

# APPENDIX A

## METHODOLOGY

### 1. Sample Design

#### 1.1 Establishments with 1 – 10 persons engaged

The stratified systematic sampling was adopted for the survey. Each province was constituted a stratum. The sampling units were establishments.

##### 1) Stratification

Each province was constituted a stratum. There were altogether 76 strata. Each stratum was classified by ISIC at class level into 127 sub-stratum and in each sub-stratum was divided into 4 groups according to number of persons engaged as follows :

Group	1	2	3	4
Number of persons engaged	1	2 – 3	4 – 5	6 – 10

##### 2) Selection of Sampling Unit

The sample selection of establishments was done by systematic sampling and performed separately and independently in each sub-stratum and group of establishment. The total sample were 49,048 from 421,850 establishments.

#### 1.2 Establishments with 11 persons engaged and over

All the establishments with 11 persons engaged and over were completely enumerated. There were 39,363 establishments which divided into 10 groups according to number of persons engaged as follows :

Group	5	6	7	8	9	10	11	12	13	14
Number of persons engaged	11-15	16-20	21-25	26-30	31-50	51-100	101-200	201-500	501-1,000	≥ 1,001

In summary, the total number of sample establishments selected for enumeration were 88,411 from 461,213 and classified by region and group as follows :

Region	Total	Group													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Bangkok metropolis	11,978	730	635	601	731	2,730	1,348	934	591	1,477	1,010	617	396	100	78
Vicinity of Bangkok	13,994	782	1,304	1,056	1,262	1,584	1,202	710	735	1,573	1,489	1,046	786	300	165
Central	16,249	2,620	3,445	1,956	1,817	1,335	631	493	355	838	858	843	641	228	189
North	16,239	3,956	3,819	1,980	1,775	1,701	828	509	376	572	341	181	123	54	24
Northeast	20,166	4,254	4,560	2,440	1,932	2,490	1,246	846	643	937	456	168	113	44	37
South	9,785	2,316	2,667	1,329	1,081	778	340	230	138	332	247	157	105	36	29
Total	88,411	14,658	16,430	9,362	8,598	10,618	5,595	3,722	2,838	5,729	4,401	3,012	2,164	762	522

## 2. Method of Estimation

The survey results were presented at regional level. There were altogether 6 regions, namely, Bangkok metropolis, Vicinity of Bangkok metropolis (Samut Prakan, Nonthaburi, Pathum Thani, Nakhon Pathom and Samut Sakhon), the North, the Northeast and the South. The sizes of establishment were aggregated into 6 groups as follows :

Size of establishment	1	2	3	4	5	6
Number of persons engaged	1 – 15	16 – 25	26 – 30	31 - 50	51 – 200	≥ 201

Let

$$p = 1, 2, 3, \dots, n_{hijm} \quad (\text{sample establishment})$$

$$m = 1, 2, 3, \dots, 14 \quad (\text{size of establishment})$$

$$l = 1, 2, 3, \dots, 23 \quad (\text{division})$$

$$k = 1, 2, 3, \dots, 61 \quad (\text{group})$$

$$j = 1, 2, 3, \dots, 127 \quad (\text{class})$$

$$i = 1, 2, 3, \dots, A_h \quad (\text{province})$$

$$h = 1, 2, 3, 4, 5, 6 \quad (\text{region})$$

### 2.1 The estimation of total at ISIC class level

1) The estimated total number of the characteristic  $X$  of the establishments with 1 – 10 persons engaged ( $m = 1, 2, 3, 4$ ) for the  $j^{\text{th}}$  class,  $h^{\text{th}}$  region was based on the formula :

$$\hat{X}_{hjm} = \sum_{i=1}^{A_h} \hat{X}_{hijm} \quad \dots\dots\dots (1)$$

where  $\hat{X}_{hijm}$  is the estimated total number of the characteristic  $X$  for the  $m^{\text{th}}$  size,  $j^{\text{th}}$  class,  $i^{\text{th}}$  province,  $h^{\text{th}}$  region which

$$\hat{X}_{hijm} = \sum_{p=1}^{n_{hijm}} w_{hijm} x_{hijmp}$$

$x_{hijmp}$  is the value of the characteristic  $X$  for the  $p^{\text{th}}$  establishment,  $m^{\text{th}}$  size,  $j^{\text{th}}$  class,  $i^{\text{th}}$  province,  $h^{\text{th}}$  region

$w_{hijm}$  is the weighting factor of the establishments for the  $m^{\text{th}}$  size,  $j^{\text{th}}$  class,  $i^{\text{th}}$  province,  $h^{\text{th}}$  region

$$w_{hijm} = \frac{N_{hijm}}{n_{hijm}}$$

$N_{hijm}$  is the total number of the establishments for the  $m^{th}$  size,  $j^{th}$  class,  $i^{th}$  province,  $h^{th}$  region

$n_{hijm}$  is the total number of the sample establishments for the  $m^{th}$  size,  $j^{th}$  class,  $i^{th}$  province,  $h^{th}$  region

$A_h$  is the total provinces in the  $h^{th}$  region, where  $\sum_{h=1}^6 A_h = 76$

2) The total number of the characteristic  $X$  of the establishments with 11 persons engaged and over ( $m = 5, 6, 7, \dots, 14$ ) for the  $j^{th}$  class,  $h^{th}$  region was based on the formula :

$$X_{hjm} = \sum_{i=1}^{A_h} \sum_{p=1}^{M_{hijm}} x_{hijmp} \dots\dots\dots (2)$$

where  $M_{hijm}$  is the total number of the establishments for the  $m^{th}$  size,  $j^{th}$  class,  $i^{th}$  province,  $h^{th}$  region

3) The total number and the estimate of the total number of the characteristic  $X$  of the establishments at the presented levels for the  $j^{th}$  class was based on the formula :

Size of establishment	Region	Whole kingdom
1. 1 – 15 persons engaged ( $m = 1, 2, 3, 4, 5$ )	$\hat{X}'_{hj1} = \sum_{m=1}^4 \hat{X}_{hjm} + X_{hj5}$	$\hat{X}'_{j1} = \sum_{h=1}^6 \hat{X}'_{hj1}$
2. 16 – 25 persons engaged ( $m = 6, 7$ )	$X'_{hj2} = \sum_{m=6}^7 X_{hjm}$	$X'_{j2} = \sum_{h=1}^6 X'_{hj2}$
3. 26 – 30 persons engaged ( $m = 8$ )	$X'_{hj3} = X_{hj8}$	$X'_{j3} = \sum_{h=1}^6 X'_{hj3}$
4. 31 – 50 persons engaged ( $m = 9$ )	$X'_{hj4} = X_{hj9}$	$X'_{j4} = \sum_{h=1}^6 X'_{hj4}$
5. 51 – 200 persons engaged ( $m = 10, 11$ )	$X'_{hj5} = \sum_{m=10}^{11} X_{hjm}$	$X'_{j5} = \sum_{h=1}^6 X'_{hj5}$
6. $\geq 201$ persons engaged ( $m = 12, 13, 14$ )	$X'_{hj6} = \sum_{m=12}^{14} X_{hjm}$	$X'_{j6} = \sum_{h=1}^6 X'_{hj6}$

## 2.2 The estimation of total at ISIC group level

1) The estimated total number of the characteristic  $X$  of the establishments with 1 – 10 persons engaged ( $m = 1, 2, 3, 4$ ) for the  $k^{th}$  group,  $h^{th}$  region was based on the formula :

$$\hat{X}_{hkm} = \sum_{j=1}^{A_k} \hat{X}_{hjm} \quad \dots\dots\dots (3)$$

where  $A_k$  is the total classes in the  $k^{th}$  group

2) The total number of the characteristic  $X$  of the establishments with 11 persons engaged and over ( $m = 5, 6, 7, \dots, 14$ ) for the  $k^{th}$  group,  $h^{th}$  region was based on the formula :

$$X_{hkm} = \sum_{j=1}^{A_k} X_{hjm} \quad \dots\dots\dots (4)$$

3) The total number and the estimate of the total number of the characteristic  $X$  of the establishments at the presented levels for the  $k^{th}$  group was based on the formula :

Size of establishment	Region	Whole kingdom
1. 1 – 15 persons engaged ( $m = 1, 2, 3, 4, 5$ )	$\hat{X}'_{hk1} = \sum_{m=1}^4 \hat{X}_{hkm} + X_{hk5}$	$\hat{X}'_{k1} = \sum_{h=1}^6 \hat{X}'_{hk1}$
2. 16 – 25 persons engaged ( $m = 6, 7$ )	$X'_{hk2} = \sum_{m=6}^7 X_{hkm}$	$X'_{k2} = \sum_{h=1}^6 X'_{hk2}$
3. 26 – 30 persons engaged ( $m = 8$ )	$X'_{hk3} = X_{hk8}$	$X'_{k3} = \sum_{h=1}^6 X'_{hk3}$
4. 31 – 50 persons engaged ( $m = 9$ )	$X'_{hk4} = X_{hk9}$	$X'_{k4} = \sum_{h=1}^6 X'_{hk4}$
5. 51 – 200 persons engaged ( $m = 10, 11$ )	$X'_{hk5} = \sum_{m=10}^{11} X_{hkm}$	$X'_{k5} = \sum_{h=1}^6 X'_{hk5}$
6. $\geq 201$ persons engaged ( $m = 12, 13, 14$ )	$X'_{hk6} = \sum_{m=12}^{14} X_{hkm}$	$X'_{k6} = \sum_{h=1}^6 X'_{hk6}$

### 2.3 The estimation of total at ISIC division level

1) The estimated total number of the characteristic  $X$  of the establishments with 1 – 10 persons engaged ( $m = 1, 2, 3, 4$ ) for the  $l^{th}$  division,  $h^{th}$  region was based on the formula :

$$\hat{X}_{hlm} = \sum_{k=1}^{A_l} \hat{X}_{hkm} \dots\dots\dots (5)$$

where  $A_l$  is the total groups in the  $l^{th}$  division

2) The total number of the characteristic  $X$  of the establishments with 11 persons engaged and over ( $m = 5, 6, 7, \dots, 14$ ) for the  $l^{th}$  division,  $h^{th}$  region was based on the formula :

$$X_{hlm} = \sum_{k=1}^{A_l} X_{hkm} \dots\dots\dots (6)$$

3) The total number and the estimate of the total number of the characteristic  $X$  of the establishments at the presented levels for the  $l^{th}$  division was based on the formula :

Size of establishment	Region	Whole kingdom
1. 1 – 15 persons engaged ( $m = 1, 2, 3, 4, 5$ )	$\hat{X}'_{hl1} = \sum_{m=1}^4 \hat{X}_{hlm} + X_{hl5}$	$\hat{X}'_{l1} = \sum_{h=1}^6 \hat{X}'_{hl1}$
2. 16 – 25 persons engaged ( $m = 6, 7$ )	$X'_{hl2} = \sum_{m=6}^7 X_{hlm}$	$X'_{l2} = \sum_{h=1}^6 X'_{hl2}$
3. 26 – 30 persons engaged ( $m = 8$ )	$X'_{hl3} = X_{hl8}$	$X'_{l3} = \sum_{h=1}^6 X'_{hl3}$
4. 31 – 50 persons engaged ( $m = 9$ )	$X'_{hl4} = X_{hl9}$	$X'_{l4} = \sum_{h=1}^6 X'_{hl4}$
5. 51 – 200 persons engaged ( $m = 10, 11$ )	$X'_{hl5} = \sum_{m=10}^{11} X_{hlm}$	$X'_{l5} = \sum_{h=1}^6 X'_{hl5}$
6. $\geq 201$ persons engaged ( $m = 12, 13, 14$ )	$X'_{hl6} = \sum_{m=12}^{14} X_{hlm}$	$X'_{l6} = \sum_{h=1}^6 X'_{hl6}$

### **3. Data Collection**

The interviewing method was employed in data collection. The enumerators who are permanent and temporary staff of the National Statistical Office were sent out to interview the owners or the entrepreneurs of manufacturing establishments during July 1 to September 30, 2007.

### **4. Data Processing**

The information of establishments in provincial areas was processed at the provincial office with the technical supports from the central office, e.g. preparation of the software programs for data entry and tabulation, and drafting form of the report. Those data were aggregated to regions and the whole kingdom, as well as the detailed information of the establishments were processed at the central office.

### **5. In Round Figures**

The summation of each amount may not equal to the total due to rounding.

### **6. Errors of the Data**

Data presented in this report might be subject to sampling and non-sampling errors. For instance, errors from the imputation for missing values and non-response, intentional misreporting and errors arising at coding and data entry stages. However, the NSO tried its best to minimize such errors, thus the data should be used with appropriate cautions.

### **7. Data Presentation and Reporting**

Results of the operational information of manufacturing establishments are presented into 3 levels of publication.

- 1) Preliminary report of the region and the whole kingdom level.
- 2) Provincial level report consists of totally 75 volumes.
- 3) Regional and Whole Kingdom level report of consists of 7 volumes, i.e. Bangkok, Vicinity, Central region, Northern region, Northeastern region, Southern region and Whole Kingdom.

## **APPENDIX B**

### **DEFINITIONS**

#### **Concepts and definitions**

##### **1. Manufacturing establishments**

Refer to establishments engaged in manufacturing which is defined as the mechanical or chemical transformation of substances into new products whether the work is performed by power-driven machines or by hand, whether it is done in a factory, a workshop or a home, and whether the products are sold wholesale or retail. The assembly of component parts of manufactured products is considered manufacturing.

##### **2. Manufacturing industry classification**

In conducting the 2007 Industrial Census, manufacturing industry activities are classified according to the International Standard Industrial Classification of All Economic Activities (ISIC - : Rev.3) category D : Manufacturing. The arrangement of ISIC structure are as follows:

**Divisions** are the sub-categories identified by the first two digits code. There are totally 23 divisions ranging from 15 - 37.

**Groups** are sub-divisions and identified by first three digits code. There are totally 61 groups ranging from 151 – 372.

**Classes** are the single industries classified in the groups and identified by four digits code. There are totally 127 classes ranging from 1511 – 3720.

##### **3. Form of legal organization**

###### **3.1 Individual proprietor**

Refers to a privately-owned establishment or an establishment owned by or organized in the form of partnership, but not registered.

###### **3.2 Juristic partnership**

Refers to an establishment which is legally registered by at least 2 persons who were bound together to form and share their responsibilities in a business.

### **3.3 Company limited or Public company limited**

#### ***Company limited***

Refers to an establishment, which was established and legally registered by an initiative group of at least 7 persons.

#### ***Public company limited***

Refers to an establishment, which was established and legally registered by an initiative group of at least 15 persons.

### **3.4 Government or State enterprise**

Refers to an establishment, which entirely owned by the government or more than 50 percent of its shares belonged to the government.

### **3.5 Cooperatives**

Refers to an establishment, which was organized on cooperative lines and registered under the Cooperation Act. With an initiative group of not less than 10 persons.

### **3.6 Others**

Refers to establishments other than those mentioned earlier.

## **4. Form of economic organization**

### **4.1 Single unit**

Refers to an establishment, which was not a branch of any establishment or which had no branch or subsidiary

**4.2 Head office** is a head quarter establishment, which owned or controlled their branches or subsidiary unit.

### **4.3 Branch or subsidiary**

Refers to an establishment, which was a branch or a subsidiary of another establishment.

## **5. Registered capital**

Refers to capital permitted by the government officials in setting up of the establishment in the form of corporation. This capital is not defined as each on delivery or ready money from the share holders but it represents how much money the establishment used to run the business

## **6. Capacity Utilization**

Refers to the proportion of production and capacity.



## **7. Persons engaged**

This refers to paid and unpaid workers working at the end of the pay period nearest to December of the year. It also included persons who normally worked in the establishments but were absent during the referred period due to illness or on leave with pay, but excluded those persons who were on leave for military services or one who had obtained long leave or were on strike.

### **Persons engaged in an establishment were classified as follows:**

#### **7.1 Unpaid workers**

The owners or business partners who managed or participated in the management of establishment; all persons living in the household of any proprietors of the owners and working in the establishment at least 20 hours a week without regular pay.

#### **7.2 Operatives**

Refer to persons who were directly engaged in the production or other related activities of the establishment and received pay in terms of wages or salaries.

*Skill labour* refer to workers in production line who have been train at least 3 months or who have work experience at least 5 years in specific works, e.g. special in machine maintenance producers or setting equipment, machine controller and assembler, etc.

*Unskill labour* refer to workers in production line who have been train before work at least 2 weeks, e.g. Machine tenders, worker in factories and caretakers, etc.

#### **7.3 Other employees**

Refer to all employees other than operatives as define earlier. They included administrative, technical and clerical personnel such as salaried managers and directors, laboratory and research workers, clerks, typists, book-keepers, administrative supervisors, salesmen and the like.

### **Excluded the persons engaged were as follows:**

(1) Managers or directors paid solely for their attendance at meeting of the board of director;

(2) Persons from other establishment working at this establishment;

(3) Home workers;

(4) Persons who were on leave for military services or one who had obtained long leave or were on strike;

(5) Persons who were employed to work occasionally such as laborer and sale agents who do not receive regular pay.

## **8. Remuneration**

### **8.1 Wages/salaries**

Refer to all payments paid to the employees during January – December 2006, whether they were paid by monthly, weekly, daily, hourly or piece-work basis.

### **8.2 Overtime, bonus, special payment, cost of living allowance and commission**

Refer to all payments paid to employees for an extra work.

### **8.3 Fringe benefits**

Refer to all payments in addition to wages or salaries paid to employees such as food, beverages, lodgings, rent, medical care, transportation recreational and entertainment services, etc. Payments might be in cash or in kind.

### **8.4 Employer' s contribution to social security**

Refers to all payments made by employers in respect of their employees, to social security schemes for the benefits received by the employees, in respect of absence from work during employment, injury, accident disability, maternity and death. Those contributions are, for example, social security fund, workmen's compensation fund and health insurance, etc.

## **9. Purchase of materials and components**

Refer to the total value of raw materials, parts and components purchased by establishments, head office or purchasing agencies for production during January-December, 2006. It includes value of those purchased or owned by the establishment but consumed by other enterprises in making products for the establishment under contract. The value also includes cost of transportation, custom duties and other expenses related.

## **10. Cost of fuels**

Refer to the cost of all fuels consumed for heat and power, except fuels that enter the product.

## **11. Cost of electricity used in production process**

Refer to the total value of electricity purchased by the establishment during January-December, 2006. It also includes the value of electricity generated in generating section of other establishment in the same enterprise.

## **12. Cost of repair and maintenance work done by others**

This covers the total cost of current repair and maintenance services on buildings and other fixed assets of the establishment. Current repair and maintenance services are those required to make good of any breakage or to keep fixed assets in proper working condition, including those of other establishments in the same enterprise.

## **13. Purchase of goods for resale**

Refer to cost of all goods purchased to be resold without any transformation or processing.

## **14. Cost of contract and commission work**

Refer to the total amount paid to other establishments for their work done or services rendered. Generally, materials are supplied by the customers.

## **15. Value of stocks**

This refers to the values of stocks of goods, all materials, parts and components, owned by the establishments, regardless of where they were kept.

*Value of stocks at the beginning of the year* refer to the value of goods, all materials, parts and components, as of January 1, 2006.

*Value of stocks at the end of the year* refer to the value of goods, all materials, parts and components, as of December 31, 2006.

## **16. Change in value of stocks**

Refer to the difference between the value of stocks at the end of the year 2006, and at the beginning of the year 2006, (Value at the end -Value at the beginning of the year)

## **17. Other operating expenses**

Refer to other expenses paid for operating the business. It includes amounts paid for rent on land, rent on building, depreciation of all fixed assets, water supply, electricity (excluding cost of electricity used in production) postage, telegram, telephone, interest paid, bad debt, advertising, etc.

## **18. Sales of goods produced**

Refer to the value of sales, during January 1 – December 31, 2006, of all goods produced either by the establishment itself, or by other establishments under contract and commission as well as the value of goods produced for own use or providing to employees as of fringe benefits. Included are value

of goods transferred from the producing establishment to their head office and branches or to their wholesale and retail organizations under the same ownership and value of sales of scrap and refuse.

#### **19. Sales of goods purchased for resale**

Refer to value of all goods that were resold without any transformation or processing.

#### **20. Receipts for contract and commission work**

This item includes the value of contract and commission work done for others on materials owned by them. Similar work done for other establishments of the same enterprise, should be included and valued at an estimated market price or the actual cost. Excluded is the value of material supplied to the establishment doing the contract work.

#### **21. Receipts for repair and installation work done for others**

This item covers the value, at actual invoice prices of repair, maintenance and installation work rendered to other establishments or to individual customers. Services provided to other establishments within the same enterprises include labour and overhead costs, charges for materials supplied by the establishment in the course of the work.

#### **22. Other receipts**

This item refers to the value of electricity sold by the establishment and value of the by – product sold.

#### **23. Book value of fixed assets**

Refer to the net value of fixed assets after deducting the accumulated depreciation at the end of the year. Fixed assets are land, building, machinery and equipments, vehicles and office appliances etc. Included are major additions, alternations, and improvements to fixed assets during January – December, 2006 in order to extend their normal life or raise their productivity.

#### **24. Value added**

The value added is computed as follows:

Value added = Value of gross output – Intermediate consumption

**Value of gross output** refers to receipts of establishment in 2006, as follows:

- (1) Sales of goods produced
- (2) Sales of goods purchased for resale
- (3) Receipts for contract and commission work

- (4) Receipts for repair and installation work done for others
- (5) Receipts for rent on building, vehicles, machinery and equipment and other receipts
- (6) Change in value of stocks of goods

**Intermediate consumption** refers to all expenses on the production process of goods or services in the establishment in 2006, it covers items as follows:

- (1) Purchase of raw materials and components
- (2) Cost of production (Cost of fuels and cost of electricity used in production process, cost of repair and maintenance sales of goods of purchase, cost of repair and maintenance of machinery and equipment, etc.)
- (3) Purchase of goods for resale
- (4) Cost of contract and commission work
- (5) Cost of sale (Advertising, transportation, commission, insurance premium, etc.)
- (6) Administrative expenses (Administrative expenses minus value of rent on land, interest paid, bad debt and losses of currency exchange)
- (7) Change in value of stocks of raw materials, parts and components