

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

Present study is descriptive in nature. The study relies upon secondary data. The main sources of data are the public agencies like Statistical Abstract of Haryana, Central Statistical Organization, Directorate of Economics and Statistics. The publications and websites of Economic and Political Weekly (EPW), Economic Survey of Haryana, Annual Survey of Industries also were made use of in the collection of data for the study. The study has covered 17 years of data i.e. from 1993-94 to 2009-2010. For the first objective to see the trends in input-output growth of manufacturing industries, year over year annual growth rate has been used. The second objective of this study is to examine the causal relationship between economic growth and manufacturing sector growth, Granger Causality Test has been used for this purpose. Gross State Domestic Product (GSDP) value has taken as an indicator of economic growth and manufacturing production value has taken as an indicator of manufacturing sector growth.

3.2 Research Design

Present study is descriptive cum causal in nature, wherein descriptive analysis is used for meeting the first two objectives that is to analyze district-wise and industry-wise trends in input-output growth of manufacturing sector in Haryana exclusively. Causal analysis is used to obtain the third objective that is to find out relationship between economic growth and growth of manufacturing sector in Haryana. This study provides insights into, and an understanding of various concepts related to manufacturing sector, and its growth, and attempts to reveal the relationship between economic growth and growth of manufacturing sector in Haryana.

3.3 Data Description and tools for Analysis

The study is based on secondary data. There is no comprehensive source of entire data used in this study. Therefore the data used in this study is taken from multiple sources as given below:

Table 3.1:Data Sources in Order			
Serial no.	Data Source	Period of Data Source	Objectives
1	Statistical Abstract of Haryana	1993-2010	1 st and 2 nd
2	Economic Survey of Haryana	1993-2010	3 rd
3	Annual Survey of Industries	1993-2010	3 rd
4	Directorate of Economics and Statistics	1993-2010	1 st and 2 nd

The study has covered 17 years of data that is 1993-94 to 2009-10. For the first and second objective to analyze district-wise and industry-wise trends in input-output growth manufacturing sector of Haryana, year over year annual growth rate has been used as a major instrument. To identify the relationship between economic growth and growth of manufacturing sector in Haryana, following model is developed:

$$GMS = \alpha_0 + \beta_0 EG + \mu_1 \dots\dots(1)$$

$$EG = \alpha_1 + \beta_1 GMS + \mu_2 \dots\dots(2)$$

Where,

GMS= Growth of Manufacturing Sector in Haryana measured by value of output in crore Rs.

EG= Economic Growth measured by GSDP value in crore Rs.

$\alpha_0, \alpha_1, \beta_0, \beta_1$ = Regression coefficients

μ_1, μ_2 = Error term

Before the development of the bidirectional regression model, Angle-Granger Causality Test has been applied to identify the existence of causal relationship.

3.4 Descriptive statistics

In descriptive research a researcher have no control over variable. Descriptive studies are aimed at finding out “What is.” One cannot define descriptive research either quantitative or qualitative research, because it can utilize elements of both, often within the same study. Descriptive research report summing up data such as measures of central tendency including the mean, median, mode, deviation from mean, variation, percentage, and correlation between variables. Descriptive studies can defer rich data that lead to important recommendations.

3.5 Testing for stationarity

In a stationary time series statistical properties such as mean, variance autocorrelation, etc. are constant over time. We can define it as below:

A time series Y_t is said to be stationary if:

- $E(Y_t) = \text{constant}$ for all t ;
- $\text{Var}(Y_t) = \text{constant}$ for all t ; and
- $\text{Cov}(Y_t, Y_{t+k}) = \text{constant}$ for all t and all $k \neq 0$

In order to have feasibility of inference and forecasting of a return time series, it is required to be stationary. A stationary return time series will tend to return to its mean and fluctuations around its mean will have broadly constant amplitude. Therefore, we can have a reliable prediction about its future behavior. A stationary time series helps in identification of stationarity in the sample data. Unit root test is a test that tests the null hypothesis of unit root against the alternative hypothesis of stationarity. This includes Augmented Dickey-Fuller (ADF) test and Phillips-Perron (PP) test.

3.6 Co-integration Test

Variables should be differenced before being used in the regression model to avoid a spurious regression, if they are non-stationary. If there is co-integration between variables or there is a long-run relationship between them over time, they could be used in the regression model in the level forms without leading to a spurious regression. We will use Johanson Co-integration Test to test for co-integration between the variables of our study. We will use Johanson test because it has an advantage over other co-integration tests as it takes into consideration the possibility of multiple co-integrating vectors.

3.7 Granger Causality Test

The Co-integration Test indicates only the existence of causal relationship but it does not indicate the direction of causal relationship between the variables. We will use Granger Causality Test to determine the direction of causality between the economic growth and growth of manufacturing sector in Haryana. The dynamic linkage may simply be examined using the concept of Granger's (1969, 1988) causality. Formally, a time series x Granger-causes another time series y if series y can be predicted with better accuracy by using past values of x rather than by not doing so, other information being identical.

3.8 Variables used in the Study

- ❖ GSDP as an indicator of economic growth.
- ❖ Production value of manufacturing industries as an indicator of growth of manufacturing sector.
- ❖ Input value of manufacturing industries.
- ❖ Output value of manufacturing industries.