DATA BASE, CONCEPTS AND METHODOLOGY

This chapter attempts to describe the need of the present study, the objectives of the study and the methodology and techniques adopted in conducting the study. The limitations of the study have also been discussed.

3.1 NEED OF THE STUDY

Universities exist for various academic and non-academic reasons and also there is a strong relationship between proper financing and quality of the educational programmes in teaching, research, administration etc. by the universities. It implies that if the university does not adopt sound financial practices, its various programmes, policies and systems will be adversely affected. A study conducted by Association of Indian Universities concluded that the “academic and non-academic programmes of the universities are adversely affected to a significant extent by inefficient and inadequate functioning of the financing system”.

The unhealthy financial practice being followed in some of the Indian universities has been portrayed in the following study conducted by Y.S. Kiran Mayi:

“A review of the financial planning exercise in some of the universities in India reveals the lack of clarity in setting up objectives; absence of short, long range plans; non fixation of priorities; and lack of procedures, methods and systems. The administrators are pre-occupied with the matters of immediate concern and they are devoting very little time to the long range needs of the institutions. Even the important issues are brought before the administrators for solution in most haphazard manner. Eventually, the administrators are seen more obsessed with the day to day problems. The present day administrators heave sigh of relief if no problem crops up for that day. In fact, they are finding it easy in following the age old pattern developed years ago and are reluctant to infuse the modern concepts of management. Universities are not preparing long range financial plans for the departments for the future growth of the university as a whole and the way to raise resources for financing such growth. There
are no clear guidelines formulated for many areas regarding financial activity. This is, in fact leading to havoc in the financial affairs of the universities.”

It is obvious that quality of various programmes of universities, both academic and non-academic can be maintained only when adequate finance facilities are available.

It is a general observation that expenditure on various budget heads of the universities is increasing. But the resources are not keeping pace with the outlays and hence the gap between income and expenditure is widening.

Further, the resources of the universities must be put to optimum use for which the universities must, at regular intervals, review their financial structure in order to uncover the limitations and explore the avenues for increasing their income. This can be done by an in-depth analysis of the sources and their applications. Effectiveness of the university system can be understood and improved to some extent by the study of management of fixed and working capital.

Universities function as per its statutes and regulations and has various social and welfare objectives to fulfill. But, because of government interference, there are certain genuine constraints that may hinder sound application of financial management principles by these institutions. This study will help to identify such constraints and formulate tentative ways and means of improving the financial system of the universities.

3.2 SCOPE OF THE STUDY

The present study is confined to the Financial Dynamics of Punjab Technical University. The study relates to a period of five years, that is, 2005-06 to 2009-10. Although, the university was established in the year 1996, but there was a lack of compatibility in the methods of preparation of accounts during the period before 2005.

3.3 DATA COLLECTION

(a) Secondary Data

The secondary data has been gathered from the Annual Budget Estimates, Annual Reports and Financial Statements of the University, reports of the University

(b) Primary Data

(i) Sampling Unit: The sample consisted of students, faculty members and administrative staff of the colleges of Amritsar and Jalandhar districts affiliated to Punjab Technical University.

(ii) Sample Size: The distribution of various sampling units in the sample is as follows:

- Students: 207
- Faculty: 94
- Administrative staff: 46

Students were divided into two categories, the distribution of which is as follows:

- Scholarship holders: 82
- Non scholarship holders: 125
- Total: 207

Similarly, for the purpose of study, teachers were also divided into the following categories:

- Teachers with less than three years of experience: 54
- Teachers with more than three years of experience: 40
- Total: 94

Administrative staff was also categorized into two classes:

- Class I employees: 19
- Class II employees: 27
- Total: 46

(iii) Sampling Method: Convenience sampling has been used for the study.
3.4 VARIABLES STUDIED

The present study analyses the composition of receipts and expenditures of the universities. Income or sources of any university can be broadly categorized into two categories, i.e. Government and non-government. Government sources include:

a) Grants from Central Government
b) Grants from State Government.
c) Grants from University Grants Commission (UGC).

Punjab Technical University is not relying on the Grants of Government and the UGC. The University is creating its own funds from the other sources like fees, interest on Fixed Deposit Receipts (FDRs) etc.

For the purpose of analyzing financial status, the budgets of the university have been divided into categories:

(i) Revenue Budget
(ii) Capital Budget

I) Revenue Budget: The revenue budget has been divided into:

(A) Revenue Receipts (B) Revenue Expenditure

A) Break up of Revenue Receipts of the University

The revenue receipts of the university have been studied under the following heads:

1. Revenue from Semester Examination and Grant-in-aid – National Service Scheme (NSS): The major sources of revenue in this case are:

a) Examination Fees
b) Grant-in-aid----- NSS

2. Revenue from Affiliated Colleges: The major sources of revenue are:

a) Affiliation Free/University Related Fee/ Processing and Inspection Fee
b) Sports Fees/ Youth Welfare Fees
3. **Revenue from Distance Education Programme**: The major chunk of university revenue comes from its Distance Education Programme.

This has been divided under the following heads:

a) Establishment Fees
b) Share of Admission Fee
c) Exam Fees
d) Miscellaneous Income including interest from Fix Deposit Receipts (FDRs).

4. **Revenue from Entrance Exam/Counseling**

The revenue from this source has been studied under the following heads:

a) Exam Fee
b) Sale of Brochures
c) Counseling Fee
d) Miscellaneous

5. **Revenue from Projects/Others**

The University has undertaken two projects, viz., UPS-ONGC and PTU Gian Jyoti. While the University generated revenue from the first project by way of Examination Fee, the second project is being run gratis.

B) **Break-up of Revenue Expenditure of the University**

The revenue expenditure of the University has been analysed under the following heads:

1. **Expenditure on Semester Examination**

   The expenditure under this head has been divided into the following components:

a) Paper setting and printing
b) Conduct/Evaluation
c) Printing and Stationery

d) Miscellaneous Expenses

2. Expenditure on Affiliated Colleges

The expenditure in this category has been analysed under the following heads:

a) Salary and Wages
b) TA/DA/Honorarium
c) Vehicle running/Hiring and Maintenance
d) Telephone/Fax/Postage
e) Printing and Stationery
f) Office expenses including water and electricity
g) Advertising and Publicity Expenses
h) Repair and Maintenance
i) Expenses on Sports, Cultural Affairs and NSS
j) Miscellaneous Expenses

3. Expenditure on Distance Education Programme

The expenses in this category have been studied under the following heads:

a) Expenses on Course Material
b) Conduct/Evaluation and Expenditure relating to exam
c) Miscellaneous Expenses

4. Expenditure on Entrance Exam/Counselling

The expenses under this head have been divided into the following components:

a) Paper setting and Printing
b) Conduct of exam
c) Advertising and publicity expenses
d) Honorarium  
e) Hospitality  
f) Share of Other Universities  
g) Printing and Stationery  
h) Miscellaneous Expenses  

5. **Expenditure on Projects/Other**  
Expenditure on UPS-ONGC:  
The expenses on this project has been divided into the following heads.  
a) Salaries and Wages  
b) Conduct of Classes  
c) Books  
d) Transportation  
e) Miscellaneous  

II) **Capital Budget**  
For the purpose of analyzing capital budget, it has been divided into the following heads:  
a) Equipment  
b) Furniture and Fixtures  
c) Vehicles  
d) Books  
e) Miscellaneous (unforeseen)  
Capital Budget includes capital budget of PTU Main, Distance Education Programme, Entrance tests and Projects.  
To study and analyse the financial health of the university, a comparison of revenue receipts and expenditure has been made that will show surplus/deficits over the
years. In case of deficit, suggestive measures can be suggested to reduce or eliminate such deficits.

3.5 OBJECTIVES OF THE STUDY

1. To examine the pattern of sources and applications of funds by Punjab Technical University.
2. To study the allocation of funds by Government and their utilization by PTU.
3. To evaluate the growth trend and extent of variability of various sources of revenues and expenditure.
4. To understand the perception of the students, faculty and administrative staff regarding the functioning of the university.

3.6 LIMITATIONS OF THE STUDY

1. The study is subject to the limitations of the accounting data.
2. The study may suffer from the biasness of the respondents.
3. The study may not apply to other technical universities of India and abroad.

3.7 METHODOLOGY

The relevant budgets, annual reports and reports of the Finance Committee have been scanned and the required portions were extracted. These were further tabulated and then analysed using the under mentioned techniques to arrive at some concrete results.

1. Percentage changes have been calculated separately for the main heads of both income and expenditure. These percentages have also been calculated for the various sub-heads of the main heads of revenue and expenditure. The items of capital budget have also been analysed using the same technique.

Percentage change is basically the extent to which a variable gains or loses intensity, magnitude, extent or value. It is assumed that the values are positive. It has been calculated by using the following formulas:
If the final figure is positive, it is percentage increase and if the figure is negative, it is percentage decrease.

2. Percentage contribution of each source of revenue and expenditure to the total revenue and expenditure has been calculated for the main heads of revenue and expenditure. Similar calculations have been made for the revenue and expenditure sub-heads.

Percent contribution merely indicates the contribution of a particular source of revenue/expenditure to the total revenue/expenditure. It has been calculated by the following formula:

\[
\text{Percentage Contribution} = \left( \frac{\text{Value of a source of revenue/expenditure}}{\text{Total revenue/expenditure}} \right) \times 100
\]

The calculations have been done for all the sources year-wise.

3. Annual Growth Rates (AGR) and Compound Annual Growth Rates (CAGR) have been calculated for all the main heads and sub-heads of revenue and expenditure to study and understand the growth trend of the variables of study.

Annual growth rate has been used to study the growth trend of the revenue and expenditure in each year whereas CAGR has been used to study the overall growth trend during the period of study. In general, CAGR over a number of years is a better indication of trend than a single year’s growth which may be typically good or bad.

CAGR is the year-over-year growth rate of an investment over a specified period; calculated by taking the Nth root of the total percentage growth rate, (N) is the number of years in the period being considered. In reality, CAGR is not the actual return but an imaginary number that describes the rate at which an investment would have grown if it had grown at a steady rate. Thus, it is an annual return of an investment assuming it has grown at the same rate every year. CAGR is a way to smoothen down the return. The term smoothen down means to remove the “peaks and valleys” from the data and results. CAGR equals:

\[
(\text{Ending Value/Beginning Value})^{\frac{1}{\text{Numberof years}}} - 1
\]
The CAGR is based on determining the number of years that will be used in the calculation. The base value for the most recent year under consideration serves as the ending value. In order to begin the process of calculating the compound growth rate, the ending value is divided by the starting value. The result percentage is then factored by the nth root, where n is the number of years involved in the calculation. The final figure will be the average or compound annual growth rate for all the years involved in the period.

Both the AGR and CAGR can be positive or negative. The positive values indicate acceleration in the growth and the negative values indicate a decline in the growth over the period. Here the annual growth rates have been calculated using the linear-splien function (piecewise semi-log trend). This function enables to obtain the growth rates of more than one period in single regression estimation.

4. Coefficient of Variation (CV) has also been calculated both for the main heads and sub-heads of revenue and expenditure. CV helps to study the extent of consistency or variability factor of the revenue and expenditure. The more the variability of a particular source of revenue or expenditure, more is the risk associated with that particular source.

CV is a statistical measure of the dispersion of data points in a data series around the mean. It is calculated as follows:

\[
\text{Coefficient of Variation (CV)} = \frac{\text{Standard Deviation (}\sigma\text{)}}{\text{Mean (}\mu\text{)}}
\]

Standard Deviation is given by the formula:

\[
\sqrt{\frac{1}{N-1} \left( (X_1 - Xm)^2 + (X_2 - Xm)^2 + \ldots + (X_n - Xm)^2 \right)}
\]

Where:

- \( X_1, X_2 \ldots X_n \) are the observations
- \( Xm \) is the mean of the series
Thus, CV represents the ratio of the standard deviation to the mean, and it is a useful statistic for comparing the degree of variation from one data series to another, even if the means are drastically different from each other. This measure is useful because the standard deviation of the data must always be understood in the context of the mean of the data. In contrast, the actual value of the CV is independent of the unit in which the measurement has taken, so it is a dimensionless measure.

5. To analyse the primary data, two techniques viz. Factor analysis and Independent Sample t-test have been used.

**Factor Analysis** is basically a technique of data reduction and data summarization. Here also, it has been used to reduce the number of variables to a manageable level.

The following statistics associated with factor analysis have been used in the study.

(a) **Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy**

KMO is an index used to measure the appropriateness of factor analysis. High values (between 0.5 and 1.0) are an indication that factor analysis is appropriate.

(b) **Bartlett’s Test of Sphericity**

This is a statistic used to test the hypothesis that the variables are not correlated in the population. In other words, it can be said that population correlation matrix is an identity matrix where each variable correlates perfectly with itself ($r=1$) and has no correlation with other variable ($r=0$). If this hypothesis is not rejected, then the appropriateness of factor analysis can be questioned large value of chi-square and small significance value will lead to rejection of null hypothesis.

(c) **Communality**

This is the amount of variance a variable shares with all other variables being considered. It is also the proportion of variance explained by the common factors.
(d) **Eigen Values**

The Eigen value represents the total variance explained by each factor.

(e) **Scree Plot**

A scree plot is a plot of the Eigen values against the number of factors in order of extraction.

(f) **Factor Loadings**

Factor loadings are simple correlations between the variables and factors.

(g) **Percentage of Variance**

This is the percentage of the total variance attributed to each factors.

(h) **Factor Matrix**

A factor matrix contains the factor loadings of all the variables on all the factors extracted.

(i) **Factor Rotation**

The coefficients of factors matrix, no doubt, can be used to interpret the factors. The initial or unrotated factors matrix seldom result in factors that can be interpreted, although it indicates the relationship between the factors and the individual variables. The reason for this is that factors are correlated with many variables. The factor matrix can be transformed into a simpler and easily interpretable matrix through rotation. Rotation does not affect the communalities and the percentage of total variance explained. But, there is a change in the percentage of variance accounted for by each factor.

There are a number of techniques available for factor matrix rotation. In our study, varimax procedure of orthogonal rotation has been used. Orthogonal rotation is the type of rotation where the axes are maintained at right angles. Varimax procedure is an orthogonal rotation that minimizes the number of variables with high loadings on a factor, thereby enhancing the interpretability of factors.
The process of interpretation is facilitated by identifying the variables that have large loadings on the same factor. That factor can then be interpreted in terms of variables that load high on it.

**Independent sample t-test** has been applied to test, if any statistically significant difference exist in the means of two categories each in the case of students, teachers and administrative staff. It is also known as two-sample t-test or students t-test. This is an inferential statistic that help us to test whether there is a statistically significant difference between the means in two unrelated groups. The term ‘unrelated’ also known as unpaired or independent implies that the members of one group cannot be the members of the other group and vice-versa. This test is used when population mean and standard deviation are unknown and two separate sample groups are being compared.

**Hypothesis for the Independent Sample t-test**

Let $\mu_1$ and $\mu_2$ be the means of two populations, then the null and alternate hypothesis will be:

Null hypothesis $H_0$: $\mu_1 = \mu_2$

Alternate hypothesis $H_1$: $\mu_1 \neq \mu_2$

To test the hypothesis, we usually set a significance level (alpha) that helps is to reject or accept the alternate hypothesis. This value is set at 0.05 (5%).

**Level of Significance:** This is the level of confidence with which a researcher rejects or accepts a null hypothesis. It is customarily expressed as percentage.

**Assumptions for the Independent sample t-test**

1. **Independence**

   This assumption means that observations within each sample must be independent. Independence implies that observations within each sample does not influence each other.
2. Normal Distribution (Normality)

It implies that the scores in each distribution follows normal distribution. Normality can be tested by using Shapiro-Wilk's test or graphical method and many more.

3. Homogeneity of Variance

This means that the populations must have equal variances which assumes that the degree to which the distributions are spread out is approximately equal. This assumption can be tested by using Levene’s Test of Equality of Variances. This test provides an F-statistic and a significance value. If significance value is greater then 0.05 we say that group variables are equal and vice-versa.

Formula \( t = \frac{\overline{x}_1 - \overline{x}_2}{S \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \)

\( \overline{x}_1 \) and \( \overline{x}_2 \) denote the sample means

\( n_1 \) and \( n_2 \) denote the sample size

\( S \) denotes an unbiased estimate of common variance

 Reporting the Results of Independent Sample t-test

For reporting the results, again we need significance value. If significance value is greater that 0.05, null hypothesis is accepted and vice-versa.

3.8 CHAPTER SCHEME

The study has been divided into seven chapters, the first one being introduction and the last one relates to summary, findings and conclusions drawn from the study. In the remaining chapters, various aspects related to financial dynamics of Punjab Technical University have been analysed using the suitable statistical techniques.

The first chapter is of “INTRODUCTION” in which the general aspects like evolution of University education in India, various education Commissions and Committees, National Policies on Education, present regulatory framework of the
Indian Education System and growth and financing of higher education in India have been discussed. The brief profile of Punjab Technical University has also been studied.

In the second chapter on “REVIEW OF LITERATURE”, detailed analysis of the various studies undertaken on the Financial Management and Administration of the Universities and Higher Education has been done as to find out what has been done till date in this area.

In the third chapter titled “DATA BASE, CONCEPTS AND METHODOLOGY”, the need of the study, scope, objectives, limitations and variables of the study have been described. Also the various statistical techniques and methods used for the analysis have also been discussed.

The fourth chapter entitled “PATTERN OF SOURCES AND APPLICATIONS OF FUNDS OF PUNJAB TECHNICAL UNIVERSITY” takes a detailed view of various items of revenue and expenditure of the University. The surplus and deficit in each year of study has been recorded along with the percent increase and decrease in revenue and expenditure items in the period of study.

In the fifth chapter titled “FINANCIAL MANAGEMENT OF PUNJAB TECHNICAL UNIVERSITY”, the growth performance of the University has been studied by analyzing Annual Growth Rates (AGR) and Compound Annual Growth Rates (CAGR) of various main heads and sub-heads of revenue and expenditure. Along with these calculations Coefficient of Variation (CV) has been calculated to study the extent of consistency of the revenue and expenditure over the period of study.

The sixth chapter titled, “APPRAISAL OF FINANCIAL AND ADMINISTRATIVE FUNCTIONING OF PUNJAB TECHNICAL UNIVERSITY” has been devoted to the study of the perceptions of the various sections of the society as regards the university financial and administrative system is concerned. The various sections studied include students, faculty and administrative staff.

The seventh chapter titled “SUMMARY, CONCLUSIONS AND SUGGESTIONS” summarises the various findings and conclusions drawn from the study. Suggestions have also been given to improve the system.