business organizations because of their simplicity and ease of computation. However, professionals of the field did not appreciate these methods because they thought that "simple methods" cannot be "sufficiently

¹Philip Babcock Gore and the Merriam-Webster Editorial Staff, (1976), Webster's third new international Dictionary (U.S.A.: G & G Meriam Co.), p. 888.

accurate". It took thirty years to recognize that "Exponential Smoothing Techniques" can be as accurate as any of the sophisticated techniques.

Another major event that revolutionized the use of forecasting was the introduction of the computer in the 1950s. The computer eliminated the difficulty of manipulating huge data, thus, facilitating the applicability of more complex methodologies.

On the other hand, qualitative forecasting methods became very popular during the '60s and '70s. These methods attempted to deal with long term trends in variables where the historical data were not available to apply statistical forecasting approach.

The most important finding in the field of forecasting whether quantitative or qualitative are that forecasts are worthless unless applied to planning and decision making purposes.²

A. Type of Forecasting

Historically, the bases of forecasting were revelation and crystal ball gazing. Presently, forecasting involves scientific and judgmental measures to estimate the expected level of a variable(s) in the future based on thorough examination of past patterns.

Generally, forecasting procedure can be classified as either qualitative or quantitative.

1. Qualitative Techniques is "purely narrative, non-numerate description of an event, a product or a process."³ This technique is useful when historical information is not

²Makridakis & Wheelwright, (1982), The handbook of forecasting, (New York: Wiley), p. 554.

³Jones & Twiss, (1978), Forecasting technology for planning decision, (New York: MacMillan press), pp. 60, 61.

available, and the result of this approach is based only on the judgment of the forecaster.

2. *Quantitative Techniques* "is the measurement of a concept in well defined terms or unit".⁴ They are mechanical procedures that produce quantitative results. This approach is highly applicable, if adequate historical data exist.

Forecasting procedure might be classified as Macro or Micro. In the former, the variable is an aggregate one, such as Gross National Product (GNP) or national income. In the latter, the part of the aggregate is the variable under consideration. For example, sales of an individual company. Macro and Micro forecasting are tightly linked and cannot be thought of as a separate process.

Another consideration is that forecasting varies according to the length of time one is looking to into the future. A short-term forecasts are used to serve as an input for operational decisions which must be made in the near future. Long-term forecasting is applied for time periods of greater duration and is used in making decisions relating to the overall perspective of the organization.

B. Need and Purpose of the Study

Since organizations are operating in an atmosphere of uncertainty, and the continual changing conditions of the modern world and the increasing complexity of the business environment is creating more intensified activities at all level of business, "organizations that cannot respond to these changes and cannot

⁴Ibid.

foresee the future with any degree of accuracy are doomed to extinction".⁵

The need of this study stems from the importance of forecasting as an essential tool for providing management with information that might reduce the range of uncertainty surrounding a business decision.

Several surveys have been conducted on forecasting and its application by United States (U.S.) managers. The major results of Mintzer & Cox (1984) study revealed the following:

1. U.S. managers are very familiar with qualitative methods (judgmental).
2. Simple quantitative methods are much more familiar than sophisticated ones.
3. The method "Jury of Executive Opinion" is the most widely used.
4. Dissatisfaction with subjective methods is higher than it is with objective methods.

The purpose of the study is to examine the issue of forecasting practices by Lebanese managers and compare it to the survey of Mintzer & Cox.

This comparison is intended to give an assessment of the differences and similarities (if any) between Lebanese and U.S. managers regarding forecasting techniques.

⁵J. E. Hank & A. G. Reitsch, (1981), Business forecasting, (Boston: Allyn and Bacon), p. 2.

In order to achieve this objective, the study will examine the degree of familiarity, extent of use, satisfaction, and attitude of Lebanese managers towards forecasting methods.

C. Research Questions

1. What are the major characteristics of the selected sample?
2. What is the extent of familiarity, usage and satisfaction of forecasting method by Lebanese managers?
3. What is the relative importance of the demographic variables in explaining the variation of both the familiarity and usage variables?
4. What is the attitude of Lebanese managers toward forecasting?

D. Data Source

This survey will rely on two sources of data:

1. *Primary Data:* A questionnaire, including questions relevant to the research project, was distributed to managers working in the Lebanese private sector.
2. *Secondary Data:* Several books, articles and previous research related to the subject of the study will be used to help in the accomplishment of this study.

E. The Study Outline

Chapter two presents an overview of the quantitative and qualitative techniques of forecasting.

Chapter three discusses the procedure and methodologies adopted in analyzing the data collected.

Chapter four presents the findings of the data analysis.

Chapter five proposes a summary of the findings and recommendations.

CHAPTER TWO

REVIEW OF LITERATURE

Forecasting methods can be broadly classified into:

A. Judgmental Forecasting

The judgmental forecasts are used when the data needed for making forecast are not available or not sufficient for building a quantitative model. Thus, the basis for making projections about the future is the human judgment. Methods related to this type are numerous; the followings will be discussed:

1. Brainstorming

Brainstorming is an old method, but best known for spurring creativity. It is attributed to 'Osborn' who developed the technique in 1938.⁶ Brainstorming is usually conducted by a group of people who attempt to solve a specific problem or present their forecasts on a subject by collecting all the ideas spontaneously contributed without any premature evaluation (Criticism or Praise) of the ideas presented; however, this method is not applicable for solving problems which have only one possible answer because the method depends on synergy arising from the interaction of the ideas.

2. Sales Force Estimate

Members of this group are in constant contact with customers and are in a better position to provide information about their

⁶Jones. & Twiss, p. 98.

buying plans, attitude, and needs. Sales people are also closer to the market, and they might be able to provide valuable information regarding the current and expected future tactics of competitors. A major drawback of this method is that sales people tend to be pessimistic when sales forecasting is concerned, thereby producing low estimate. This gives sales people an advantage to set the sales quotas to a level they could achieve and be compensated according to that level which is based on their forecasts.

3. Jury of Executive Opinion

This method consists of combining the opinions of top executives concerning the subject to be forecasted. These insights are to a large extent subjective and depend on the experience of the managers within the company. Generally, executives from different areas are brought together or independently, and forecasts are reached by combining their views and opinions.

4. Customers Expectations

This method seeks to use customers' expectations of their needs and requirements as the basis for forecasting. This is often done by using surveys or through active participation of the field sales force.⁷

5. Delphi Technique

Delphi technique is a technique for achieving a structured anonymous interaction between experts using a questionnaire approach with controlled feedback of information designed to

⁷D. L. Hurwood, E. S. Grossman & E. L. Bailey, (1978), Sales forecasting, (New York: The conference board), p. 45.

eliminate or reduce the shortcomings of the face-to-face meeting. Basically, experts, from inside and outside the organization, are asked for their own opinion regarding the possible outcome of specific variable(s). The experts give their answers by a letter to a coordinating forecaster who determines the consensus opinion from the individual forecast. The result is sent back to the experts asking whether they want to revise their opinions in the light of the results obtained. This step is repeated until the experts stop changing their opinion.⁸

6. Program Evaluation and Review Technique (PERT)

This method was developed to assist in estimating the time needed to complete different phases of a certain project. The use of this method as a forecasting technique has been fruitful. Requirement needed to use this method is that forecasters should make three estimates 1) optimistic, 2) pessimistic, 3) the most likely, the combination of these estimates form an expected value.

$$EV = \frac{\text{Pessimistic estimate} + 4 (\text{most likely estimate}) + \text{Optimistic estimate}}{6}$$

The weights 1, 4, and 1 have been derived from application of the technique in a wide variety of industrial setting.

The advantage of this method is in converting the three estimates (optimistic, pessimistic, and most likely) into numerical value that could give a measurable result:

⁸Liyods & Byars, (1987), *Strategic management, planning & implementation*, 2nd edition, (New York: Harper & Row), p. 31.

In order to describe the variation in the expected value, a Standard Deviation (S.D.) is used:

$$\text{S.D.} = \frac{(\text{Optimistic} - \text{Pessimistic})}{6}$$

This S.D. gives this technique an advantage of using probabilistic measure regarding future performance of the dependent variable.

Limitation of this method is the assumption of ability to produce realistic estimates, but it is an effective control tool to be compared with estimates produced by other methods.⁹

B. Quantitative Methods

1. Factors Affecting Forecasting

Before introducing the forecasting methods, it is essential to identify the factors that are important in determining the requirements that forecasting must accommodate and respond to in order to be effective. These factors are:

a. Pattern of Data

The basic assumption underlying the use of Time-Series forecasting or causal forecasting is that the actual value observed will be determined by some pattern and some random influences. Generally, four kinds of pattern(s) are found in the data to be forecast:

- i. Horizontal pattern
- ii. Seasonal pattern
- iii. Cyclical pattern

⁹C. Gross & R. T. Peterson, (1976), Business forecasting, (Atlanta: Houghton miffin), p. 29.

iv. Trend pattern.

With the horizontal pattern, the data series fluctuate over a constant mean. A product whose sale does not increase or decrease over time would be of this type.

In the seasonal pattern, where a series fluctuates according to some seasonal factor, the seasons may be the months or the four seasons of the year, i.e., sales of soft drinks may follow such pattern.

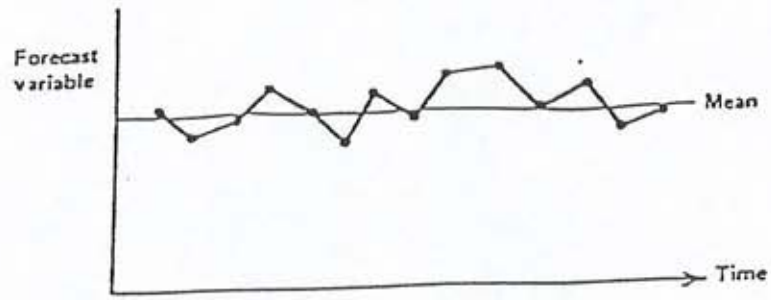
The cyclical pattern is similar to seasonal variation, but the length of a single cycle is longer than one year. This pattern is difficult to predict because it does not repeat itself at a constant interval of time, and its duration is not uniform. The price of metals is an example of this pattern

Trend pattern is where the value of the variable tends to increase or decrease over time. The steady increase in the cost of living over time is considered of this type.

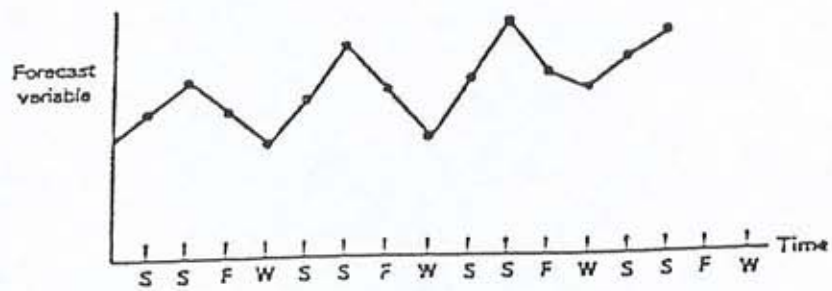
The four kinds of patterns are illustrated in Figure 1. A data series might include one or more of the above patterns, thus the forecasting method selected should be compatible with the pattern(s) of the data series, selection of the wrong forecast model may yield to misleading results.¹⁰

¹⁰S. Makridakis & S. Wheelwright, (1978), Forecasting: Methods and applications, (New York: Wiley), p. 9-10.

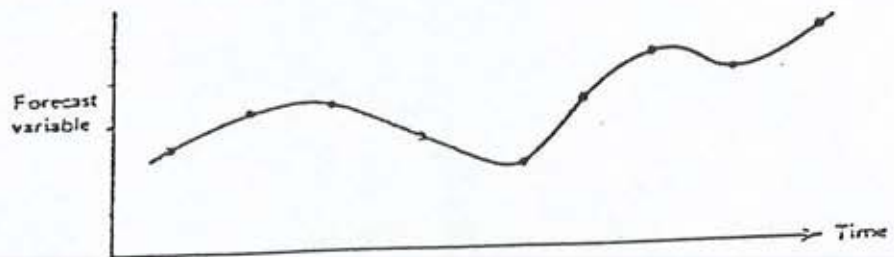
Figure 1
Data patterns



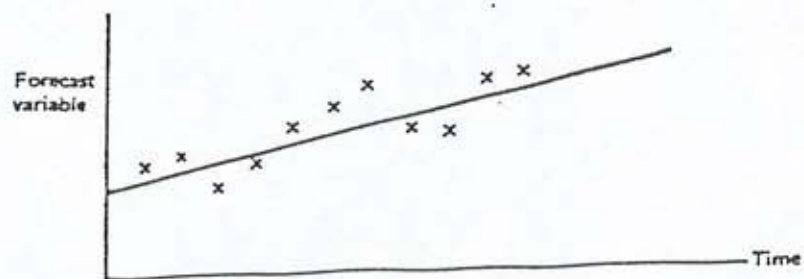
Horizontal Data Pattern.



Seasonal Data Pattern.



Cyclical Data Pattern.



Trend Data Pattern.

b. Time Horizon

In addition to the data patterns, it is also essential to consider the time horizon in selection of the appropriate forecasting method because the data patterns change with the span of time. Time horizons can be divided into:

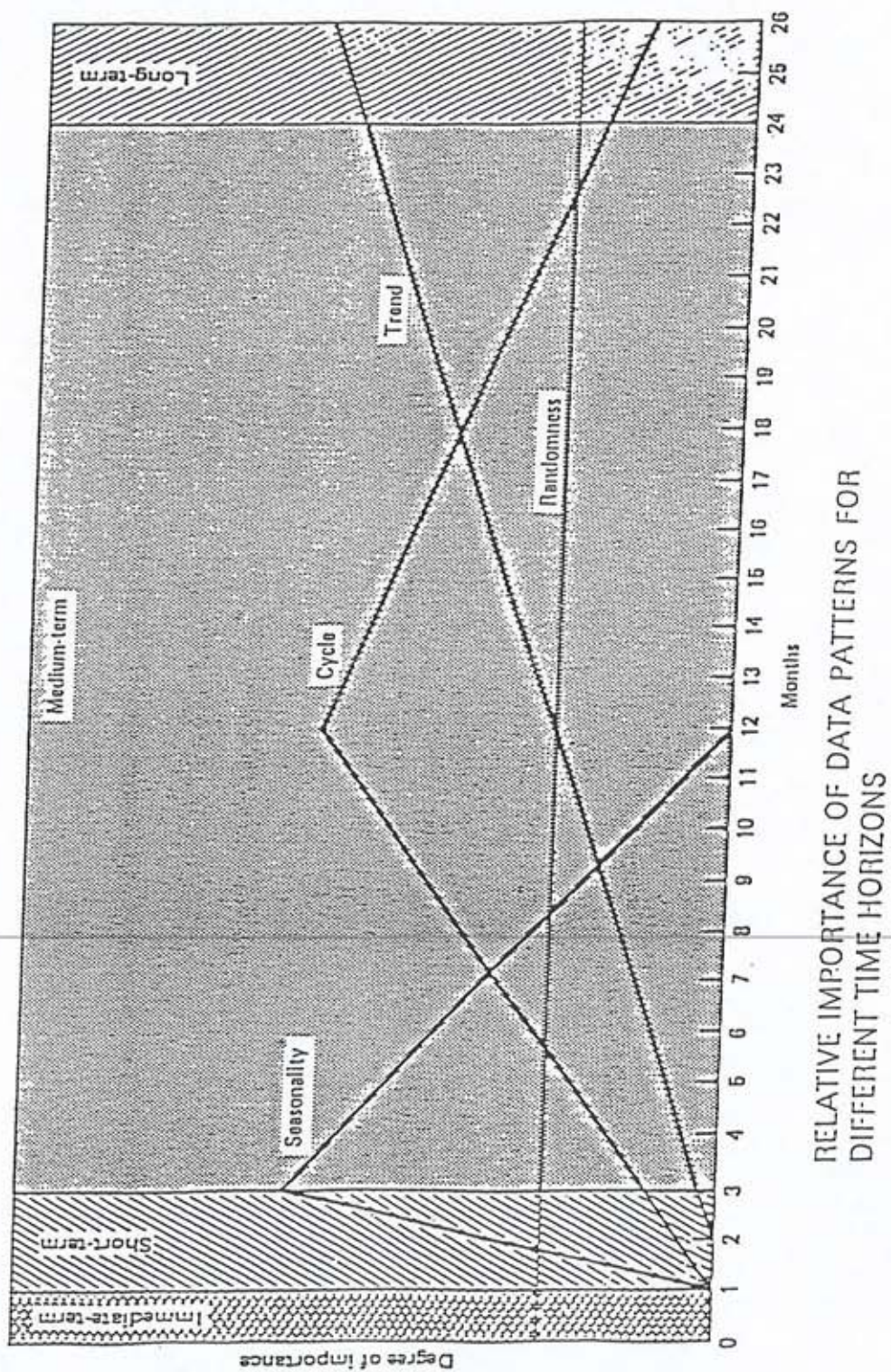
- i. Immediate term (less than one month)
- ii. Short term (one to three months)
- iii. Medium term (three months to two years)
- iv. Long term (over two years).

The changes of data pattern with respect to the time horizon can be stated as follows. In the immediate term, the randomness is the most important element. As the time horizon lengthens to two or three months, the seasonal pattern generally becomes dominant. Then, in the medium term, the cyclical pattern becomes more important. Finally, in the long term, the trend element dominates. Figure 2 presents the changing importance of the data patterns for different time horizons. Since the various patterns change with the time horizon, selection of the forecasting method should be based on the span of time into the future for which the method is best suited.

c. Cost of Forecasting Methods

In applying a quantitative forecasting method, three main elements of costs should be considered, the development costs, data storage cost, and the cost of repeated applications.

Figure 2



The development costs include the programming time (human cost) and the computer time cost to apply a given forecasting method.

The storage cost represents the storage space required for the data and the computer program of the forecasting model. The costs of repeated application are mainly the expenses incurred when modifications are made on the model to suit a certain forecasting situation, and the computerized output needed for each new forecast.

Concerning qualitative methods, costs are dependent on both the situation and the method used. Generally, the cost estimate will need to consider the human resource input and data acquisition as a major part of the total cost of forecasting.¹¹

The major elements of costs for different quantitative methods are presented in Figure 3.

d. Ease of Application

In order to have decisions on forecast obtained from forecasting methods, managers should understand the basis of the method used. This would enable the manager to identify the limitations and capability of what is being forecasted, can be interpreted and judged. The features generally included under ease of application are the basic complexity of the method, its timelines in providing forecast when needed, and the level of expertise required to apply different methods.

¹¹Ibid., p. 596.

Figure 3

COSTS OF QUANTITATIVE FORECASTING METHODS

Methods	Number of Trials to Achieve Acceptable Working Model	Overall Development Costs	Program Storage Requirements (1000s of words)	Minimum Data Storage Requirements ^a	Frequency of Program Reruns	Cost per Run ^b
Mean	1	\$300	1.8	30	Rarely needed	\$.15
Simple moving average	2	300	1.8	7.5	Every time	.03
Simple exponential smoothing	2	150	1.6	2	Every time	.025
Linear moving average	2	250	2.6	15	Every time	.035
Linear exponential smoothing	2	300	2.4	3	Every time	.025
Simple regression	1	900	3.4	30	Rarely needed	.50
Multiple regression	6	1800	6.8	30	Rarely needed	1.00

^a Based on a 32 bit, single precision word of an IBM 370.

^b Based on a cost of \$300 an hour of CPU time.

Source: Makridakis, S. & Wheelwright, S. C., Forecasting methods and applications.

Quantitative methods can be classified as either time series or causal forecasting methods.

2. *Time Series Analysis*

Time series or extension of past history, uses past historical data to generate forecasts. These methods are based on the assumption that the data series follows a certain pattern which will continue into the future. The following four Time-Series Methods will be dealt with:

a. Naive Models

This model is based on the assumption that recent periods are best predictors of the future.

Algebraically:

$$F_{t+1} = X_T$$

where

X_T = actual value for period t .

t = present period.

F_{t+1} = Forecast for period $t + 1$

Thus, if x stands for sales, then forecasts of sales for the next period is the same as the present period.

Naive model can be modified to suit different types of patterns that exist in a data series; when a data series contains a trend pattern, the above model will not do very well. To overcome

this situation, an alternative model could be used which takes into consideration the change that occurred between the present and the last period; the naive model becomes:

$$F_{t+1} = X_T + (X_T - X_{T-1})$$

In case of seasonal pattern the model could take the form of

$$F_{t+1} = X_{T-3}$$

This means that forecast for the next quarter value will be the same as the quarter one year ago.

Existence of the trend and seasonal variations can be treated by combining the two approaches, and the model will be

$$F_{t+1} = \frac{X_{T-3} + (X_T - X_{T-1}) + \dots + (X_{T-3} + X_{T-4})}{4}$$

where X_{T-3} is the seasonal pattern, and the remaining is the average of the amount of change for the past four quarters.

The advantages of this model is simplicity, and its minimal data requirement, but at the same time, the forecasts generated are poor and of a small practical value. In spite of the weakness of this approach, naive model can serve as a comparison to other more refined forecasting models.¹²

b. Moving Average

It is a numerical average of the last N data point that is used for purposes of making a forecast. Each new data point acquired is

¹²Hank & Reitsch, pp. 250-151.

included in calculating the average, and the data point for the Nth period preceding the new data point is discarded. The moving average forecast for period $t + 1$ can be represented as:

$$MA_{t+1} = \frac{X_t + X_{t-1} + \dots + X_{t-N+1}}{N}$$

where

X_t = actual value at time t .

N = number of values included in moving average.

Selection of the number of data values to be included in the moving average is highly critical because different length moving average will differ in the ability to forecast accurately the time series.

There are two major limitations to the use of moving average. First, moving average requires a considerable data storage if a large number of items need to be forecast. Second, the method gives equal weight to each of the last N values and no weight at all to values before period $(t - N + 1)$.¹³

c. Double Moving Average Model

The double moving average is an extension of the moving average method, and it is used when data follow a trend pattern. Thus, two moving averages are measured at time period T to be used in generating forecasts.

¹³N. T. Thomopoulos, (1980), Applied forecasting method, (New Jersey: Prentice Hall), p. 55.

$$\text{Moving Average (MA)} = \frac{X_T + X_{T-1} + \dots + X_{T-N+1}}{N}$$

$$\text{Double Moving Average (DMA)} = \frac{MA_t + M_{t-1} + \dots + M_{t-N+1}^{14}}{N}$$

This double moving average is moving averages of the moving average model based on the actual data.

d. Simple Exponential Smoothing

Exponential Smoothing is a procedure for continually revising an estimate in the light of more recent data. The model assigns more weight to the most recent data values; in this way, the forecasts can react quickly to potential shifts in the data series. Exponential smoothing is well suited to application when a large number of items are involved because little data storage is needed to carry out the calculation.

The model takes the form of:

$$ES_t = \alpha x_t + (1 - \alpha) ES_{t-1}$$

where

X_t = actual value

ES_{t-1} = average data smoothed to period $t - 1$.

t = present period

¹⁴Ibid., p. 78.

The term α is called 'smoothing constant', and its value ranges between 0 and 1 ($0 \leq \alpha \leq 1$). The value of α determines the extent to which the most current observation is to influence the forecast value.

One of the limitations of simple exponential smoothing is that when a data series contains a consistent trend, the forecast will lag behind that trend. The method double exponential smoothing avoids this problem by recognizing the presence of a trend pattern.

In addition to double exponential smoothing, there is also triple and higher forms of smoothing based on the same principle of re-smoothing the different patterns in a time series. The basic approach of these methods is similar to the simple exponential smoothing expressed in the form

$$\text{New forecast} = (\text{smoothing constant}) (\text{actual observation}) + (1 - \text{smoothing constant})(\text{old forecast})^{15}$$

e. Trend Projection

Trend projection implies a simple extrapolation of historical patterns. This method is often employed in economic and business forecasting. The popularity of this technique is due to the fact that many economic data series contain a trend element that results from population and economic growth. A basic shortcoming, however, of this technique is that trend projection might produce poor forecast in the presence of cyclical, seasonal, and irregular variations. For a

¹⁵S. Makridakis & S. C. Wheelwright, Forecasting: Methods and applications, pp. 111-112.

linear trend, the estimated forecast expressed as a function of time can be written as

$$S = a + bt$$

where

S = Trend value in period t.

a = Intercept of the trend line.

b = Slope of the trend line.

t = Time in years.

3. *Causal Forecasting Models*

Causal Forecasting Models are based on the assumption that the forecasted variable is influenced by one or more independent variables. This type attempts to make use of the relationship between the variable to be forecast and the other variables that explain its variation. Regression Model can be one example under this category.

Assumption under this technique is that the variable to be forecasted can be predicted on the basis of the value of one (simple regression) or more independent variables (multiple regression). When the independent variable is not time, it is a causal model, which assumes a linear relationship between the dependent variable and independent variable(s). When time is the independent variable, it is called a time series regression model.

The functional form of simple and multiple regression might be:

$$Y = a + bx$$

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3 + \dots + b_kx_k$$

These expressions state that as the independent variable(s) (x) take on new value, the dependent variable (Y) will also change. In a causal model, future value of the independent variable must be estimated before forecasting. In a time series model, the period for which the forecast is to be prepared, becomes the value of the independent variable.

Once the functional relationship is assumed to exist between a dependent and independent variable, two steps must be taken in order to forecast. First the form of relationship must be determined. Although the form of functional relation might be non-linear, it is not of a major limitation, because many non-linear functions (exponential, quadratic, cubic, etc.) can be transformed into linear function by converting the variables into their logarithmic form. Second, estimating the value of the parameters in the functional relationship. One of the most commonly used methods is the criterion of minimizing the sum of squared error.

4. Forecasting Accuracy

An important consideration in using any forecasting method is the accuracy of the forecast. One of the commonly used accuracy measure is the Mean Squared Error. It can be expressed as:

$$MSE = \frac{\Sigma(\text{Actual value} - \text{Forecast value})^2}{\text{number of data values}}$$

As indicated previously, in order to use the moving average method, one must choose the number of data values to be included in the moving average. One possible approach is to use experimentation to identify the length that minimizes the MSE measure. The length that minimizes this accuracy measure for the historical data will be used to forecast the future value in the time series. The above criterion is also applicable for choosing the value of the smoothing constant α in exponential smoothing model. Thus, the value of α producing the smallest error is chosen for use in generating forecast.¹⁶

Among the other possibilities of measuring forecast accuracy are the Mean Absolute Deviation (MAD) which gives equal weight to each error and the Mean Absolute Percentage Error (MAPE) which gives relative measure of accuracy.

These two measures can be expressed as

$$\text{MAD} = \frac{\sum |\text{Actual value} - \text{Forecast value}|}{\text{number of data values}}$$

$$\text{MAPE} = \frac{\sum \frac{|\text{Actual value} - \text{Forecast value}|}{\text{Actual value}}}{\text{number of data values}}^{17}$$

Applying one of these three accuracy measures will not determine if forecasts are good, bad, or indifferent. To reach such an evaluation, one may compare the accuracy measure (MSE,

¹⁶S. Makridakis & S. C. Wheelwright, *Forecasting: Methods and applications*, p. 569.

¹⁷S. Makridakis & S. C. Wheelwright, (1993), *Forecasting methods for management*, (New York: Prentice Hall), p. 58.

MAPE or MAD) of a given forecasting method with the naive model. The method which cannot outweigh the accuracy of the naive model should be discarded or vice versa.

Another approach to measure forecasting accuracy is the U statistics developed by "Theil" in 1966. This statistics provides a relative comparison of formal forecasting methods with naive models.

Theil's U statistics is defined as

$$U = \sqrt{\frac{\sum \left(\frac{F_{i+1} - x_i - x_{i+1} - x_i}{x_i} \right)^2}{n-1}}{\frac{\sum \left(\frac{x_{i+1} - x_i}{x_i} \right)^2}{n-1}}$$

where

x_i = actual value

F_i = forecast value

n = number of data values.

Interpretation of U statistics can be stated as follows, when U equals unity, naive model is as good as the model being evaluated. If U is less than unity, the forecasting model being evaluated is better than the naive model. On the other hand, if U is greater than

unity, no need to use the evaluated forecasting model since naive model could produce better results.¹⁸

This accuracy comparison could narrow the possibility of choosing an inappropriate forecasting method.

C. *Forecasting Methods in Practice*

Several surveys have been conducted on the application of forecasting methods in business organizations. These studies revealed important dimensions regarding forecasting practice: Management familiarity with the methods, satisfaction with the result of that usage, applicability of these methods for different time horizons, application areas where forecasts are used, and type of organizations using forecasting techniques.

The results of Mintzer & Cox (1984) study concerning familiarity of more than 150 U.S. manager with twelve quantitative and qualitative methods of forecasting are listed in Table (2-1):

Table (2-1)
Familiarity with forecasting methods (as a percentage of those responding)

Method	Very familiar	Vaguely Familiar	Completely Unfamiliar
<i>Subjective</i>			
Jury of executive opinion	81	6	13
Sales force composite	79	5	16
Customer expectations	73	7	20
<i>Objective (quantitative)</i>			
Moving average	85	7	8
Straight-line projection	82	11	7
Exponential smoothing	73	12	15
Regression	72	8	20
Trend-line analysis	67	16	17
Simulation	55	22	23
Life cycle analysis	48	11	41
Classical decomposition	42	9	49
Box-Jenkins	26	9	65

¹⁸S. Makridakis, & S. C. Wheelwright, Forecasting methods for management, pp. 573-574.

Based on the results of the table, the following observations can be stated:

Respondents are very familiar with qualitative methods (jury of executive opinion, sales force composite, and customer expectations) and are much more familiar with simple quantitative methods (moving average) than with sophisticated ones (classical decomposition and Box-Jenkins).

With respect to the second dimension, satisfaction with various forecasting methods is shown in Table (2-2).

Table (2-2)
Satisfaction with forecasting methods (as a percentage of those responding)¹⁹

Method	Satisfied	Neutral	Dissatisfied
<i>Subjective</i>			
Jury of executive opinion	54	24	22
Customer expectations	45	23	32
Sales force composite	43	25	32
<i>Objective (quantitative)</i>			
Regression	67	19	14
Exponential smoothing	60	19	21
Moving average	58	21	21
Trend-line analysis	58	28	15
Classical decomposition	55	14	31
Simulation	54	18	28
Life cycle analysis	40	20	40
Straight-line projection	32	31	37
Box-Jenkins	30	13	57

The respondents are less satisfied with subjective methods than with quantitative methods. Regression is found to be with the highest level of satisfaction, followed by exponential smoothing. The methods moving average and trend line analysis also produced a high level of satisfaction, with trend line having one of the

¹⁹Ibid.

smallest percentage of dissatisfied users. The method which users were least satisfied and the most dissatisfied with was the Box-Jenkins.

The third dimension, the use of forecasting method for different forecasting horizons, is summarized in Table (2-3).

Table (2-3)
Forecast horizon

Mthod	Foecast horizon		
	Up to 3 months	3 months-2 years	Over 2 years
Extrapolation:			
1. Moving averages	24	22	5
2. Exponential smoothing	24	17	6
3. Trend line analysis	21	28	21
4. Straight-line projection	13	16	10
5. Classical decomposition	9	13	5
6. Box-Jenkins	5	6	2
Causal:			
7. Causal regression	14	36	28
8. Simulation	4	9	10
Judgmental:			
9. Jury of executive opinion	37	42	38
10. Sales force composite	37	36	8
11. Customer expectations	25	24	12

Source: J. T. Mintzer & J. E. Cox, Jr., (1984), "Familiarity, application and performance of sales forecasting techniques," *Journal of forecasting*, vol. 3, pp. 27-36.

The method jury of executive opinion is the most widely used for all time horizons. Whereas sales force composite and customers expectations are used for short and medium terms, the moving verage and exponential smoothing are used more for short term and less for medium and long term horizons. Finally, regression is used most for medium and long term forecasting horizons.

Regarding the application areas where different methods are being used is shown in Table (2-4).

Table (2-4)
Percentage of respondents for different application areas where forecasts are used²⁰

	Total	Primary Decision	Secondary Decision	Tertiary Decision
Production planning	73	36	20	18
Budgeting	54	11	25	22
Strategic planning	45	6	18	26
Sales analysis	29	14	5	12
Inventory control	26	13	9	5
Marketing planning	22	8	13	0
Logistics planning	17	8	3	7
Purchasing	10	3	7	0
Material requirements planning	5	1	0	5
Product Planning	4	0	0	5
-	-	100	100	100

Production planning is the heaviest use of forecasting, followed by budgeting and strategic planning. Sales analysis and inventory control are using forecasting moderately compared to production planning. Material requirement is one of the least areas making forecast.

Table (2-5) shows the percentage of regular use of forecasting by industrial and consumer firms based on the study conducted by "Dalrymple" (1987).

The subjective method sales force composite is the most used by industrial firms whereas consumer firms are most using jury of executive opinion. Overall, it seems that industrial firms are heavier users of forecasting than consumer firms.

This brief review of the results of Mintzer & Cox, 1984 and Dalrymple, 1987 studies was to provide an insight and to present a comprehensive picture on the practice of forecasting by U.S. managers.

²⁰Ibid.

Table (2-5)
Regular Usage of sales forecasting techniques by industrial and consumer firms

Methods	Percent of Industrial Firms	Percent of Consumer Firms
<i>Subjective</i>		
Sales force composite	33.9	13.0
Jury of executive opinion	25.4	19.6
Industry survey	6.8	8.7
Intentions to buy	6.8	4.3
<i>Extrapolation</i>		
Naive forecast	18.6	17.4
Leading indicators	16.9	2.2
Moving average	8.5	10.9
Unit rate of change	6.8	6.5
Percentage rate of change	5.1	15.2
Exponential smoothing	3.4	10.9
Line extension	1.7	6.5
<i>Quantitative</i>		
Econometric models	10.2	4.3
Multiple regression	10.2	4.3
Simple regression	5.1	2.2
Box-Jenkins	5.1	2.2

Source: Makridakis, S. & Wheelwright, S. C., Forecasting methods for management.

The study on hand will tackle relatively the same dimensions presented by the previous surveys and will try to assess the status of forecasting practices by Lebanese managers.

The next chapter will describe the methodology adopted in reaching the above objective, and the procedure used in analyzing the data collected from the selected sample.

CHAPTER THREE

RESEARCH METHODOLOGY

The survey has been conducted with the intent of measuring the degree of familiarity, extent of use, and satisfaction of forecasting techniques by Lebanese managers.

This chapter is a description of the procedure followed to reach the above objectives.

A. Population and Sample Selected

The target population of this survey is composed of managers working in different business organizations in the Lebanese private sector. The method used for sampling in this study is the purposive survey research method which usually has the advantage of studying a large number of managers whereas a random sample would have yielded few numbers from the managerial ranks.

B. Survey Instrument

A questionnaire was used as the main tool for collecting data. It was validated after a pilot study conducted with ten managers so as to pretest the prevalent questionnaire (Appendix A). The survey instrument was modified according to the feedback obtained from the pilot study and from three professors who gratefully participated in validating the questionnaire.

The questionnaire was distributed on a convenience basis to one hundred and twenty managers working in the following organizations:

1. Commercial companies
2. Banks
3. Insurance companies
4. Industrial companies
5. Real estate

Ninety-six questionnaires were returned, out of which only eighty-five were valid for further statistical analysis. Thus, making the rate of return equals to sixty-eight percent.

The distributed questionnaire was divided into the following sections:

**Demographic Variables:* These are the independent variables of the study that will be tested against the dependent ones. Questions are used to determine respondents' age, gender, education, years of experience, and the type of the organization.

**Part One:* It is composed of two questions intended to determine the number of employees and the amount of capital, so as to evaluate the size of the selected company.

**Part Two:* This part is designed to investigate the "familiarity" of the Lebanese manager with forecasting methods. It covers four qualitative and five quantitative forecasting techniques. Familiarity with them was graded on a five-points likert type scale ranging from "very familiar" to "not at all".

**Part Three:* Part three is a follow up to the second part in which the manager who is familiar with the forecasting methods has to indicate the extent of usage of those methods. It comprises the same nine methods with extent of usage ranging from "very frequent" to "not at all".

**Part Four:* It is also a repetition of the nine forecasting methods; and the respondent has to indicate his/her satisfaction with the method used. Satisfaction is measured on a scale from "highly satisfied" to "not at all".

**Part Five:* It is composed of three questions concerning the factors being forecasted, the area where these factors are used, and the time horizon for the usage of forecasting.

**Part Six:* It is a list of eight subjective questions in which managers have to choose the answer that mostly reflect their attitude. This part is measured on a scale ranging from "strongly agree" to "strongly disagree".

C. Conceptual Frame Work for Analyzing the Data

The data collected will be numerically coded, inputted through the data base storage facilities, and will be statistically interpreted and analyzed using the Statistical Package for Social Science (SPSS). The statistical output will be mainly for answering the research questions stated in Chapter One. A descriptive statistical analysis will be used to determine frequencies and

percentages of the data under study. Regression analysis will determine the relationship between the dependent and independent variables. In addition, a cross tabulation will measure the relationship between variables.

D. Limitations of the Study

Despite the efforts to make the results of the study as accurate as possible, several limitations were uncontrollable.

1. The sampling procedure followed cannot be used to make inference about larger population.
2. Some of the questionnaires distributed were returned within few minutes, which raises doubts on whether respondents gave reliable answers or not.
3. Managers lacking the knowledge of the English language were excluded in order to avoid any influence while explaining the nature of the questions.

The next chapter is an analytical one, where frequency distribution, regression and cross tabulations are used to answer and explain the research questions stated in Chapter one.

CHAPTER FOUR

RESEARCH FINDINGS

This chapter will present the findings and analyze them in accordance with the research questions listed as follows:

1. What are the major characteristics of the selected sample?
2. What is the extent of familiarity, usage, and satisfaction of forecasting method by Lebanese managers?
3. What is the relative importance of the demographic variables in explaining the variation of both the familiarity and usage variables?
4. What is the attitude of Lebanese managers toward forecasting?

This chapter will answer the above questions in the light of the results obtained.

A. General Respondents Characteristics

The selected sample of managers covered in the survey is described according to the following demographic variables.

1. Age

Table (4-1)
Frequency distribution of respondents of age

Value	Frequency	Percent	Valid Percent	Cum Percent
25	1	1.2	1.2	1.2
26	3	3.5	3.5	4.7
27	4	4.7	4.7	9.4
28	5	5.9	5.9	15.3
29	3	3.5	3.5	18.8
30	3	3.5	3.5	22.4
31	4	4.7	4.7	27.1
32	6	7.1	7.1	34.1
33	5	5.9	5.9	40.0
34	4	4.7	4.7	44.7
35	8	9.4	9.4	54.1
36	3	3.5	3.5	57.6
37	2	2.4	2.4	60.0
38	2	2.4	2.4	62.4
39	3	3.5	3.5	65.9
40	5	5.9	5.9	71.8
41	1	1.2	1.2	72.9
42	3	3.5	3.5	76.5
43	2	2.4	2.4	78.8
44	4	4.7	4.7	83.5
45	6	7.1	7.1	90.6
46	1	1.2	1.2	91.8
47	1	1.2	1.2	92.9
48	2	2.4	2.4	95.3
50	3	3.5	3.5	98.8
55	1	1.2	1.2	100.0
TOTAL	85	100.0	100.0	

Mean	36.388	Standard Error	.760	Median	35.000
Mode	35.000	Standard Deviation	7.004	Variance	49.050
Valid Cases	85	Missing Cases	0		

The results of the above table show that approximately 72% of the respondents fall into the category of 25 years to 40 years.

2. Sex

Table (4-2)
Frequency distribution of respondents by gender

	Value	Frequency	Percent	Valid Percent	Cum Percent
	1 Male	74	87.1	87.1	87.1
	2 Female	11	12.9	12.9	100.0
		85	100.0	100.0	
Mean	1.129	Std Err	.037	Median	1.000
Mode	1.000	Std Dev	.338	Variance	.114
Valid Cases	85	Missing Cases	0		

The gender frequencies show that seventy-four of the managers (87.1%) are males, and eleven (12.9%) are females.

3. Education

Table (4-3)
Frequency distribution of respondents by education

	Value	Frequency	Percent	Valid Percent	Cum Percent
	1 High school	3	3.5	3.5	3.5
	2 Former college student	2	2.4	2.4	5.9
	3 B.S.	36	42.4	42.4	48.2
	4 M.S.	39	45.9	45.9	94.1
	5 Ph. D.	5	5.9	5.9	100.0
	TOTAL	85	100.0	100.0	
Mean	3.482	Std Err	.086	Median	4.000
Mode	4.000	Std Dev	.796	Variance	.634
Valid Cases	85	Missing Cases	0		

The majority of the respondents are holders of a university degree. More than 88% are Bachelor of Sciences (B.S.) and Master of Sciences (M.S.) graduates.

4. *Type of Organization*

Table (4-4)
Frequency distribution of respondents by type of organization

	Value	Frequency	Percent	Valid Percent	Cum Percent
	1 Commercial	42	49.4	49.4	49.4
	2 Banks	10	11.8	11.8	61.2
	3 Insurance	10	11.8	11.8	72.9
	4 Industrial	18	21.2	21.2	94.1
	5 Real Estate	5	5.9	5.9	100.0
	TOTAL	85	100.0	100.0	
Mean	2.224	Std Err	.152	Median	2.000
Mode	1.000	Std Dev	1.400	Variance	1.961
Valid Cases	85	Missing Cases	0		

It is worth mentioning that several companies, such as pharmaceuticals, merchandising, and manufacturing were included under commercial companies.

5. *Years of Experience (on the Job)*

Table (4-5)
Frequency distribution of respondents by years of experience

Value	Frequency	Percent	Valid Percent	Cum Percent	
1	5	5.9	5.9	5.9	
2	6	7.1	7.1	12.9	
3	8	9.4	9.4	22.4	
4	4	4.7	4.7	27.1	
5	6	7.1	7.1	34.1	
6	7	8.2	8.2	42.4	
7	8	9.4	9.4	51.8	
8	4	4.7	4.7	56.5	
9	5	5.9	5.9	62.4	
10	8	9.4	9.4	71.8	
11	2	2.4	2.4	74.1	
12	4	4.7	4.7	78.8	
13	1	1.2	1.2	80.0	
14	3	3.5	3.5	83.5	
15	2	2.4	2.4	85.9	
16	3	3.5	3.5	89.4	
17	1	1.2	1.2	90.6	
18	2	2.4	2.4	92.9	
19	1	1.2	1.2	94.1	
20	3	3.5	3.5	97.6	
21	1	1.2	1.2	98.8	
22	1	1.2	1.2	100.0	
TOTAL	85	100.0	100.0		
Mean	8.471	Std Err	.596	Median	7.000
Mode	3.000	Std Dev	5.496	Variance	30.204
Valid Cases	85	Missing Cases	0		

Seventy-one point eight percent (71.8%) of the selected sample had an experience of less than eleven years while twenty-eight point two (28.2%) had a ranged experienced extending between eleven and twenty-two years.

6. *Years of Experience (Previous Job)*

Table (4-6)
Frequency distribution of respondents by previous experience

	Value	Frequency	Percent	Valid Percent	Cum Percent
	0	21	24.7	24.7	24.7
	1	5	5.9	5.9	30.6
	2	5	5.9	5.9	36.5
	3	11	12.9	12.9	49.4
	4	7	8.2	8.2	57.6
	5	11	12.9	12.9	70.6
	6	6	7.1	7.1	77.6
	7	2	2.4	2.4	80.0
	8	7	8.2	8.2	88.2
	9	5	5.9	5.9	94.1
	10	4	4.7	4.7	98.8
	13	1	1.2	1.2	100.0
	TOTAL	85	100.0	100.0	
Mean	3.941	Std Err	.360	Median	4.000
Mode	.000	Std Dev	3.321	Variance	11.032
Valid Cases		Missing Cases	0		

Twenty-one respondents had no previous experience. 45.88% had previous experience below six years, and only 29.4% had previous experience between six and thirteen years.

7. *Title of Present Job*

Due to the various titles given by respondents, it was suggested to use the term "managers" to encompass all the managerial titles. A list of the titles given by the respondents could give a valid reason for this choice.

- a. Credit Officer
- b. Sales Manager
- c. Marketing Manager

- d. Administrative Manager
 - e. Product Manager
 - f. Director of the Research Department
 - g. Chairman
 - h. Production Manager
 - i. Head of Department
 - j. Branch Manager
 - k. Counter Manager
 - l. Assistant Manager
- etc.

8. *Number of Employees*

Table (4-7)
Frequency distribution of organizations by number of employees

	Value	Frequency	Percent	Valid Percent	Cum Percent
	1 Less than 25	19	22.4	22.4	22.4
	2 25 - 50	15	17.6	17.6	40.0
	3 51 - 75	14	16.5	16.5	56.5
	4 75 - 100	13	15.3	15.3	71.8
	5 More than 100	24	28.2	28.2	100.0
	TOTAL	85	100.0	100.0	
Mean	3.094	Std Err	.167	Median	3.000
Mode	5.000	Std Dev	1.540	Variance	2.372
Valid Cases	85	Missing Cases			

71.8% of the selected organizations have a work force of less than one hundred employees. 28.2% have more than one hundred employees.

9. *Capital Intensity*

Fifty-two point nine percent (52.9%) of the selected organizations have a capital of less than one million dollars. 34.1% have a capital above one million, but less than five million dollars, and only 28.2% above five million dollars.

Table (4-8)

	Value	Frequency	Percent	Valid Percent	Cum Percent
1	Less than 1 M	45	52.9	52.9	52.9
2	1 M - 2 M	14	16.5	16.5	69.4
3	2.1 M - 3 M	3	3.5	3.5	72.9
4	3.1 M - 4 M	9	10.6	10.6	83.5
5	4.1 M - 5 M	3	3.5	3.5	87.1
6	Above 5 M	11	12.9	12.9	100.0
	TOTAL	85	100.0	100.0	
Mean	2.341	Std Err	.197	Median	1.000
Mode	1.000	Std Dev	1.816	Variance	3.299
Valid Cases		Missing Cases			

B. *Familiarity*

The degree of familiarity of forecasting methods by Lebanese managers is shown in Table (4-9).

Table (4-9)
Degree of familiarity (%)

	Highly Familiar	More than Familiar	Familiar	Hardly Familiar	Unfamiliar
Qualitative Methods					
a. Brainstorming	60	9.4	8.2	3.5	18.8
b. Jury of executive opinion	37.6	11.8	17.6	17.6	15.3
c. Sales force estimate	44.7	17.6	28.2	2.4	7.1
d. Customers expectation	49.4	11.8	23.5	7.1	8.2
Quantitative Methods					
a. Moving average	30.6	11.8	10.6	10.6	36.5
b. Exponential Smoothing	15.3	9.4	12.9	17.6	44.7
c. Simple regression	22.4	17.6	20.0	4.7	35.3
d. Multiple regression	22.4	16.5	21.2	8.2	31.8
e. Trend line analysis	31.8	12.9	18.8	5.9	30.6

Brainstorming is the most familiar of the subjective methods. Customers expectations is the second method being highly familiar with, followed by sales force estimate and jury of executive opinion. Managers, who are highly familiar with the qualitative methods, are much more than those who are unfamiliar with them.

The opposite is true when it comes to quantitative methods. Managers, who are unfamiliar with quantitative methods, outweigh those who are highly familiar with them. Exponential smoothing is the least familiar and the highest being unfamiliar among the quantitative methods.

Simple and multiple regression are equally being highly familiar with. Trend line analysis is the method having the highest percentage of being highly familiar by respondents followed by moving average.

In order to compare the results of the study with Mintzer & Cox (1984) survey, the responses were combined together to reflect familiarity and unfamiliarity with the forecasting methods.

Table (4-10)
Familiarity (Lebanese managers vs. U.S. managers)

	Familiarity (%)		Unfamiliarity (%)	
	Research Findings	Mintzer & Cox	Research Findings	Mintzer & Cox
Brainstorming *	77.6	-	22.3	-
Jury of executive opinion	67	81	32.9	19
Sales force estimate	90.5	79	9.5	21
Customers expectations	84.7	73	15.3	27
Moving average	53	85	47.1	15
Exponential Smoothing	37.6	73	62.3	27
Regression	60.0	72	40.0	28
Trend line analysis	63.5	67	36.5	33

* Brainstorming was not included in Mintzer & Cox survey.

Based on the results of the two tables, the following major observations can be made:

1. Qualitative methods are more familiar than quantitative methods. This result is similar to the survey of Mintzer & Cox conducted on U.S. managers.
2. "Jury of executive opinion" and "exponential smoothing" are the methods in which Lebanese managers are less familiar with than the U.S. ones. This is the first difference between U.S. and Lebanese managers.
3. Both U.S. and Lebanese managers are less familiar with quantitative methods, but if one takes into consideration the difference in the years when each survey was conducted, one would find out that the results of this research are drastic.

After presenting and comparing the degree of familiarity of forecasting methods by Lebanese and U.S. managers, the intent of the study now is to identify the critical factors that are likely to be associated with the degree of familiarity.

The following is a description of the steps followed in order to reach a regression equation that can reasonably associate both variables (dependent and independent ones).

In order to avoid multicollinearity among independent variables which could affect the result of the multiple regression, a correlation matrix was used to identify the availability of large correlation coefficients. A stepwise method

was selected to follow inclusion of the independent variables one by one into the equation according to their significance.

The first regression output was to identify the factor(s) that affects the degree of familiarity with qualitative methods.

In step number one, the regression function included Age as the only variable into the equation. The output of this equation resulted in a coefficient of determination $R^2 = 0.10704$. The F ratio is 9.94918. The F significant is equal to 0.0022.

A list of the variables, their coefficients (Beta), T-test and T significant is presented as follows.

<u>Variables</u>	<u>Beta</u>	<u>T</u>	<u>Significant T</u>
Age	-.49621	-3.154	0.0022
(Constant)	3.25985	9.517	0.0000

The regression equation derived from the above variables is:

$$\text{Familiarity Qualitative Methods} = 3.25985 - .49621 \text{ Age}$$

(0.0000) (0.0022)

$$R^2 = 10.74\%$$

$$\text{Sig. } F = 0.0022$$

The critical F value is considered significant for the regression equation at the 5% and 1% level of significance. The negative Beta coefficient for Age suggests that the younger the manager in the organization the more he/she is familiar with qualitative methods. This could be attributed to the fact that young managers who have freshly graduated from universities still recall what they have learned during their education.

Another regression equation was obtained to identify the factors that affect familiarity with quantitative methods.

The regression equation is

$$\text{Familiarity Quantitative Methods} = 5.55781 - .36838 \text{ educ} - .53585 \text{ Age}$$

(0.0000) (0.0000) (0.000)

$$R^2 = 0.12185$$

$$F \text{ significant} = 0.0049$$

The R^2 implies that 12% of the variation in familiarity with quantitative methods could be explained by age and education., and it also indicates a low association between the two factors, i.e., age and education.

This result contradicts the general belief that education should be positively correlated with familiarity with quantitative methods, but the reason for the negative Beta might be due to the following reasons:

1. The percentages of unfamiliar managers with quantitative method, are more than those who are familiar with them.
2. The major reason for having a negative coefficient for education might be due to the fact that the field of study of the degree obtained by the managers was not included.

The second variable, which is negatively correlated, is age. It seems that old managers are less familiar with both qualitative and quantitative method due to the same reasoning stated previously.

C. Usage

Table (4-11) represents the extent of use by Lebanese managers who are familiar with forecasting methods.

By visual inspection of the percentages of Table (4-11), several observations can be made. Brainstorming is the method

Table (4-11)
Extent of Use (%)

	Very frequent	Frequent	Sometimes	Hardly ever	Not at all
Qualitative Methods					
a. Brainstorming	31.9	18.8	27.5	1.4	20.3
b. Jury of executive opinion	11.4	22.9	35.7	18.6	11.4
c. Sales force estimate	30.8	21.8	29.5	6.4	11.5
d. Customers expectation	26.9	29.5	28.2	9.0	6.4
Quantitative Methods					
a. Moving average	13.2	28.3	15.1	7.5	35.8
b. Exponential Smoothing	6.5	10.9	17.4	15.2	50.0
c. Simple regression	22.2	14.8	22.2	18.5	22.2
d. Multiple regression	21.1	14.0	21.1	21.1	22.8
e. Trend line analysis	17.2	22.4	37.9	5.2	17.2

being used very frequent followed by sales force estimate, customers expectations, and finally jury of executive opinion.

The extent of use of quantitative methods is less than the usage of qualitative methods. Simple regression has the highest percentage of being very frequently used along with multiple regression; they are followed by trend line analysis, and then moving average, and finally exponential smoothing.

The above results may lead to the following remarks:

1. "Exponential smoothing" is the method being the least used by Lebanese managers. This finding contradicts the empirical findings that exponential smoothing is capable of considerable accuracy and is easy to understand and use.
2. Rregressions (simple and multiple) are very frequently used, despite the empirical findings that time-series methods show more accuracy than explanatory methods. However, since regression can be used for purposes other than forecasting, this finding may not be surprising.

The following is a list of the factors, application areas and time horizon for forecasting method used by Lebanese managers.

The factors being forecasted by Lebanese managers are

	<u>Factors</u>	<u>Percentage (%)</u>
1.	Sales	81.2
2.	Market share	58.8
3.	Revenue	38.8
4.	Production	34.1

Sales is the factor being forecasted by eighty-one percent. Market share is the second factor having a percentage of fifty-eight, followed by revenue and production.

The application areas where the various methods are being used are shown below.

<u>Application areas</u>	<u>Percentage</u>
Strategic planning	58.8
Budgeting	58.8
Marketing strategy	56.5
Inventory control	31.8

Strategic planning and budgeting share the same percentage; they are followed by marketing strategy and inventory control.

The time horizons for the usage of forecasting by Lebanese managers is summarized below.

<u>Time Horizon</u>	<u>Percentage</u>
0 - 3 months	30.6
3 months - one year	60
more than one year	28.2

The results show that forecasting is mostly used for short and medium terms and less for long term.

A cross tabulation is used to measure the relation between the factors being forecasted and the application area for such factors. Inspecting Table (4-12), managers tend to forecast sales for the purpose of preparing a marketing strategy.

Table (4-12)
Sales by marketing strategy

	0	1	Row Total
0	11 29.7	5 10.4	16 18.8
1	26 70.3	43 89.6	69 81.2
Column Total	37 43.5	48 56.5	85 100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F. < 5
3.91468	1	.0479	6.965	None
5.10029	1	.0239	(Before Yates Correction)	

The table shows that forty-three of Lebanese managers (89.6%) forecast sales for the sake of preparing a marketing strategy. The chi-square is 3.91468, and the observed significance is .0479 less than the critical one (5%), implying that the two variables sales and marketing strategy are interrelated and dependent of each other.

Table (4-13)
Sales by budgeting

	0	1	Row Total
0	11 31.4	5 10.0	16 18.8
1	24 68.6	45 90.0	69 81.2
Column Total	35 41.2	50 58.8	85 100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F. < 5
4.86402	1	.0274	6.588	None
6.18692	1	.0129	(Before Yates Correction)	

Table (4-13) shows that forty-five managers (90%) forecast sales for budgeting purposes.

Forecasting market share was for preparing a marketing strategy.

Table (4-14)
Market share by marketing strategy

	0	1	Row Total
0	25 67.6	10 20.8	35 41.2
1	12 32.4	38 79.2	50 58.8
Column Total	37 43.5	48 56.5	85 100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F. < 5
16.96052	1	.0000	15.235	None
18.84057	1	.0000	(Before Yates Correction)	

Thirty-eight of the respondents (79.2%) forecast market share to aid in preparing a marketing strategy.

Table (4-15) shows that fourteen managers (51.9%) forecast production to assess in preparing an inventory control.

Table (4-15)
Production by inventory control

	0	1	Row Total
0	43 74.1	13 48.1	56 65.9
1	15 25.9	14 51.9	29 34.1
Column Total	58 68.2	27 31.8	85 100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F. < 5
4.44054	1	.0351	9.212	None
5.53643	1	.0186	(Before Yates Correction)	

Finally, managers forecast market share for a time horizon of more than one year.

Table (4-16)
Market share by time horizon

	0	1	Row Total
0	30 49.2	5 20.8	35 41.2
1	31 50.8	19 79.2	50 58.8
Column Total	61 71.8	24 28.2	85 100.0

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F. < 5
4.60354	1	.0319	9.882	None
5.71394	1	.0168	(Before Yates Correction)	

The same steps followed to form a regression equation to explain the variation in familiarity was used to measure the variation in usage. The independent variables included did not enter to form a regression equation that could explain or identify the factors that affect the extent of usage of forecasting methods by Lebanese managers.

D. Satisfaction

The degree of satisfaction of forecasting methods used by Lebanese managers is shown in Table (4-17).

Table (4-17)
Degree of satisfaction (%)

	Highly satisfied	Satisfied	Moderately Satisfied	Hardly Satisfied	Not at all
Qualitative Methods					
a. Brainstorming	31.6	31.6	14.0	19.3	3.5
b. Jury of executive opinion	6.5	27.4	32.3	16.1	17.7
c. Sales force estimate	10.0	40.0	24.3	20.0	5.7
d. Customers expectation	26.0	24.7	24.7	20.5	4.1
Quantitative Methods					
a. Moving average	8.6	48.6	22.9	5.7	14.3
b. Exponential Smoothing	0	19.2	26.9	26.9	26.9
c. Simple regression	15.6	24.4	28.9	17.8	13.3
d. Multiple regression	26.1	23.9	30.4	13.0	6.5
e. Trend line analysis	20.8	22.9	33.3	18.8	4.2

Brainstorming is the method being highly satisfied with, followed by customers expectations and sales force estimates. Concerning quantitative methods, multiple regression is the method being highly satisfied with, followed by trend line analysis and single regression. Exponential smoothing has a null percentage on the highly satisfied category and the highest percentage on being dissatisfied with.

A comparison between Tables (4-17) and Mintzer & Cox findings is shown in Table (4-18).

Table (4-18)
Satisfaction (Lebanese managers vs. U.S. managers)

	Satisfaction (%)		Dissatisfaction (%)	
	Research Findings	Mintzer & Cox	Research Findings	Mintzer & Cox
Brainstorming *	77.2	-	22.8	-
Jury of executive opinion	33.9	54	66.1	46
Sales force estimate	50	43	50	57
Customers expectations	50.7	45	49.5	55
Moving average	57.2	58	42.8	42
Exponential Smoothing	19.2	60	80.8	40
Regression	45	67	55	33
Trend line analysis	43.7	58	56.5	43

* Brainstorming was not included in Mintzer & Cox survey.

Dissatisfaction with quantitative methods is much more than it is with qualitative methods. This is the second difference between U.S. and Lebanese managers.

E. Lebanese Managers' Attitude

The following eight questions asked to the managers determine the attitude of the Lebanese managers towards forecasting. Respondents had to rate each question on a five point likert scale ranging from strongly disagree to strongly agree.

Table (4-19)
Managers' attitude

	SD	D	U	A	SA
Relationship between usage of forecasting method(s) and success of your company is considered low.	17.6	41.2	15.3	23.5	2.4
Managers are successful without using forecasting.	24.7	54.1	12.9	7.1	1.2
Data required for using forecasting are not available.	0	22.4	18.8	32.9	25.9
Training on forecasting techniques is not yet introduced.	4.7	15.3	10.6	60	9.4
The cost of hiring qualified personnel in forecasting is high.	24.7	17.6	29.4	22.4	5.9
Volatility of the business environment in Lebanon limits the use of forecasting.	11.8	15.3	2.4	44.7	25.9
Concentration on future results is not supported. Only immediate results are appreciated.	15.3	24.7	11.8	34.1	14.1
Own personal judgment is the best method for estimating future outcome.	28.2	29.4	11.8	18.8	11.8

The percentages of the first two questions contradict the results obtained previously regarding the extent of usage of forecasting. Lebanese managers can be considered as low users of forecasting techniques. This also raises another question: if forecasting is not used by most of the managers, then what are the other management tools that are used by them, and can they be related to the success of their companies? Approximately 60% of the respondents agree that data required for using forecasting are not available, inspite the fact that the methods presented in the survey require little amount of data to be used.

Concerning question number four, almost 70% of the respondents agreed that training on forecasting is not yet introduced. This present a major obstacle facing Lebanese managers who are not exposed to one of the tools that are

necessary for reaching better decisions and proper planning by management.

More than 70% of the managers agreed that the volatility of the business environment limits the use of forecasting. This result shows the intuitive mentality of the managers since volatility of the environment should enhance and not limit the use of forecasting.

Respondents who agree that concentration is only on immediate results outweigh those who disagree. If this is the case, then not only forecasting application will be hindered, but also far sightness, that is the base of proper management and decision making by managers. A high percentage of respondents believe that their own personal judgment is the best method for estimating future outcome. This would lead to the assumption that Lebanese managers are far away from objective decision making, and the mentality of the "one man show" still dominates.

CHAPTER FIVE

CONCLUSION

The purpose of the study was to tackle the subject of forecasting techniques and its applications by Lebanese managers. The results obtained showed that managers in Lebanon are qualitatively oriented. The finding is opposite to what is expected since the majority of the managers surveyed were university graduates, whom quantitative methods are supposed to be one of their basic tools.

The intended comparison between Lebanese and U.S. managers revealed the following major differences and similarities:

1. On average, Lebanese and U.S. managers are more familiar with qualitative methods and less familiar with quantitative ones.
2. Lebanese managers are more dissatisfied with quantitative methods. On the other hand, the U.S. managers are dissatisfied with qualitative methods. It is worth mentioning that the forecasting methods dissatisfied with are the ones being least familiar and used. For example, exponential smoothing is unfamiliar by 62%, not used at all by 50%, and being dissatisfied with by 80.8% despite the empirical findings that this method is easy to understand and use and is capable of considerable accuracy. One may conclude that this dissatisfaction is the result of ignorance and not practical application.

3. The method jury of executive opinion is least used among the qualitative methods by Lebanese managers while it is mostly used by U.S. managers.

4. Lebanese managers are not very familiar with the time series methods (moving average and exponential smoothing), while these simple methods are very familiar to U.S. managers. The method moving average is familiar by 53% to Lebanese managers, compared to 85% by U.S. managers. Only thirty-seven point six percent (37.6%) of the Lebanese managers are familiar with exponential smoothing while familiarity of U.S. managers with the same method is about seventy-three percent (73%).

Concerning the factors being forecasting, sales seems to be the main factor forecasted by 81.2% of the managers surveyed. The application areas for the forecasting methods used by Lebanese managers are strategic planning and budgeting. One may conclude that the usage of forecasting by the surveyed managers is mainly for decisions related to the overall perspective of the organization and not for the operational decisions. The time horizon for usage of forecasting methods is mainly for the medium-term (3 M - 1 year). Lebanese managers seem to be conservative in dealing with future decisions; their perspective is relatively limited to the short foreseeable future.

Another finding is that Age is playing a negative role concerning familiarity and consequently the usage of forecasting methods. The older the manager, the more he/she is unfamiliar

with both qualitative and quantitative methods. This result could be the reason behind the low use of forecasting by managers because old managers might have influence on their younger counterparts, and thus make it more difficult for them to initiate some changes by using forecasting methods.

The study also found out that the attitude of Lebanese managers toward forecasting is a major obstacle. Managers in Lebanon are only appreciated for the immediate results they achieve. This result contradicts the whole concept of forecasting. In addition, managers are not exposed to training on forecasting methods. This is a very negative sign since it clearly reflects the intuitive environment in which those managers are operating. The number of managers, who agreed that their own personal judgment is the best method for estimating future outcome, is approximately the same number of managers who are above forty years. This could increase the doubts on whether old managers, who are supposedly in a higher position, are hindering the use of forecasting by younger managers.

From the above factors, it can be concluded that the low usage of forecasting techniques by the surveyed companies could be traced back to the fact that the Lebanese firms do not provide the opportunity of using such techniques.

The results obtained by the study is directly urging the companies in Lebanon to:

1. Hire young educated managers who are better prepared to accept and apply forecasting techniques.
2. Conduct seminars or training on forecasting application in order both to promote the manager's own ability to successfully implement his/her knowledge in reaching better decisions and eliminate the resistance of older managers for usage of qualitative and quantitative forecasting.

The study conducted has formed a general perspective on forecasting practices by Lebanese managers, and it can at least be used as a benchmark for further research regarding all what the study has missed.

APPENDIX A
QUESTIONNAIRE SAMPLE

Dear Sir,

I am a Master student majoring in Business Management at Beirut University College. This survey is conducted in order to finalize my project on "Forecasting Techniques: Practices by Lebanese Managers."

Your response will be kept confidential and will only be used for analytical purposes.

Thank you.

AGE :YEARS
 SEX : MALE FEMALE

EDUCATION : HIGH SCHOOL FORMER COLLEGE STUDENT BACHELOR DEGREE
 MASTERS DEGREE PH.D OTHERS

TYPE OF ORGANIZATION : COMMERCIAL BANKING INSURANCEINDUSTRIAL
 OTHERS

YEARS OF EXPERIENCE : ON THE JOB PREVIOUS JOB

TITLE OF PRESENT JOB :

PART ONE

PLEASE CHECK THE APPROPRIATE ANSWER :

1- NUMBER OF EMPLOYEES AT YOUR COMPANY :

- A- LESS THAN 25
 B- 25 — 50
 C- 51 — 75
 D- 76 — 100
 E- ABOVE 100

2- THE CURRENT CAPITAL OF YOUR COMPANY IS : (IN DOLLARS)

- A- LESS THAN 1,000,000
 B- 1,000,000 — 2,000,000
 C- 2,000,001 — 3,000,000
 D- 3,000,001 — 4,000,000
 E- 4,000,001 — 5,000,000
 F- ABOVE 5,000,000

PART TWO

IN SEQUENCE OF FAMILIARITY, PLEASE ENCIRCLE THE ANSWER THAT SUITS YOU :

- 1=HIGHLY FAMILIAR
 2=MORE THAN FAMILIAR
 3=FAMILIAR
 4=HARDLY FAMILIAR
 5=UNFAMILIAR

1- ARE YOU FAMILIAR WITH THE FOLLOWING FORECASTING METHODS ?

	1	2	3	4	5
A-QUALITATIVE : a- BRAIN STORMING	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b- JURY OF EXECUTIVE OPINION	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c- SALES FORCE ESTIMATION	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d- CUSTOMERS EXPECTATIONS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e- OTHERS (please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B- QUANTITATIVE : a- MOVING AVERAGE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b- EXPONENTIAL SMOOTHING	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c- SINGLE REGRESSION	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d- MULTIPLE REGRESSION	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e- TREND LINE ANALYSIS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f- OTHERS (please specify).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PART THREE

IN SEQUENCE OF USAGE , PLEASE ENCIRCLE THE ANSWER THAT SUITS YOU

- 1=VERY FREQUENT
 2=FREQUENT
 3=SOMETIMES
 4=HARDLY EVER
 5=NOT AT ALL

1- WHAT IS THE EXTENT OF USAGE OF THESE METHODS

	1	2	3	4	5
A-QUALITATIVE : a- BRAIN STORMING	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b- JURY OF EXECUTIVE OPINION	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c- SALES FORCE ESTIMATION	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d- CUSTOMERS EXPECTATIONS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e- OTHERS (please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B- QUANTITATIVE : a- MOVING AVERAGE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b- EXPONENTIAL SMOOTHING	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c- SINGLE REGRESSION	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d- MULTIPLE REGRESSION	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e- TREND LINE ANALYSIS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f- OTHERS(please specify).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PART FOUR

IN DEGREE OF SATISFACTION, PLEASE ENCIRCLE THE ANSWER THAT SUITS YOU:

- 1=HIGHLY SATISFIED
 2=SATISFIED
 3=MODERATELY SATISFIED
 4=HARDLY SATISFIED
 5=NOT AT ALL

1- YOUR DEGREE OF SATISFACTION TOWARDS THE METHOD USED :

	1	2	3	4	5
A-QUALITATIVE : a- BRAIN STORMING	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b- JURY OF EXECUTIVE OPINION	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c- SALES FORCE ESTIMATION	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d- CUSTOMERS EXPECTATIONS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e OTHERS (please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B- QUANTITATIVE : a- MOVING AVERAGE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b- EXPONENTIAL SMOOTHING	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c- SINGLE REGRESSION	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d- MULTIPLE REGRESSION	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e- TREND LINE ANALYSIS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f- OTHERS(please specify).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PART FIVE

1- WHAT FACTORS DO YOU PRECISELY FORECAST ?(you may check > one)

- A- SALES
- B- REVENUE
- C- MARKET SHARE
- D- PRODUCTION
- E- OTHERS (please,specify).....

2-THE FACTORS BEING FORECASTED ARE ESSENTIAL IN PREPARING :

- A- STRATEGIC PLANNING
- B- MARKETING STRATEGY
- C- BUDGETING
- D- INVENTORY CONTROL
- E- OTHERS(please specify).....

3-HOW FAR AHEAD DO YOU FORECAST ?(you may check >1)

- A- 0 — 3months
- B- 3months — 1 year
- C- more than 1 year

PART SIX

PLEASE, CHECK THE ANSWER THAT MOSTLY REFLECTS YOUR ATTITUDE :

- 1=STRONGLY DISAGREE
- 2=DISAGREE
- 3=UNDECIDED
- 4=AGREE
- 5=STRONGLY AGREE

1 2 3 4 5

- 1- RELATIONSHIP BETWEEN USAGE OF FORECASTING METHOD(S) AND SUCCESS OF YOUR COMPANY IS CONSIDERED LOW
- 2-MANAGERS ARE SUCCESSFUL WITHOUT USING FORECASTING
- 3-DATA REQUIRED FOR USING FORECASTING ARE NOT AVAILABLE
- 3-TRAINING ON FORECASTING TECHNIQUES IS NOT YET INTRODUCED
- 4-THE COST OF HIRING QUALIFIED PERSONNEL IN FORECASTING IS HIGH.....
- 6-VOLATILITY OF THE BUSINESS ENVIRONMENT IN LEBANON LIMITS THE USE OF FORECASTING.....
- 7- CONCENTRATION ON FUTURE RESULTS IS NOT SUPPORTED, ONLY IMMEDIATE RESULTS ARE APPRECIATED.....
- 8-OWN PERSONAL JUDGEMENT IS THE BEST METHOD FOR ESTIMATING FUTURE OUTCOME.....

BIBLIOGRAPHY

- Abraham, B. & Ledoller, J. (1983). Statistical methods for forecasting. New York: Wiley.
- Granger, C. W. J. (1980). Forecasting in business and economics. New York: Academic press.
- Gross, C. & Peterson, R. T. (1976). Business forecasting. Atlanta: Houghton mifflin.
- Hank, J. E. & Reitsch, A. G. (1981). Business forecasting. Boston: Allyn and Bacon.
- Hurwood, D. L., Grossman, E. S. & Bailey, E. L. (1978). Sales forecasting. New York: The conference borad.
- Jones, H. & Twiss, B. C. (1978). Forecasting technology for planning decisions. New York: MacMillan press.
- Liyods & Byars. (1987). Strategic management, planning & implementation. 2nd edition. New York: Harper & Row.
- Makridakis, S. & Wheelwright, S. C. (1978). Forecasting: Methods and applications. New York: Wiley.
- Makridakis, S. & Wheelwright, S. C. (1993). Forecasting methods for management. New York: Prentice Hall.
- Makridakis, S. & Wheelwright, S. C. (1982). The handbook of forecasting. New York: Wiley.
- Mintzer, J. T. & Cox, J.E. Jr. (1984), "Familiarity, application and performance of sales forecasting techniques," Journal of forecasting, vol. 3, pp. 27-36.
- Thomopoulos, N. T. (1980). Applied forecasting methods. New Jersey: Prentice Hall.