

CHAPTER 2

METHODOLOGY OF STUDY

2.1 Introduction

The methodology employed by the National Survey Innovation is similar to those employed in national innovation surveys in the EC countries. These surveys, known as the Community Innovation Surveys, are based on the Oslo Manual. This Chapter discusses the various aspects of the methodology employed in the present study in greater detail.

2.2 The Oslo Manual

As in the previous report, the methodology employed is mainly based on the recommendations set out in the the Oslo Manual. The Oslo Manual is a document first published in 1992 by the Organization for Economic Co-operation and Development (OECD) and the European Commission (EC). The manual provides guidelines on data collection on technological innovation. It was published mainly in response to the need for a systematic and internationally standardized methodology for collecting data on innovation.

The two objectives of the Oslo Manual are:

- to provide a framework within which existing surveys can evolve towards comparability; and
- to assist newcomers to collect and analyze innovation data.

Since its publication in 1992, the Oslo Manual was revised once in 1997.

2.3 Community Innovation Surveys

The questionnaire design for this study is modeled after the questionnaires used in the Community Innovation Surveys (CIS). These surveys are national innovation surveys that are based on the Oslo Manual and have been carried out in the EC countries since the mid-1990s. The Community Innovation Surveys have been carried out in three waves, namely in the mid-1990s (CIS-1), in the late 1990s (CIS-2) and the latest in the early 2000s (CIS-3). The CIS-3 surveys are still on-going in many countries at the moment.

2.4 Basic Definitions

The National Innovation Survey uses definitions of types of innovation and innovative activities provided in the Oslo Manual and used in the Community Innovation Surveys. They are as follows:

Innovation

An innovation, as defined in this survey, is a new or significantly improved product (good or service) introduced to the market or the introduction within a company of a new or significantly improved process. The innovation is based on the results of new technological developments, new combinations of existing technology or utilisation of other knowledge acquired by the company.

A new product is a product whose technological characteristics or intended uses differ significantly from those of previously produced products. An improved product is an existing product whose performance has been significantly enhanced or upgraded.

The innovation should be new to a company; it has not necessarily to be new to the market. It does not matter whether the innovation was developed by the company or by another company. Changes of a solely aesthetic nature, and purely selling of innovations wholly produced and developed by other companies shall not be included.

Product Innovation

Product innovation is a good or service which is either new or significantly improved with respect to its fundamental characteristics, technical specifications, incorporated software or other immaterial components, intended uses, or user friendliness.

Process Innovation

Process innovation includes new and significantly improved production technology, new and significantly improved methods of delivering products. The outcome should be significant with respect to the level of output, quality of products or costs of production and distribution. The innovation should be new to a company; a company does not necessarily have to be the first to introduce the process. It does not matter whether the innovation was developed by the company or by another company. Purely organizational or managerial changes shall not be included.

2.5 Questionnaire Design

A detailed questionnaire was designed and used for the survey. The detailed questionnaire used was based on the questionnaire used in the CIS-3 Surveys (see Appendix B). To obtain further information, some modifications were made in the form of additional questions.

2.6 Sampling Methodology

As in the case of the NIS-2, the target population is the manufacturing sector and the sample frame was obtained from the Department of Statistics. Table 2.1 summarizes the various manufacturing industries included in the survey. A sample size of 4,000 questionnaires was chosen.

Sampling Method

A stratified sampling method was used whereby the stratification of the random sample is based on the size and the principal activity of the units as recommended by the Oslo Manual. Based on the advice of the Statistics Department, the size of the establishment was defined in terms of its employment size, unlike the NIS-2 where the revenue size was used to define the size of the establishment.

Three categories of size were used:

- Category 1: Less than 50 employees
- Category 2: 50 – 249 employees
- Category 3: More than 250 employees

Sample Data

At the time of the NIS-3 survey, 20,359 firms were registered with the Department of Statistics' registry of business establishments. The sample of 4,000 establishments was therefore drawn from this population according to the 5-digit classification of the industries in the manufacturing sector. However the number of establishments for some of the industries, at the 5-digit level, is sometimes less than 3. Therefore, the allocation of the 4,000 establishments was undertaken in three stages:

First Stage: At the 5-digit level, industries with three or less establishments in any of the three employment size groups were aggregated together. For example, industry code 15111 was collapsed together with industry code 15119 so that none of the employment sizes in these 2 aggregated codes have less than three establishments in order to abide by the Statistics Act.

Second Stage: This stage is to determine the number of establishments that should be selected to represent each group of industries. The criterion used is that each group of industries should be represented in proportion to the total number of establishments in the group relative to the total for the manufacturing sector as a whole. For example, if there are n number of establishments in industry j , then the number of establishments chosen to represent this industry is taken to be $\{(n / N) \times 4000\}$, where N is the total number of establishments in the manufacturing sector and 4000 is the targeted sample size of the survey.

Third Stage: In the final stage, the total number of establishments chosen in the second stage is then apportioned proportionately among the three categories of employment size, according to their respective number of establishments. This ensures that each employment group in each industry grouping is represented in the survey.