

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

MINISTRY OF INDUSTRY
THE KINGDOM OF THAILAND

A STUDY
ON
THE DEVELOPMENT
OF
INDUSTRIAL STATISTICS
IN
THE KINGDOM OF THAILAND

(Phase 2)

Job Manuals for the Current Survey of Production

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Enumerators' Manual for the Current Survey of Production

This manual shows how to conduct the Current Survey of Production (hereinafter referred to as “the Survey”) by the Ministry of Industry (MOI). All personnel who are engaged in the Survey are required to have a proper understanding of the major points and carry out the Survey according to this manual.

1. Purpose of Survey

The Survey aims to clarify monthly production trends of the Manufacturing Sector of Thailand, and covers establishments that produce industrial products. The Survey is designated as the Ministerial Decree No. 9, and it is implemented since November 1999 onward.

2. Survey Target

The Survey covers business establishments (hereinafter referred to as “factories”) that produce items specified in the questionnaire, and registered with the Department of Industrial Works of MOI. When the Survey started, the number of target factories to be surveyed totaled 1,281 representing 34 industries under ISIC 4-digit code “Industry” classification for each month. The survey industries and commodities, and a summary of targeted establishments (factories) are shown in Table 1 and Table 2 respectively.

3. Content of Questionnaire

The Survey covers 34 industries (ISIC 4-digit code basis) and 485 commodities. These are classified into 57 kinds of questionnaires according to characteristics of production process and survey items. The basic survey items are shown as follows.

- a. Products : Output, Receipts, Shipment, Inventory, Capacity in quantity
- b. Products : Shipment, Sales plan in value
- c. Labor : Number of works, Average working hour and days
- d. Materials : Inventories
- e. Business condition

The establishments, which actually produce the commodities, should report output instead of companies who commission production. This is called the Principle of Actual Basis.

Shipment should also be reported when the products are actually shipped out. The products should be considered in inventory as long as they are not shipped out, even after conclusion of a sales contract. This Principle is essential to avoid double reporting.

4. System of Survey

(1) Organization of Survey

The Ministry of Industry (MOI) is the competent authority of the Survey. Within the MOI, the Industrial Information Center (IIC) of the Office of Industrial Economics (OIE) has jurisdiction over implementation of the MOI Current Survey of Production. IIC may employ local consultants as “survey assistants” for the Survey. The Organizations concerned of the Survey are the Industrial Information Center, the MOI provincial offices, and survey assistants.

(2) Survey Flow

The Survey is conducted using the Survey Questionnaires. Questionnaires currently in use are shown in the Annex. The Questionnaires submitted by establishments reach the Industrial Information Center through the following three different flows.

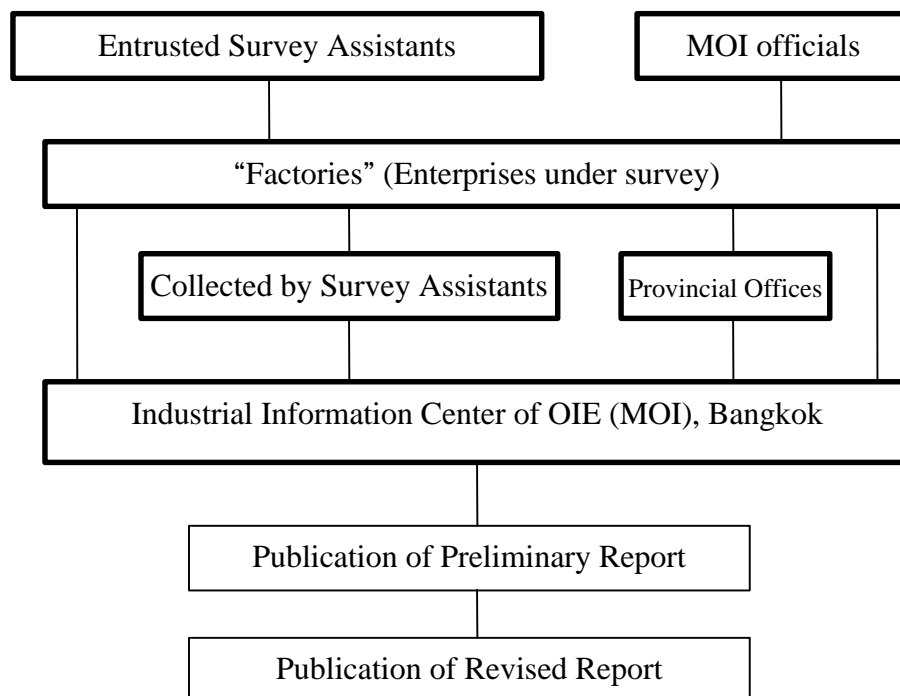
Category A: Distribution, guidance, collection and reminder call/visit of a questionnaire shall be done by survey assistants who are entrusted by IIC.

Category B: survey assistants do Distribution, instruction and urging, but collecting work shall be done through facsimile. In case a Questionnaire is not received by the date of submission deadline, survey assistants contact and remind the staffs of target factories.

Category C: the Ministry of Industry utilizing the staff of Industrial Information Center and through MOI's provincial offices does Distribution, instruction, collection and urging.

Category of each factory is indicated in the list of establishments of Table 3.

Figure 1 Distribution & Collecting Flow



When MOI officials and the entrusted survey assistants distribute questionnaires to factories, they have to explain the purpose of survey, confidentiality, and how to complete a questionnaire in accordance with the manual ‘Outline for Completing the Questionnaire’. Method and expected date of collection shall be fixed at that meeting. Copies of all questionnaires in Category A and B collected by survey assistants shall be made, and the original one submitted to IIC, while the copies are kept by survey assistants for reference of the following month. Extreme care should be taken to keep the confidentiality of the contents of the Questionnaires. Enumerators may be subject to punishment in case the information contained is known to any third party.

(3) Deadline and Term of Survey

The term of the survey is basically from the first day through the last day of the month (the calendar month). Under unavoidable circumstances, factories may designate a fixed date (e.g. 20th, or 25th of the month) as the last day of the survey and set out a month ending with that fixed date as the term of the survey. If factories change the term, they should report to that effect in the remark column. A questionnaire shall be distributed to each factory within the first 10 working days of

each month. Submission (or collection) of the questionnaire to (by) the MOI official the entrusted survey assistant shall be completed by 10th day of the next month.

All questionnaires which are collected, including those by facsimile, shall be checked by the MOI official or the entrusted survey assistant whether a questionnaire is properly filled in each item or not, before being gathered at the Industrial Information Center (IIC) by 15th of next month. Staff member in charge of reporting at factories, who does not submit the questionnaire to MOI until the deadline, is reminded by IIC and/or survey assistants. In case of a missing answer in some question items, contact is also made.

The results of the Survey will be published in a Preliminary Report issued at the end of the next month after tabulation process by IIC, and in a Revised Report issued during the middle of the subsequent month.

Figure 2 shows basic rotation of monthly survey.

(4) Suspension or Closure of Operation, Change of Business or Business Establishments' Name

If establishments suspend or close operations (including production of survey commodities), or change business or business establishment's name, they are required to submit a report to the same official or survey assistants as in the case of the questionnaire.

(5) Preliminary Report Processing

All questionnaires of surveyed industries shall be processed on Production Output, Shipment, and Inventory into the Indices of Industrial Production, and published as the Preliminary Report in the following flow.

- 1) Around 15th of the following month, the Survey Questionnaires submitted by the responding factories are directly faxed to the Industrial Information Center of OIE, or submitted through the entrusted survey assistants or MOI provincial offices. The Industrial Data System Section (IDSS) receives the relevant questionnaires and situation of each questionnaire is recorded in a computer.
- 2) IDSS uses a computer system for processing examination and calculation. While inputting data, the staff of IDSS confirms the data, which are replied by factories

for each question item and units (figure numbers), and check for simple mistakes in the questionnaires.

- 3) IDSS staff and entrusted survey assistants request the factories to submit those questionnaires not in time for Preliminary Report processing.
 - 4) The final examination and calculation list is created.
 - 5) IDSS examines the commodities on the basis of the examination and calculation list. The computer checks a portion of Output, Shipment, and Inventories, as well as the balance between the amount of the commodities and the total, and displays a signal or a message indicating an anomalous value deviated from a tolerance range specified according to characteristics of the commodities.
 - 6) IDSS and Industrial Index Section (IIS) jointly examine and correct the mistakes and add the data that came late for computing, or submitted by facsimile, thereby making the Preliminary Report. At this stage the existence of some yet-to-be-submitted questionnaires is expected.
 - 7) IIS arrange all the data processed as described above to create the Indices of Industrial Production (the Preliminary Report on Output, Shipment, and Inventories), and compile a booklet for publication as the Preliminary Report.
- (6) Revised Report Processing
- 1) After finishing the Preliminary Report processing, IDSS makes a second request to the relevant factories to submit the questionnaires delayed for the preliminary processing.
 - 2) IDSS receive the additional questionnaires after processing of the Preliminary Report, arrange them, and process in a computer. When mistakes are found during the Preliminary Report processing, IDSS corrects only the errors, not the entire contents of the questionnaire.
 - 3) IDSS process them in computer and create an examination and calculation list.
 - 4) IIS examine the examination and calculation list. The Revised Report contains all surveyed products and question items, whereas the Preliminary Report comprises only the 3 items of Output, Shipment, and Inventories of main Commodities.
 - 5) IIS enters corrected values instead of the values recorded in the computer and on the basis of the corrected values IIS calculates a tabulation of the Revised Report.
 - 6) IIS arranges the resulting values to calculate the Indices of Industrial Production (the Revised Report of Output, Shipment, and Inventories, capacity and Operation Ratio, Consumption of Materials and Inventories), and compile them into a booklet for publication as the Revised Report.

5. Reporter and Penal Regulations

The “reporter” in this survey refers to the management representative of a factory or an enterprise. The reporter must report on the items in the questionnaire accurately. If the reporter does not report at all or he or she makes a false report, he or she is punishable under the Ministerial Decree No. 9. All enumerators (both of MOI officials and entrusted survey assistants) may, if necessary, call attention to the reporters of the regulations, when they visit on factories.

6. Publication and Utilization

The data obtained by the Survey are widely used by a number of organizations such as MOI itself, the Bank of Thailand, National Economic and Social Development Board, and other administrative organizations, industrial sectors, enterprises, research institutes, and so on. The data are used to create the secondary statistics such as the Indices of Industrial Production and Input-Output Table.

7. Principles for Interviews

Success of this Pilot Survey depends on how efficiently interviews are made. So, survey assistants (enumerators) must be tactful and conduct interviews effectively in a manner that would encourage interviewees to be cooperative.

Personalities and skills required for Enumerators

Enumerators are required:

- 1) To be honest
- 2) To be a conscientious person, ready to work in accordance with the requirements.
- 3) To be intelligent, with good public relations.
- 4) To be able to adapt to changing conditions.
- 5) To dress properly, speak politely and meaningfully.
- 6) To be hardworking, calm and neutral.
- 7) To have interest in field job and able to do it properly.
- 8) To maintain confidentiality of data and information written in the questionnaire which shall not be divulged.

The general method of interview is given herein and may need to be adjusted according to various situations encountered:

1) Self-introduction with Purpose of Survey

Upon meeting an owner/managers introduce yourself, where you come from and the purpose of visit; present a letter of attorney issued by OIE. Use everyday words and explanations that the interviewees can understand. Tell them about the MOI's plan and the purpose of monthly current production survey.

2) Dressing and Manners

First impression is important; a good impression allows you to win the confidence of the interviewee. Proper dressing is important, just as the manner of speech. Try to be friendly but show respect to the owner/manager all the time.

3) Setting Questions

The interviewer should ask questions along the guidelines given by IIC. If the interviewee does not understand the question, the interviewer should confirm the premise of their answer, and report to IIC.

4) Recording Answers on Question

Answers made by interviewees are to be taken as true and correct; if its credibility becomes doubtful, the question should be asked again for confirmation.

In making revision, sometime, it may be necessary to request documentary evidences, such as account books, income/expense sheets, inventory books and so on.

There is reason to suspect that the data supplied by an interviewee is not correct or true, the interviewer should not argue with the interviewee, nor show an apparent suspicion. The interviewer shall be patient to get the facts by politely requesting the interviewee's cooperation.

5) Action in Force of Non-cooperation

If the interviewer encounters a non-cooperative respondent, e.g., an interviewee is not willing to meet or responses in a false manner, he shall explain the purpose of the survey and stress that information supplied by the interviewee shall be treated strictly confidential.

If the interviewee evades and plays delaying tactics like having to wait for the real authority to be present and so on, the interviewer should request him to listen to the questions. If the interviewee is unable to respond to all questions, the establishment should be marked for abeyance.

If the interviewee persistently refuses to cooperate, a report shall be submitted to the Director of IIC to decide on the subsequent action.

8. Data Confidentiality

Data collected from the survey of industries shall be taken by MOI to further official interest and shall be printed for general interests in collective and processed state. Nevertheless, data collected from each factories under Ministerial Decree **MUST BE KEPT CONFIDENTIAL**.

Commodities Listed in the 96 Questionnaires by IIC

July 15, 1999

ISIC Code	GDP share	Q. #	New Q. #	Grouping	Subgroup	Commodities	Cow	Buffalo	Goat	Sheep	Duck	Chicken						
1511			4600	Slaughtering		Pig	Cow	Buffalo	Goat	Sheep	Duck	Chicken						
			4610	Frozen/Chilled Meat		Pig	Cow	Buffalo	Goat	Sheep	Duck	Chicken						
			4620	Canned Meat		Pig	Cow	Buffalo	Goat	Sheep	Duck	Chicken						
			4630			sausage	ham	bacon	Goat	Sheep	Duck	Chicken						
				Meat ball		chicken	pork	beef										
1512		0100		canned fish		tuna	sardine	baby clams	squid									
		0110		other canned		chilled/frozen	crabs	smoked	minced	salted								
1513		2900		canned veg		corn	bamboo shoot	longan	rambutan									
				canned fruit		pineapple	lichee											
1514		1100		veg oil		soybean	palm	corn	bram	castpr	sunflower							
		1110		animal fat		lard	chicken											
		1120				margarine												
1520		3000		milk		milk yogurt	cheese	concentrated m	icecream	butter	yogurt							
		3010		non-dairy milk		milk	condensed	evaporated	soybean	powder								
		3020				non-dairy milk												
1532		3200		glucose		liquid	powder											
				dextrose		liquid	powder											
				sorbitol		liquid	powder											
						fructose syrup												
				msg		msg												
1533		3210		animal feed		pig	cattle	chicken	fish	shrimp								
1541		4700		sugar		biscuit	bread	cookies	wafer	cake	pastries	pie						
1542		1300				raw	white	pure white	molasses									
1543		4800		noodle		cocoa	chocolate	candies	lozenge	gun								
1544		3100				instant	rice flour	spaghetti	pasta	macaroni								
1549		3300		vinegar		instant coffee	roasted/ground	conf. Mix	ice cof powder	tea powder	tea leaves							
		3310				distilled	fermented											
1551		1900				whiskey	ethyl alcohol	cordials	other spirits									
1553		0200				beer												
1554		2400				carbonated	soda water	syrup	pure water	fruit juice								
1600		2100				cigarettes												
1711		0300		spinning		cotton	woolen	worsted	spun silk	hemp	viscose	nylon						
		0310		weaving		cotton	woolen	nylon filament	nylon textured	polyester filam	polyester tex	acrylic						
				knitting		cotton	woolen	nylon fila.	nylon tex.	polyester fla.	polyester tex.	acrylic						
1723			5000			rope	net	fishing net	purse/ring net									
1729			5100			tyre cord	woolen fabric	lamp-wick										
1730				knitted/crochet		fabric	clothes	panyhose										
1810		0400		men/boy's		outwears	underwears	other										
				women's		outwears	underwears	other										
				women's		outwears	underwears	other										
1911			5300	tanned leather		cow	buffalo	crocodile	Goat	sheep	ray fish							
1912		2210		bag		synthetic tendon	glue for leather	bric/case	wallet									
						baggage	handbag	belts										
						leather glove	golf bag											

Table 2(1) Regional Distribution of Target Establishments by Sector in the 2nd Stage

Sectors	Bangkok & Vicinity	Central	North	Northeast	South	Total
1512 Canned fish	56	4	0	0	23	83
1513 Canned veg/fruits	4	11	5	2	1	23
1514 Vegetable oil	11	4	0	0	7	22
1533 Animal feed	13	14	2	2	5	36
1542 Sugar	3	16	6	9	0	34
1551 Alcoholic drinks	3	2	1	4	0	10
1553 Beer	6	2	0	0	0	8
1554 Soft drinks	6	1	1	2	0	10
1600 Tobacco	2	0	0	0	0	2
1711 Spinning/weaving	67	0	0	0	0	67
1810 Apparel	147	7	9	3	0	166
1911 Tanned leather	2	1	0	0	0	3
1920 Leather shoes	9	22	0	1	0	32
2101 Pulp & paper	7	9	1	1	0	18
2320 Refinery	1	3	1	0	1	6
2411 Basic chemicals	16	23	0	1	0	40
2424 Soap/detergent	8	0	0	0	0	8
2511 Tyre/tube	8	1	0	0	0	9
2519 Rubber products	12	11	0	2	12	37
2520 Plastic products	13	2	0	2	0	17
2694 Cement	0	11	4	0	2	17
2695 Concrete products	25	13	2	3	5	48
2710 Steel products	45	30	0	3	1	79
2899 Metal products	74	14	2	2	0	92
2919 Air conditioner	5	5	0	0	0	10
3000 Computer	5	5	0	0	0	10
3120 El. components	24	14	0	0	0	38
3210 Electric tube/ic	67	14	1	1	0	83
3230 Radio/tv	17	2	0	0	0	19
3320 Glasses/lens	9	1	0	0	0	10
3410 Auto	47	31	3	6	4	91
3430 Auto parts	55	19	1	1	0	76
3591-2 Motorcycles/bicycles	25	5	0	3	0	33
3610 Furniture	12	9	4	1	3	29
Total	804	306	43	49	64	1266

Table 2(2) Provincial Distribution of Target Establishments in the 2nd Stage

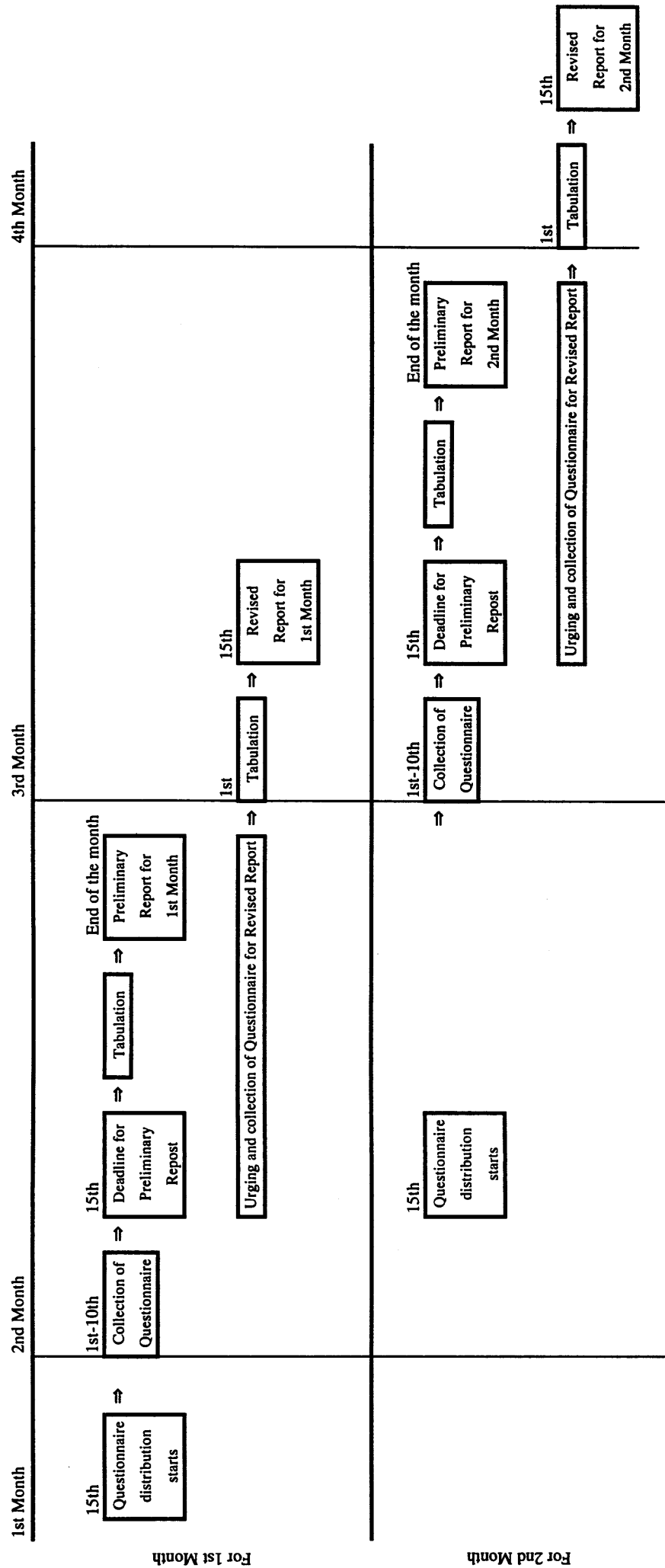
Province	No. of Establishments
Bangkok	216
Nakhonpathom	45
Nontaburi	36
Pathumthani	119
Samutprakarn	276
Samutsakorn	112
Sub Total (Bangkok & Vincinit	804
Ang-thong	1
Ayuttaya	48
Chacheongsao	45
Chainat	2
Chantaburi	-
Chonburi	61
Kanjanaburi	10
Lopburi	18
Nakhonnayok	2
Petchburi	8
Pracheubkirikhan	12
Prajinburi	10
Rachaburi	10
Rayong	32
Samutsongkram	2
Saraburi	35
Singburi	4
Srakaew	-
Supanburi	6
Trad	-
Sub Total (Central)	306
Chiangmai	8
Chiangrai	-
Kampangpetch	2
Lampang	8
Lampoon	5
Maehongson	-
Nakornsawan	4
Nan	-
Pa-yao	-
Petchaboon	5
Phitsanulok	3
Pichit	2
Prae	-
Sukhothai	3
Tak	1
Uttradit	2
Sub Total (North)	43

Province	No. of Establishments
Burirum	4
Kalasin	-
Khon-kaen	8
Loey	-
Maharakham	-
Mukdaharn	-
Nakornpanom	2
Nakhonrachasima	26
Nongbualumphoo	-
Nongkhai	2
Roi-ed	-
Sakonnakorn	1
Srisaket	-
Surin	-
Ubonratchatani	3
Udonthani	3
Yasothon	-
Sub Total (Central)	49
Chumporn	5
Krabi	2
Nakhonsriathammarat	5
Naratiwat	-
Pattalung	-
Pattani	1
Phuket	-
Ranong	1
Songkla	32
Suratthani	9
Trang	9
Yala	-
Sub Total (South)	64
Grand Total	1,266

Table 3 List of Establishments and their Categories

Enumerators are to be supplied with a list of establishments they cover from the Ministry of Industry.

Figure 2 Working Cycle of the Current Survey of Production



Notes: Distribution of Questionnaires could be made once a year to save troubles of distributing them each month.

Filling Manual

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Manual for Respondent to the Current Survey of Production

This outline shows how to fill out the questionnaire for the **Current Survey of Production** conducted by the Industrial Information Center (IIC) of the Ministry of Industry (MOI).

Business establishments covered by this survey are required to fill out the questionnaire accurately according to this outline and return it to the competent official or enumerators from the MOI by deadline.

1. General Explanations of Survey

(1) Purpose of Survey

The purpose of this survey is to clarify monthly production trends of the manufacturing industry in Thailand. The survey is designated in the Ministerial Decree No. 9.

(2) Confidentiality

Confidentiality of data reported in this survey is kept under the Ministerial Decree No. 9. Consequently, this information may not be used or otherwise disclosed for purposes other than the scope of the survey, including tax collection.

(3) Surveyed Establishments

The survey covers business establishments (factories) that are producing commodities specified in the questionnaire. All surveyed establishments are selected from the “plant registration database” in the Department of Industrial Works of the MOI, generally in view of the number of employees and production volume.

(4) Respondent and Penal Regulation

“Respondent” in this survey means the management representative of each establishment. Respondents must report the items in the questionnaire accurately.

If a respondent does not report at all or he/she makes a false report, he/she is punishable under the Ministerial Decree No. 9.

(5) Term of Survey

The term of the survey is basically from the first day through the last day of the month. Under unavoidable circumstances, you may designate a fixed date (e.g., 25th or 20th of the month) as the last day and set one month ending with that fixed date as the term of the survey. Afterwards, however, you may not change the term without proper reasons.

If you change the term, be sure to report about the effect in the “Remarks” column in the questionnaire.

(6) Deadline of Submitting Questionnaire

Please submit the completed questionnaire to the competent official or enumerators from the MOI by 10th day of the next month.

(7) Publication of Survey Results

The results of this survey shall be published in the form of monthly preliminary and revised reports, and in the form of annual report.

2. Notes for Filling in the Questionnaire

2.1 Matters Requiring Attention

(1) Thai version and English version

One side of the questionnaire is written in Thai and the other side in English. You can fill out either side.

(2) Figures

Please enter applicable figures precisely and clearly according to the commodities, units and items in the questionnaire. Use Arabic figures. In the digits below the unit, count fractions over 1/2 as one and disregard the fraction less than one half.

Avoid assumption in filling in the questionnaire. If you cannot possibly avoid assumption, clarify how you have come to that assumption in the “Remarks” column concisely.

It is advisable to make copies of completed questionnaires every month and to refer to the figures of the previous months when you fill out a new questionnaire.

(3) Data Correction

If you find that you have entered incorrect in the questionnaire after submission, promptly report to the official to whom you submitted the questionnaire. If you find the incorrect entry before submission, it is acceptable to report it in the “Remarks” column of the questionnaire.

(4) “Remarks” Column

In the “Remarks” column, please report on matters that need explanation (e.g., the reason for a significant change in production from the previous month) as well as matters designated by this outline for filling in the questionnaire.

(5) Contact Address

If you have any inquiries on the survey or how to fill out the questionnaire, please contact the following address.

**Industrial Information Center, Office of Industrial Economics,
Ministry of Industry**

[Address] Rama VI Road, Bangkok 10400

Tel: (02) 202-4347-60 / Fax: (02) 202-4356, 202-4346

2.2 General Data Concerning Factory and Respondent

Before making entry to each item, please enter the following general data to identify a factory and a respondent.

(1) “Plant Registration No.”

Please fill out the “Plant registration No.” column in the upper left side of the questionnaire. It must be the same as the registration number of your factory in the Department of Industrial Works of the MOI.

(2) “Month” and “Year” to be Surveyed

Confirm the “Month” and the “Year” written in the upper central part of the questionnaire, which show the term to be surveyed by the questionnaire. Be sure not to report data of another month/year in the questionnaire.

(3) “Name of Establishment”

Fill out the “Name of establishment”, which means the factory name. In case the factory name is different from the name of factory owner, enter the factory name. For example, if the owner’s name is “AAA Co., Ltd.” but the factory name is “BBB Factory”, the name of establishment must be “BBB Factory”.

(4) “Address”

Enter the actual full address of the factory that includes Moo, Soi, Road, Tambon, Ampoo and Province as well as the zip code.

If the factory moves to another place, please make sure to report it to the Industrial Information Center.

(5) “Name of Respondent”

“Respondent” means the management representative of the factory. As well as the respondent’s name, be sure to enter the “Tel (telephone number)” and “Fax (facsimile number)” for the respondent.

2.3 Important Notes on Survey Commodities

Respondents have to fill out the survey items on each commodity. Please read the following notes in order to understand the commodity classifications shown in the questionnaire accurately.

(1) Commodity Classifications in the Questionnaire

The questionnaire specifies the survey commodities in it, based on the commodity classifications as shown in the Annex to this manual.

(2) Other Products

If the factory makes any other products than those shown in the questionnaire, please specify the name in the “Others” column and report on them according to the survey items.

2.4 Survey Items

(1) Product (Quantity)

1) Production

“Production” includes only products manufactured in Thailand.

Please enter the quantity of each product made at the factory during the survey term. The name of each commodity (product) are printed in the questionnaire. However, exclude semi-finished products in process.

Include the following in the production category.

- Products made on consignment
- Products made at the factory to consume or process into other products

2) Shipment

Report the quantity of each product shipped from the factory and warehouses or other storage sites the factory rents during the survey term. Shipment should be reported when the products are actually shipped out. As long as the products are not shipped yet, they should be considered in inventory, including those that have been sold under a formal contract.

Shipment quantity is distinguished into the following three items.

- a. “Intra-firm use” means products that has either been shipped to other factories of the same enterprise or been consumed at the factory. In case a

product is shipped to a factory of the same company overseas, it is not “intra-firm use” but “export”.

- b. “(Domestic) Sales” means products sold to domestic dealers or other enterprises that are consumers.
- c. “Export” means products sold to dealers or other enterprises overseas that are consumers.

3) Month-end inventory (finished goods)

Report on the quantity of each product stored as of the last day of the survey term at the factory and in the warehouses or other storage sites the factory rents.

4) Monthly capacity

“Capacity” means the maximum production capability of the process, not in horsepower of any equipment or machinery. Enter the maximum level of production (not actual production figure) that can be obtained under a normal employee work schedule, with existing equipment, and allowing normal downtime for maintenance, repair and cleanup.

If it is difficult to report the figure according to each commodity, please evaluate the capacity of each production line in terms of quantity, and sum up. Then, enter the summation into the top column of this question.

(2) Product (Value)

1) Shipment

Please report the total value of each product shipped from the factory and warehouses or other storage sites the factory rents during the survey term. The total shipment value means the total of the domestic sales value and the export value, not including the intra-firm use.

2) Sales order

Report the value of sales orders by the customers for the factory in terms of the following two items.

- a. “This month” means the value of sales orders for each product during the survey term.
- b. “Previous months” means the value of remaining sales orders for each product that have not been shipped yet, as of the end of the previous month.

3) Sales plan

Enter the value of sales expected for the next month.

(3) Labor

1) Total number of workers employed by the plant

Please report the number of workers who actually worked in the factory during the survey term, excluding those who work in the management section.

2) Average working hours at the plant (per day per worker)

Report the average working hours per day per worker in the factory during the survey term. "Worker" excludes those who work in the management section.

3) Average working days at the plant (per month per worker)

Report the average working days per month per worker in the factory during the survey term. "Worker" excludes those who work in the management section.

(4) Raw Materials (Month-end Inventory)

Report on the quantity (not value) of raw materials (including those received for production on consignment) that are stored as of the last day of the survey term at the factory and in the warehouses or other storage sites the factory rents.

Raw materials include goods that are work-in-process (WIP).

Names of raw materials are not exhaustive in the questionnaire. Please enter the names of major materials that the factory is using, if they are not specified in the questionnaire. The unit of measurement should be the most commonly used one in the market.

(5) Perceived Business Conditions in the Market

As to the business conditions in the market where the factory supplies its products, show your perception by marking the corresponding answer from among "very good", "somewhat good", "stable", "somewhat bad" and "bad", in terms of the following two items.

- a. "This month" means the perception based on the actual market conditions during the survey term.
- b. "Next months" means the perception based on your forecast of the market conditions in the next survey term.

Annex

1. สินค้า (จำนวน)		รายการ		การจำหน่าย					กำลังการผลิตต่อเดือน	
				ในประเทศ	ส่งออก	อื่น ๆ	สินค้าคงคลัง ณ สิ้นเดือน	กำลังการผลิตต่อเดือน		
				*1	*2					
				สิ้นค้าคงคลัง ณ ต้นเดือน	สิ้นค้ารับมา					
				A	B	C	D	E	F	
สินค้าที่สำรวจ	ปลาประป่อง	ปลาทูน่า (Tuna)	หน่วย							
			กิโลกรัม							
		ปลากระป๋อง								
		ปลากระป๋อง								
		ปลากระป๋อง								
		ปลากระป๋อง								
อาหารทะเลกระป๋อง	อื่น ๆ	กุ้งแช่น้ำแข็ง (Prawn and shrimp)	หน่วย							
			กิโลกรัม							
			ปู (Crab)							
			หอยลาย (Baby clam)							
			ปลาหมึกกล้วย (Squid)							
			ปลาหมึกกล้วย (Squid)							
สินค้าหลักอื่น ๆ (ประกอบ)										
ตัวเลขรวมทั้งหมด										

รายการ	การจำหน่าย		ยอดสิ่งรับ		แผนการจำหน่าย
	รวม		เดือนนี้ "5	เดือนก่อน ๆ "6	
หน่วย	A	B	C	D	
201					
202					
203					
204					
205					
206					
—					
—					
—					
999					

รายการ		รหัส	หน่วย	ทั้งโรงงาน	สินค้าที่สำรวจ
จำนวนคนงาน		301	คน		
จำนวนชั่วโมงทำงานโดยเฉลี่ย (ต่อวัน ต่อคน)		302	ชั่วโมง		
จำนวนวันทำงานโดยเฉลี่ย (ต่อเดือน ต่อคน)		303	วัน		

รหัส	จำนวน	หน่วย	มูลค่า	หน่วย
401	ตัน	ตัน	ตัน	ตัน
402	ตัน	ตัน	ตัน	ตัน
403	ตัน	ตัน	ตัน	ตัน
404	ตัน	ตัน	ตัน	ตัน
405	ตัน	ตัน	ตัน	ตัน
406	ตัน	ตัน	ตัน	ตัน
อื่น ๆ				
(ไม่)				
รวม)				

กรุณาทัดเครื่องหมาย ✓ ใน □					
	(1)	(2)	(3)	(4)	(5)
ดีมาก	□	□	พอควร	□	□
ดีเล็กน้อย	□	□	พอควร	□	□
ดีเล็กน้อย	□	□	พอควร	□	□
ดีเล็กน้อย	□	□	พอควร	□	□

[illegible]

< หมายเลข >

เลขานที่ติดต่อ) สนับสนุนยอดสงฆกรรม ผ่านงานเศรษฐกิจอุตสาหกรรม กระทรวงอุตสาหกรรม ถนนพระรามที่ 6 กรุงเทพฯ 10400, โทร. (02) 202-4347-60 โทรสาร (02) 202-4346, 4356

Examination Manual

1. General Explanations on Examination	1 -
2. Individual Examination Procedure	5 -

Current Survey of Production
By
The Industrial Information Center of the Ministry of Industry

Questionnaire Examination

This outline explains the method and procedure to examine the questionnaire on [name of industry] for the *Current Survey of Production* conducted by the Industrial Information Center (IIC) of the Ministry of Industry (MOI).

All questionnaires which is filled in by Business establishments covered by this survey must be examined accurately according to this outline by specified dead line.

1. General Explanations on Examination

1.1 Purpose of This Manual

This manual is prepared for the purpose of helping either the enumerator or the inspector to examine the questionnaire of “Current Survey of Production.” All questionnaires that are collected by either the enumerator or by any other methods such as mail and facsimile machine, shall go through the formal examination process. And after completion of this procedure, all data must be advanced to computer processing through operators.

1.2 Scope of This Manual

This manual mainly deals with following 5 sections of each 10 types of questionnaires which are used in the pilot survey.

5 sections

- ✓ Face section
- ✓ Product Quantity section
- ✓ Product Value section
- ✓ Labor section
- ✓ Raw Material section

[name of industry]

10 types of questionnaires (ISIC No.)

- ✓ Canning of Fish & Other Seafood (1512)
- ✓ Breweries (1553)
- ✓ Spinning of Cotton & Man – Made Fibers (1710)
- ✓ Manufacture of Clothes (1810)
- ✓ Petroleum Refineries (2320)
- ✓ Manufacture of Cement (2694)
- ✓ Manufacture of Electric Tubes, Semiconductors and Integrated Circuits (3120)
- ✓ Manufacture of Television and Communication Equipment and Apparatus (3230)
- ✓ Electric and Electronic Components and Parts (3190)
- ✓ Assembly of Automobiles (3410)

1.3 Work Flow of Questionnaire Examination (See also Work Flow Chart on p.4)

(1) Confirmation of Face Section and Blank Items of Other Sections

Case1: Received by Mail or fax machine

(Questionnaire sent from respondents to MOI (IIC) directory.)

This Step Implemented by the Inspector. (See section B.1,2.(1))

Case2: Collected by Enumerator

(Questionnaire collected by the enumerator)

This Step Implemented by the Enumerator. (As same as above)

(2) Collect All Questionnaires to MOI and Final Check of Face Section

Check Blank Items and Remarks on Questionnaires for “Case2 at (1)”.

This Step Implemented by Inspectors. (*As same as above*)

(3) Check of Figure Other Than Face Section

Check the contents of following sections.

Product Quantity section

Product Value section

Labor section

Raw Material section

This Step Implemented by the Inspector. (See section B.2.(2),(3),(4),(5))

(4) Supplement for Deficit of Data

If some part of data on questionnaire are missing and can not figure out within a limited deadline, data supplement will be implemented for following sections.

Product Quantity section

Product Value section

Labor section

Raw Material section

This Step Implemented by Inspectors. (See section C)

(5) Input for Data Processing

All five-section data obtained from the questionnaire, as examined by the inspector, are processed immediately on computer using the computer software developed for current survey of production.

Face section

Product Quantity section

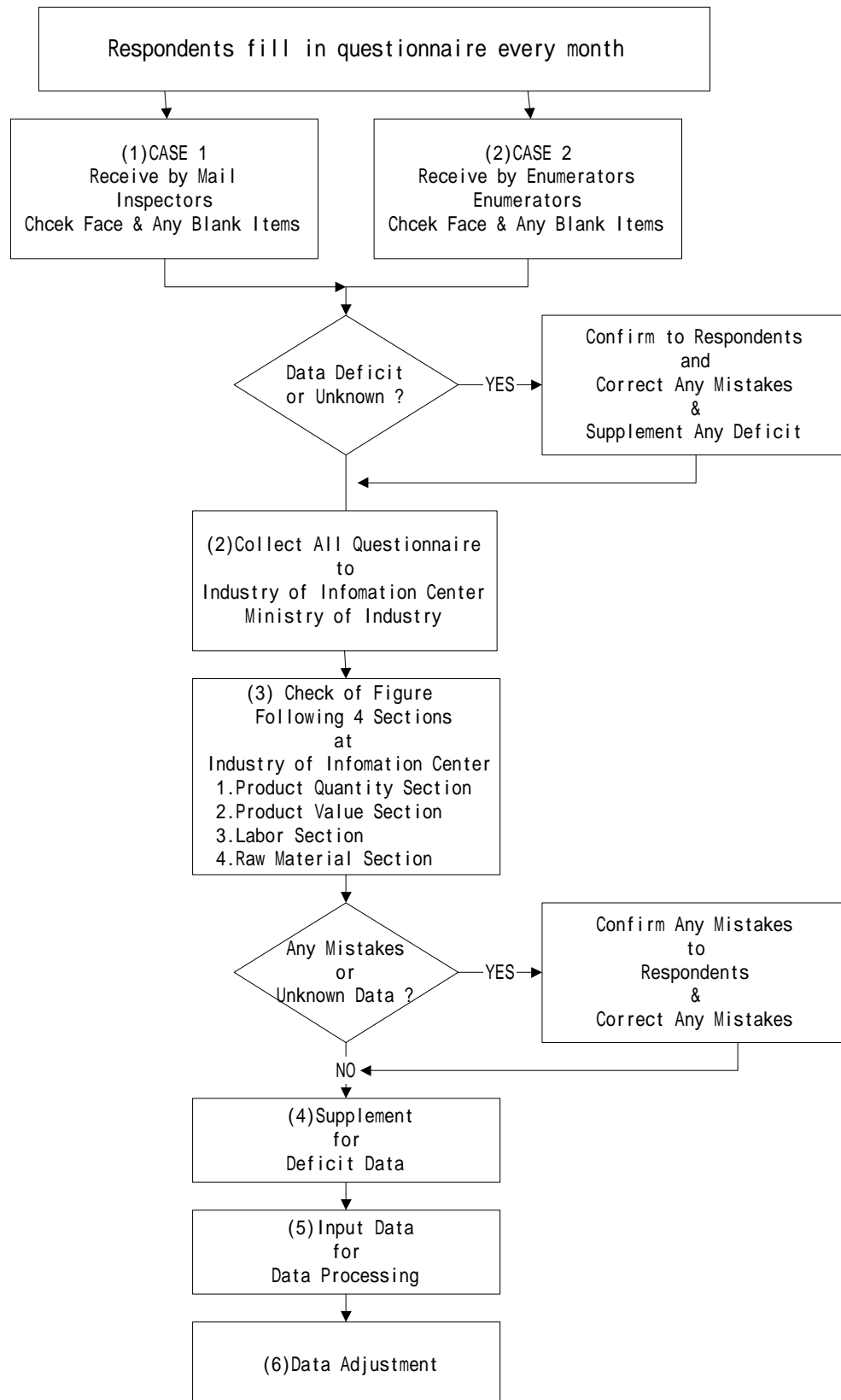
Product Value section

Labor section

Raw Material section

This Step Implemented by Either Inspectors or Operators.

Basic Work Flow for the Questionnaire Examination



2. Individual Examination Procedure

2.1 Confirmation of Collection Status of Questionnaire

Questionnaires surveying major establishments which represent each industry or commodity group must be collected within a time period set for preliminary survey in each month.

If not, check the status and write it down in a 'Remarks Column' of the questionnaire.

- 1) Failure by the establishment to collect data on time
- 2) Suspend operation for specific commodity :ISIC level (short-term)
- 3) Suspend operation for specific commodity :ISIC level (long-term)
- 4) Refuse to answer the corresponding questionnaire

* In the case of '1)', collect the questionnaire by the deadline of certified version.

In the case of '2)', treat as data deficit temporary.

In the case of either '3)' or '4)' replace the establishment.

2.2 Examination of Questionnaire

(1) Face Section and Blank Items of Other Sections

- Major Check Item and Process

The face section and blank items of other section must be taken care of by either each enumerator or inspector (in case of returning by any method other than direct collection by the enumerator). Through this step, all questionnaires must be checked to see if they are filled out correctly by surveyed establishments and the reason for blank items.

- 1) Face
- 2) Product quantities
- 3) Product value
- 4) Labor
- 5) Raw material

* Any blank item through 2) to 5). More details will be mentioned in the following section.

After the enumerators or provincial offices passed the questionnaire sheets to the MOI (IIC), check all items on each questionnaire whether they are answered. If no

response is found in a particular item and no reason is specified in “Remark”, ask to the enumerator or respondent and also confirm the reason why the item is left blank:

- 1) No production or no sales order for this month.
- 2) Suspend operation for corresponding commodity.
- 3) Refuse to answer corresponding commodity.
- 4) Others

* Report this in the ‘Remarks’ column of the questionnaire. And this reason is applied on the procedure of data supplement

- Detail Check

- a) *For the first time (month) of the survey*

The enumerator should confirm all of the above items by comparing the questionnaires with the list of establishments before handling them to the MOI (IIC). If you find any incorrect entry, ambiguous response or blank item; check with the enumerator or respondent directly.

- **Registration number** is correct or not
- **Name of the establishment** is correct or not (any changes?)
- **Address of the establishment** is correct or not (any changes?)
- **Name of respondent, telephone number and fax number**
- **Month** to be surveyed
- **ISIC Code**

- b) *For the second time (month) of the survey and forward*

Check the above items by comparing the current month with the previous month questionnaires. If there are some changes, ask to the respondents and report it in the ‘Remarks’ column.

* If some establishments are replaced, treat them as first time survey.

(2) Automatic checking functions for the prevention of inappropriate input (by each questionnaires)

The system will display the WARNING messages on the input screen when the input-data fall under any of the following.

1) <Input-Check by each Commodities & Items>

Data Type (Numeric/Character)

- In the case that the input value has an incorrect data-type
(Ex. In the case that the user enters a character in an input area which accepts a numerical value only such as “Production Qty” etc.)

Comparison with the previous month / the same month of the previous year

- In the case that the input value deviates more than 10% from the figure of the previous month or the same month of the previous year (The allowable range of deviation can be preset with reference to the Master file by each item.)
 - This function will cover the checking for an inappropriate column.
 - In the case that the object month is in the starting year of the survey (1999), “Comparison with the same month of the previous year” does not execute.

2) <Input-Check by each Commodities>

Not Filled

- In the case that all the items such as “Production Qty”, “Shipment Qty”, “Finished goods-Inventory”, “Processing Capacity”, “Shipment Value”, “Sales plan”, “Total number of workers”, “Average Working Hours”, “Average Working Days” are not assembled, although one of these items was input (0 is admitted as an input-value).

Continuous Response

- In the case that the value of the survey month is not input although the same item of the previous month was already input.

Logical Balance

- In the case that the “Month-end Inventory” of this month is not equal to the value which is calculated by following formula.

$\text{Month-end inventory} = \text{Production} + \text{Receipts} + \text{Month-end inventory (of the previous month)} - \text{Total shipment}$

Unit Price

- In the case that the input value deviates more than 10% from the figure of the previous month or the same month of the previous year. (The allowable range of deviation can be preset with reference to the Master file by each item.)

And, the formula that calculates the unit price is shown as follows.

$$\text{Sales Plan(Value)} \div \text{Sales Qty}$$

Fluctuation of the Employees

- In the case that the “Total number of workers” deviates more than 10% from the figure of the previous month or the same month of the previous year (The allowable range of deviation can be preset with reference to the Master file by each item).

Fluctuation of the Operation days

- In the case that the “Average Working Days” is exceeded the total days of the survey month (Ex. January = 31days, February = 28days...etc.).

Fluctuation of the Operation days comparison with the previous month

- In the case that the “Average Working Days” deviates more than 10% from the figure of the previous month or the same month of the previous year (The allowable range of deviation can be preset with reference to the Master file by each item).

3) <Input-Check by each Questionnaires>

Relative Commodities

- In the case that the input values between the relative commodities are not logically consistent. (Ex. In the case that the “**Shipment Qty**” of “**Car-Air Conditioner**” has increased although the “**Shipment Qty**” of “**Automobile**” is not increase...etc.).

Relative Items

- In the case that the input values between the relative items are not logically consistent. (Ex. In the case that a certain “Finished-goods Inventory” has increased despite the decreasing of the relative “Raw Materials”...etc.)

(3) Output of the Warning History

In order to confirm the warning history after making an entry to the computer screen, the system will print out the log list of warning by each questionnaire (establishment).

(4) Functions on the input screen

1) Attribute - setting for the input values

In order to distinguish the meaning (attribute) of each input value (data), the input screen should have the “list-box” (which is capable of selecting the attribute) beside each input area (item) because it’s impossible to identify the attribute of the data by only numeric value and blank.

<For the blank items which have NOT been obtained the continuous response in the past>

“Un-produced”

All the input area will be set as “Un-Produced” initially

<For the blank items which have been obtained the continuous response in the past>

When the user push the “OK” button to register specific data in a questionnaire, following , or should be selected as the attribute of the data.

* However, it should not be input only the attribute but also the numeric value if was selected.

“Production Discontinuance” (Complete market evacuation)

An establishment may withdraw from the market due to the bankrupt or other reasons. In this case, IIC is expected to receive the questionnaire containing the figures of shipment and inventory but production and for the time being.

So, the system will not execute the Input-Check which are mentioned in above 1. (2) in the case that “Production Discontinuance” is set as the attribute to the item.

“Automatic Estimation”

If the user select “Automatic Estimation” as attribute to the unfilled item, the system will execute the calculation process that is mentioned as following .

However, it should not be used to prepare the revised report.

<For the numeric values>

“Actual Value”

The system will set the “Actual Value” as the attribute to the item when the numeric value was input to the item.

“Manual Estimation”

The user should set the attribute as “Manual Estimation” in the case that the establishment has reported an estimated value in the questionnaire due to the lack of actual data for the preliminary report, and the user inputs the estimated value manually.

2) Automatic estimation for the missing data (uncollected data from the establishments)

The user should set the estimation method (pattern) in “Establishment Master (file)” out of the following choice.

Applying the figure **from the same item of previous month**

Applying the figure that is **calculated by the growth rate** of the commodity group.

$$\text{Estimated figure} = \text{Value of the previous month} \times \text{Growth rate}$$

* Growth rate = Total figure of the previous month (excluded the uncollected establishment in this month)/Total figure of the this month

(5) Output functions

1) Output program of the summing-up data for examination

(1) Summary & Detail List of the Actual Figures

- Quantity will be multiplied by the unit price of the establishment, and be calculated to make the share for each. (Because some commodities have the plural units)

(2) Summary & Detail List of the Actual Figures

(3) Summary & Detail List of the Actual Figures

(3) Summary & Detail List of the Actual Figures

(4) Summary & Detail List of the Actual Figures

Establishment list of the contribution ratio

2) Output program for listing of the information for analysis

Time series list of figures by commodity

(1) Index list of the growth rate by commodities in the industry (Pattern 1)

(2) Index list of the growth rate by commodities in the industry (Pattern 2)

Comparison list with the figures in the previous month/ the same month of the previous year by industry

Comparison list with the figures in the previous month/the same month of the previous year by commodity

(1) List of time-series indices list by commodity (Pattern 1)

(1) List of time-series indices list by commodity (Pattern 2)

(2) List of time-series indices list by industry (Pattern 1)

(2) List of time-series indices list by industry (Pattern 2)

3) Listing program for the comparative factor analysis between the preliminary publication and the revised one

The balance-comparison of the growth rate between “preliminary” and “revised” report

Contribution degree of the revised report - Contribution degree of the preliminary report = Balance of the contribution degree

4) Report program for dissemination

(1) List and Graph for dissemination (Pattern 1)

(2) List and Graph for dissemination (Pattern 2)

List and Graph for dissemination (Annual Report)

Form of general explanation

1. Graph and Table for General Explanation

2. Graph and Table for General Explanation

(6) Other functions

The following functions are now under review in JICA Study Team.

User-ID Control for recording of the input-log

User-Setting of the range for the aggregation to the Master file, in order to categorize the small commodity groups.

<Attachment>

Figure 1 Type of the Attribute

Attribute Type	Object Data	Response Status
Actual Value	for Numeric Value (including 0)	for Continuous Response
Un-Produced	for Blank	for Not Continuous Response
Production Discontinuance	for Blank	for Continuous Response
Automatic Estimation	for Blank	for Continuous Response
Manual Estimation	for Numeric Value (including 0)	for Continuous Response

Figure2 Image of the new input screen

1.Finished Goods					
Item		Production		Receipts	
Commodity		A		B	
Canned Fish	Tuna	5,325	4	234	4
	Sardine		1		1
	Salmon		1		1
Other Canned Seafood	Prawn & Shrimp		1		1
	Crabs	12,343	4	342	4
	Oyster		3		3
	Baby crams	3,456	5	0	5
	Squid	0	4	0	4
	Shark fin	3,456	4	65	4

(Attribute)

1. Un-Produced
2. Production Discontinuance
3. Automatic Estimation
4. Actual Value
5. Manual Estimation

List Box for a selection of the attribute

Analysis Manual

1.	Introduction•.....	- 1 -
2.	Analysis of monthly statistics•.....	- 1 -
3.	Analysis of Annual Statistics •.....	- 3 -

Manual for Analysis

1. Introduction

This manual describes the method and procedures to analyze production statistics. The manual is valid until March 2000 and is subject to revision thereafter to reflect any improvement of the survey method and the system.

2. Analysis of monthly statistics

After the collection of the questionnaire, data input and examination, production statistics are analyzed by the data analysis team on a monthly basis. As monthly production statistics are expected to achieve a high level of accuracy, together with timely publication, analytical work must be performed in an efficient manner. In essence, IIS's analysis is carried out in the following procedures:

To prepare a data table by establishment and commodity;

For an establishment which reports a more than 10% increase or decrease in any data compared to the previous month or the same month a year ago, output is made to the "Warning Log Report: Comparison Error with Pre Month or with Pre Year." The IIS team works together with the IDSS team to contact the establishment by telephone, fax, e-mail or visit in order to determine a reason for the increase or decrease.

If accuracy of data is verified through the work in step above, summary tables by commodity and industry are compared with those covering the previous month and the same month a year ago.

For an industry which shows a notably large increase or decrease in data, the range of change is recorded together with comments on possible causes.

The relationships among production, shipment and raw material inventory need to be carefully watched. For instance, if shipment is relatively small compared to large production in the previous month, production in the current month may decline. On the other hand, the increase in raw material inventory in the previous month leads to the increase in production in the current month. The reverse is also true. These relationships can be applied to the forecasting of production indices in the future.

Information useful for the above analytical work should be collected from economic and business journals and trade magazines, which are the excellent

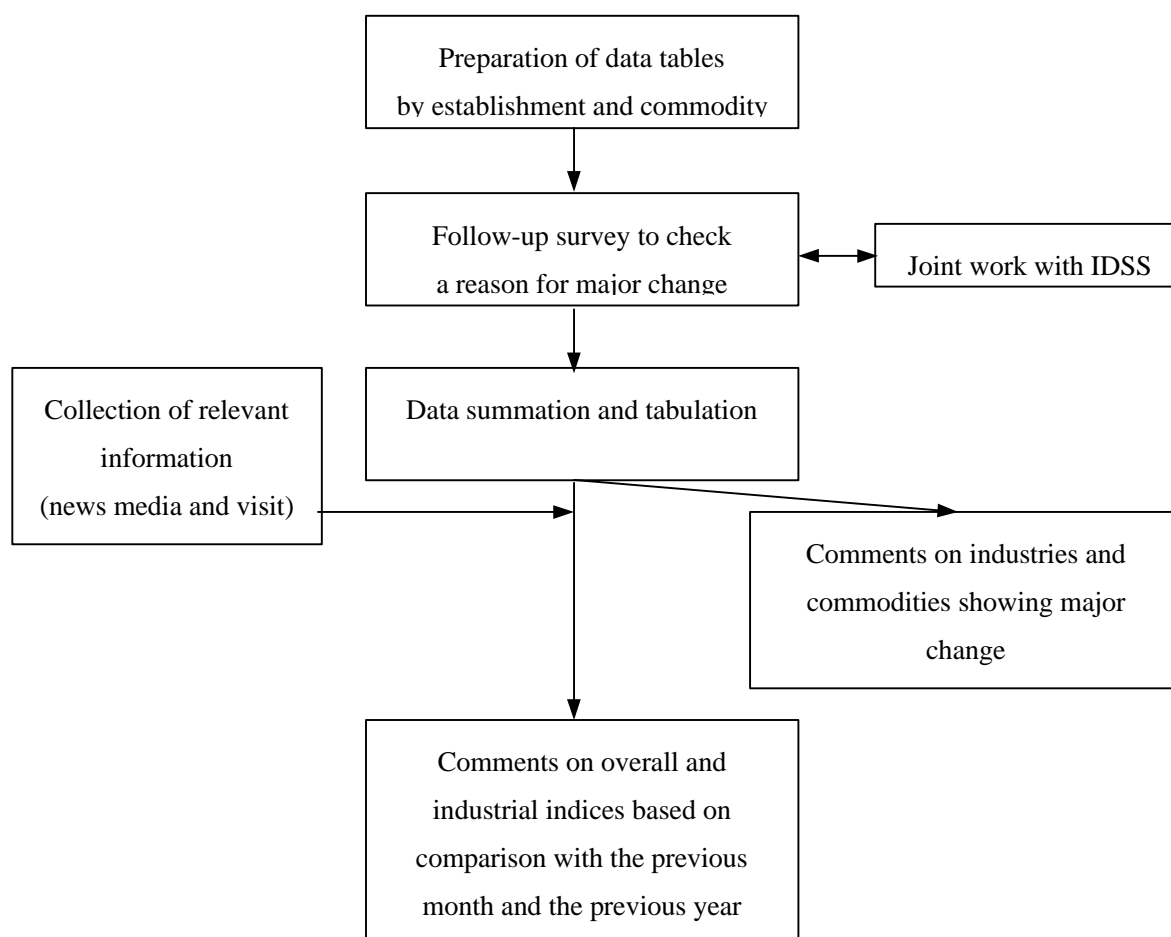
source of updated information on industrial trends including new entries and products, as well as withdrawal and discontinued production.

At the same time, IIC staff collect field information including products by visiting establishments he covers and other organizations.

Also, it is important to establish close communication with respondents and other information sources at surveyed establishments so as to promptly check the reason for a significant change in reported data.

In analyzing monthly statistics, focus should be placed on promptness and clarification of the reason for any significant variation, rather than detailed analysis.

Analytical Work Flow



3. Analysis of Annual Statistics

Monthly statistics are summarized to produce annual production statistics for publication. In the process, efforts are made to improve accuracy of data by adding data on establishments not covered in monthly statistics.

To add data contained in the questionnaire that have not been included in monthly statistics.

To compile new monthly production statistics (additional table by industry and commodity) into a list.

To comment on any significant changes in production statistics by industry and possible factors, together with similar comments on the overall index.

To comment on major events and changes in relevant statistics, industries, domestic and international markets.

As for producer's goods, comment should emphasize the relations with trends in user industries.

Reference should be made to domestic market trends in the comment on products serving the domestic market, and to international market trends in the case of export products. For producer's goods, in particular, the market for end user products (both domestic and international) is important to watch. Comments on the international market should include foreign exchange rates, competitive products and market stability.

As time series data are stored in the long run, the relationship (statistical association) with other indices (e.g., price, employment, consumption, investment) can be established and used as the basis of analysis and forecast of economic trends.

Security Manual

1. General	- 1 -
2. Objective.....	- 1 -
3. Proper Management of Completed Questionnaires	- 1 -
4. Management of Data on Computer.....	- 2 -
5. Management of Computer System	- 2 -
6. Notification to Employees and Compliance.....	- 4 -
7. Violation and Disciplinary Action	- 5 -

Security Manual

1. Introduction

This manual sets forth basic policies and procedures required to ensure secured management of the proposed production statistics. Note that it was prepared in March 2000 to meet the latest requirements for statistical information management, and it should be reviewed and revised from time to time in the future as the survey method and the computer system that constitute the backbone of the production statistics are upgraded.

2. Objective

1. Statistical information management is designed to ensure integrity and security of statistical data and information to be handled by the IIC.
2. This manual defines IIC's responsibility for protection of statistical data and information under its custody from unauthorized disclosure, misuse and/or loss and sets forth basic rules and procedures to be followed by IIC employees in order to ensure proper protection of statistical information they handle.

3. Proper Management of Completed Questionnaires

The forms collected from respondents contain confidential information that requires careful handling and proper protection, including detailed data on production and shipment. Basic rules and procedures for handling, storing and disposal of completed questionnaires are as follows:

Each form returned must be kept at a designated place for a designated period according to the applicable provisions of the Statistical Law.

The form that has been kept for the specified period must be incinerated. The disposal must be acknowledged and certified by IDSS's responsible personnel.

No copy of a completed questionnaire shall be made unless it is required for a specific purpose and is approved in writing by IDSS's responsible personnel, in which case only one copy is made and shall be destroyed by incineration

immediately after the copy has been used for the approved purpose. The disposal must be acknowledged and certified by IDSS's responsible personnel. Completed questionnaires must be filed for each respondent according to year and ISIC four-digit code so as to facilitate access to previous data for comparison. The file containing the returned forms for a responding establishment may be checked out for the day, provided that it is properly recorded on a registry managed by IDSS's responsible personnel. All completed questionnaires that have been kept over a year must be stored in a lockable place.

4. Management of Data on Computer

Data contained in the completed questionnaire are entered to the computer system for storing and processing. These data stored in the computer shall be managed as follows:

In general, access to the computer system must be controlled pursuant to the applicable manual entitled "The Operation Procedure Manual of the New Statistics Process System 15. Maintenance work for the master file – (10) User-ID Master."

No output from the computer system, regardless of format (printout, FD, MO or other electronic file), shall be brought outside the IIC's building, unless specifically approved in writing by IIC's administrator in charge.

All outputs shall be disposed from time to time in a secured manner approved by responsible personnel of IDSS and IIS so as to prevent unauthorized disclosure or misuse.

When computer hardware is upgraded, old hardware shall be destroyed or may be sold or leased back under approval of IDSS's responsible personnel, provided that every data stored on the hardware is erased.

5. Management of Computer System

(Security management of the computer system)

The computer system shall be installed in a place which is properly protected from foreseeable natural disasters, and an adequate disaster recovery plan shall be established to set forth emergency procedures if the system is affected or damaged by a disaster.

The computer system shall be configured to allow only the authorized user to access physically to statistical data stored therein.

The computer system shall be securely protected from computer viruses by installing adequate anti-virus software. See Operation Manual 15. (13) for details.

The computer system shall be equipped with sufficient hardware resources to provide adequate backup in order to prevent loss of statistical data. See Operation Manual 15. (11) for details.

Information stored on the computer system shall be completely erased before disposal.

(Network security)

Before the internal computer network is connected to the Internet, it shall be securely protected from foreseeable attacks by means of firewall and other effective safeguards against any attempt to view, tamper or manipulate statistical data without authorization, with an adequate disaster recovery plan being established to set forth emergency procedures if the network is affected or compromised by such attack.

The IIC network shall be configured to allow remote connection only from an authorized user, accompanied by necessary protection measures against unauthorized access.

A computer system that is exposed to unknown visitors over the Internet, such as the Web site, shall be properly configured to protect privacy of its users.

(Security measures for networked PCs)

An administrator shall be appointed for each PC connected to the internal network.

The administrator of a networked PC shall control access so that it is used by an authorized person only.

The PC connectable to the network shall be used within the IIC under proper security management.

The PC connectable to the network shall not be taken outside or brought into the IIC's premise unless approved according to the applicable procedures.

(Data and database security)

An administrator shall be appointed for the database on statistical data.

The administrator shall determine the degree of importance of statistical data for each file storing such data.

The administrator shall specify a class of users who can view and/or update important statistical data

The administrator shall define the risks related to loss of important statistical data and establish recovery measures if such data are lost.

(Program security)

Any computer program that handles important statistical data shall be managed by the administrator to limit the access right to the authorized user.

Any computer program that handles important statistical data shall be securely managed so that it can be executed and/or modified only by the authorized user.

The administrator of important statistical data shall be responsible for monitoring users' access to statistical data and the operation of a program that updates the database.

(Record)

The administrator of important statistical data shall keep detailed records of users' access to statistical data, database updating, backup and recovery.

(Other security measures related to the computer system)

Any user of important statistical data, who intends to print out, copy to a portable electronic medium or download via the network statistical data stored on the computer system, shall follow the following security measures:

- To allow only the authorized user to access to the copied data; and
- To store the copied data only on the approved equipment.

Statistical data printed out, copied to a portable electronic medium or downloaded via the network shall be disposed in an approved manner after use.

6. Notification to Employees and Compliance

This manual is notified to all employees of IIC.

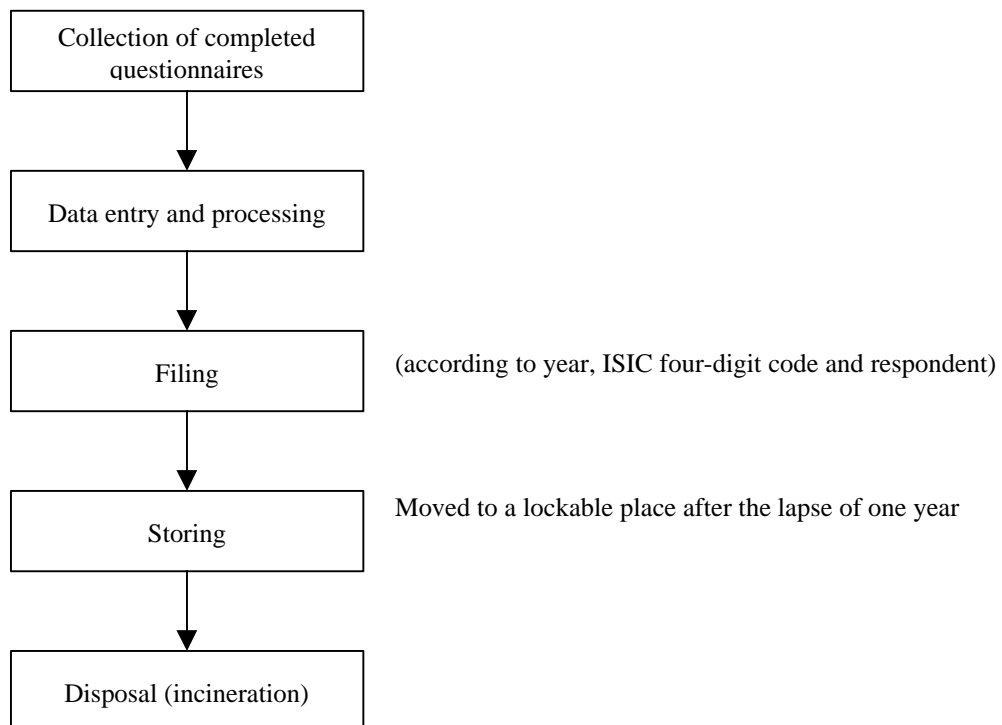
An employee who handles or manages important statistical data shall understand and comply with security policies, rules and procedures set forth in this manual.

7. Violation and Disciplinary Action

The IIC director will notify an employee who violates any of the provisions in this manual of his act with a warning to take corrective measures.

An employee who has intentionally violated or has repeatedly violated despite the previous warning shall be subject to disciplinary action according to the applicable regulations of the MOI.

General Flow of Questionnaire Handling and Control Procedures



Industrial Indices Manual

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Industrial Indices Manual

1. Revision of the Baseline Period and Linkage of Index

Fundamental Matters

(1) Needs for Revision of the Baseline period

1) Removal of bias

The Laspeyres formula enables to aggregate many commodities measured by different units without the effect of price change of each commodity.

$$Q_t = \frac{\sum_{i=1}^n p_{i0} q_{it}}{\sum_{i=1}^n p_{i0} q_{i0}} \times 100$$

Q : General index, q : Quantity, p : Price,

0: Baseline period, t : Compared period,

i : Selected commodities ($i = 1, 2, 3, \dots, n$)

However, it cannot be unrelated with the bias from change of relative price among the commodities.

In general, the relative price of a growing commodity decreases due to the scale economy and, on the other hand, that of a stagnating commodity increases or becomes rigid. If both commodities are evaluated with the fixed price at the baseline period, the growing commodity is overestimated and the stagnating commodity is underestimated, causing an upward bias.

If fixing the baseline period too long, the bias from change of relative price becomes excessive. Therefore, the baseline period should be moved to a later period at an appropriate timing.

2) Selection of the latest major commodities

It is very difficult to cover all of the commodities produced in Thailand with the limitation of manpower and budget. That is the reason why the IIC selects the “major” commodities which represent the general trend of the manufacturing sector.

The major commodity varies according to change of the economic circumstances. Therefore, it is necessary to re-consider the commodity selection for the Industrial Indices at an appropriate timing.

Adding new commodities to the Industrial Indices requires the revision of the baseline period so that all the selected commodities are calculated by an identical baseline period.

(2) Limitation of Linkage of Indices

Linkage of indices enables the statistical users to make analyses on a long time-series of index based on different baseline periods. However, if it is applied for a very long period, say ten years or more, statistical errors might be accumulated since the indices are not based on the same weight. The limitation of the method should be carefully considered when examining the long-term change of the Industrial Indices.

Technical Guideline

(1) Revision of the Baseline period

1) Cycle of revision

Although economic conditions are always changing, it is difficult to revise the baseline period so often, because it takes a lot of labor and time to do.

In Japan, for example, the revision of the baseline period has been executed every sixth year (five-year-cycle), within which the statistical reliability of the weight for the Industrial indices is not ruined, and the works for the revision can be finished with given resources.

Under normal circumstances, there will not be a serious problem if Thailand takes five-year-cycle like Japan for the revision. However, in case such a special situation as the currency crisis happens at the time for the revision by accident, the baseline period should be tentatively set in a normal period.

2) Monthly average

The Industrial Indices of the IIC is a monthly statistics, so the baseline period should be a month. Though, it does not always mean that the baseline period has to be a particular month like “January 2000”, but it can be monthly average in a year, as adopted by the BOT for its MPI.

To adopt the monthly average might be preferable, because it can level the seasonal changes, which is an important advantage before introduction of the seasonal adjustment.

3) Coincidence with other important statistics

In order to assure the consistency among related statistics as a whole, the baseline period of the Industrial Indices should be coincided with the compilation period (year) of other important statistics of Thailand. For instance, Thai Input-Output Table by the NESDB is compiled every sixth year, of which the latest version is 1995 published in 2000.

(2) Linkage of Indices

Supposing that there are two index series (A and B) based on different baseline periods as shown below, they cannot be observed continuously without linking to each other by some method.

(Index series-A --- Baseline period: 1990)

Aug 1999	Sep	Oct	Nov	Dec	Jan 2000	Feb
.....	105.3	102.9	108.7	106.1 (a)		

(Index series-B --- Baseline period: 1995)

Aug 1999	Sep	Oct	Nov	Dec	Jan 2000	Feb
				97.7 (b)	100.5

The old index series-A (the baseline period is 1990) ends in December 1999 with 106.1. On the other hand, the new index series-B (the baseline period is 1995) starts from January 2000 with 100.5, but traces back to December 1999 (= 97.7). Thus, the two series are overlapping in December 1999, and this is a very important point for the linkage of indices.

The ratio of the series-B to the series-A as of December 1999 is calculated as follows:

$$(b) / (a) = 97.7 / 106.1 = 0.921 \quad \text{--- (c)}$$

By multiplying the whole series-A by the above-calculated ratio (c), the figures of both series are identical with each other in December 1999, and the series-A is linked with B as one continuous index series, as shown below.

(Index series-A after multiplied by the ratio (c))

Aug 1999	Sep	Oct	Nov	Dec	Jan 2000	Feb
.....	97.0	94.8	100.1	97.7		

(Index series-B)

Aug 1999	Sep	Oct	Nov	Dec	Jan 2000	Feb
				97.7	100.5

If some industries are newly added to the index calculation concurrently with the revision of the baseline period, it is not appropriate to apply the linkage method as it is explained above, because the share of “weight” remarkably changes among selected industries. Accordingly, in this case, the old index series need to be re-calculated on the basis of the new weight in advance of the linkage.

The method explained here is the most convenient one for the linkage of indices, but if it is applied to a relatively long period, say ten years or more, statistical discrepancies might be accumulated. Therefore, the limitation of the method should carefully be considered when making an analysis on the long-term change in the Industrial Indices.

2. Index Integration for the “Index of Manufacturing”

Fundamental Matters

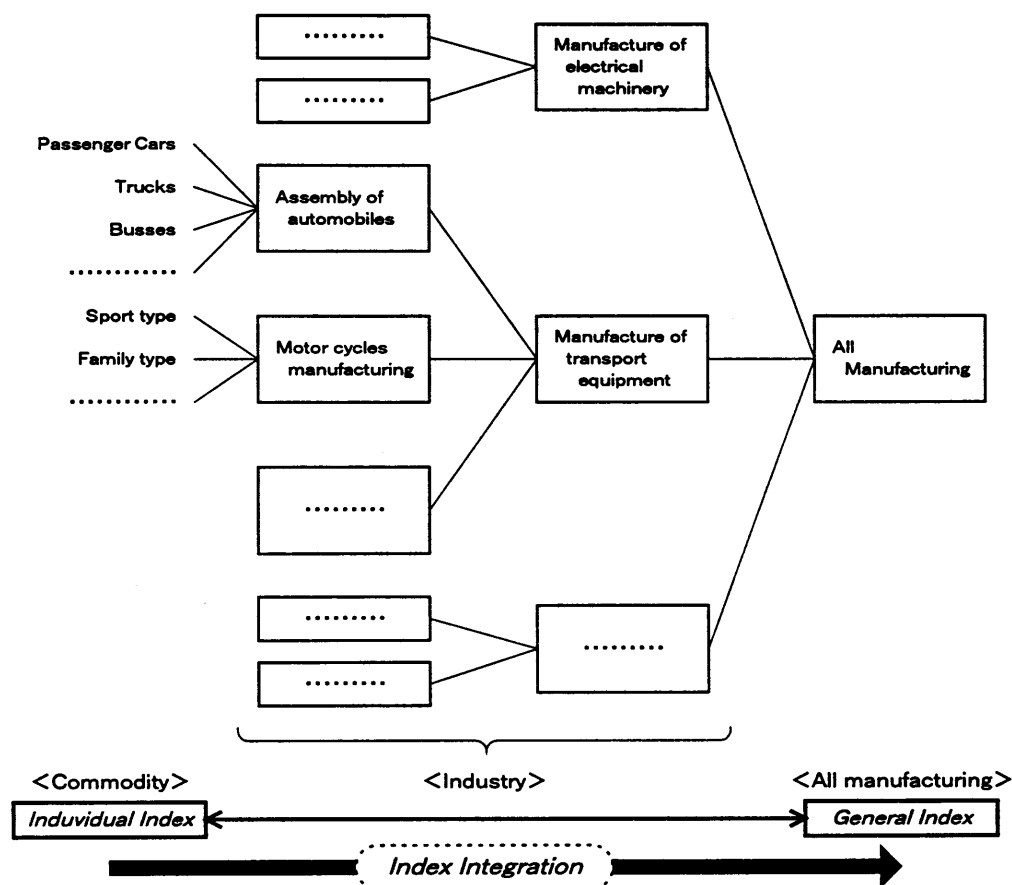
(1) Individual Index and General Index (= “Index of Manufacturing”)

From the viewpoint of the “industrial classification”, the Industrial Indices can be distinguished into two types: the individual index and the general index.

The individual index indicates the trend of each selected “commodity”, which is the most detailed category of industrial classification. On the other hand, the general index indicates the trend of a wider category like a particular “industry” or “all manufacturing”.

The general index is derived from integration of the individual indices for different commodities (Figure 2.1).

Figure 2.1 Industrial Classification and Index Integration



The index that corresponds to the “all manufacturing” shall be called “**Index of Manufacturing**” as it is the most general one.

(2) Two Methods for Index Integration

1) Total Value Addition Method

The Total Value Addition Method calculates the Index of Manufacturing faithfully to the Laspeyres formula. Firstly it multiplies the quantity by the unit price of the baseline period for each commodity, and then it totals all the value of commodities.

2) Weighted Average Method

On the other hand, the Weighted Average Method calculates the individual index on a quantity basis for each commodity first, and then aggregates the individual indices using the “weight” of each commodity.

Formulas of above two methods are as shown below. While the Total Value Addition Method can be expressed by the Laspeyres formula itself, the Weighted Average Method is transformed from the Laspeyres formula, which means that results from both methods are theoretically identical to each other.

$$Q_t = \frac{\sum_{i=1}^n p_{i0} q_{it}}{\sum_{i=1}^n p_{i0} q_{i0}} \times 100 \quad \text{..... Total Value Addition Method}$$

(The Laspeyres formula)

$$= \frac{\sum_{i=1}^n p_{i0} q_{i0} \times \left(\frac{q_{it}}{q_{i0}} \times 100 \right)}{\sum_{i=1}^n p_{i0} q_{i0}} = \sum_{i=1}^n \left(\frac{p_{i0} q_{i0}}{\sum_{i=1}^n p_{i0} q_{i0}} \times \left(\frac{q_{it}}{q_{i0}} \times 100 \right) \right) \quad \text{..... Weighted Average Method}$$

Weight for commodity i
 ↓
Individual index for commodity i
 (quantity basis)
 ↑

Q : Index of Manufacturing, q : Quantity,
 p : Price, 0: Baseline period, t : Compared period,
 i : Selected commodities ($i = 1, 2, 3, \dots, n$)

In the formula of the Weighted Average Method, $\frac{P_{i0}q_{i0}}{\sum_{i=1}^n P_{i0}q_{i0}}$ stands for the share of

each commodity in terms of value at the baseline period, which is called “weight” and can be expressed by $\frac{w_{i0}}{\sum_{i=1}^n w_{i0}}$. The “ $w_{i0}(= p_{i0}q_{i0})$ ” is called “standard value for the

weight” as it is the basic value for the calculation of weight. On the other hand, $\left(\frac{q_{it}}{q_{i0}} \times 100\right)$ is the “individual index” as it is the ratio of the quantity of each

commodity at the compared period to that at the baseline period.

While the calculation results from the Total Value Addition Method and the Weighted Average Method are theoretically identical to each other, there are differences between them in some points as shown in Table 2.1.

Table 2.1 Comparison of the “Total Value Addition Method” and the “Weighted Average Method”

	Total Value Addition Method	Weighted Average Method
Data required	<ul style="list-style-type: none"> - Quantity at the baseline period - Quantity at the compared period - Unit price at the baseline period 	<ul style="list-style-type: none"> - Quantity at the baseline period - Quantity at the compared period - Weight at the baseline period
Theoretical basis	- The Laspeyres formula	- The Laspeyres formula
Formula	$Q_t = \frac{\sum_{i=1}^n P_{i0}q_{it}}{\sum_{i=1}^n P_{i0}q_{i0}} \times 100$	$Q_t = \sum_{i=1}^n \left(\frac{P_{i0}q_{i0}}{\sum_{i=1}^n P_{i0}q_{i0}} \times \left(\frac{q_{it}}{q_{i0}} \times 100 \right) \right)$
Property	<ul style="list-style-type: none"> - Very faithful to the Laspeyres formula. - Calculation process is a little complicated compared with the Weighted Average Method. 	<ul style="list-style-type: none"> - Calculation process is simpler than the Total Value Addition Method. - Therefore, more suitable for the actual use for index compilation.
Application to the computer system	- Adopted for the pilot computer system developed in the Phase I.	- Adopted for the new computer system developed in the Phase II.

The advantage of the Weighted Average Method is that its calculation process is simpler than the Total Value Addition Method and, therefore, it is more suitable for the actual use for index compilation.

Technical Guideline

(1) Formulas for the Individual Index

Formulas for the individual index of the 6 kinds of indices that the IIC calculates are as follows.

1) Production Index

$$\frac{q_{it}}{q_{i0}} \times 100$$

q : Quantity (of production),
 0 : Baseline period, t : Compared period,
 i : Selected commodities ($i = 1, 2, 3, \dots, n$)

2) Shipment Index

Formula is the same as the Production Index.

3) Finished-goods Inventory Index

Formula is the same as the Production Index.

4) Finished-goods Inventory Index

$$\frac{q_{it}^I / q_{it}^S}{q_{i0}^I / q_{i0}^S} \times 100 = \frac{r_{it}}{r_{i0}} \times 100$$

q^I : Quantity of inventory, q^S : Quantity of shipment,
 r : Ratio of inventory to shipment

5) Capacity Utilization Index

$$\frac{q_{it}^P / q_{it}^C}{q_{i0}^P / q_{i0}^C} \times 100 = \frac{cu_{it}}{cu_{i0}} \times 100$$

q^P : Quantity of production, q^C : Quantity of capacity,
 cu : Capacity utilization ratio

6) Labor Productivity Index

$$\frac{v_{it}^P / l_{it}}{v_{i0}^P / l_{i0}} \times 100 = \frac{lp_{it}}{lp_{i0}} \times 100$$

v^P : Value of production, l : Labor input,

lp : Labor productivity

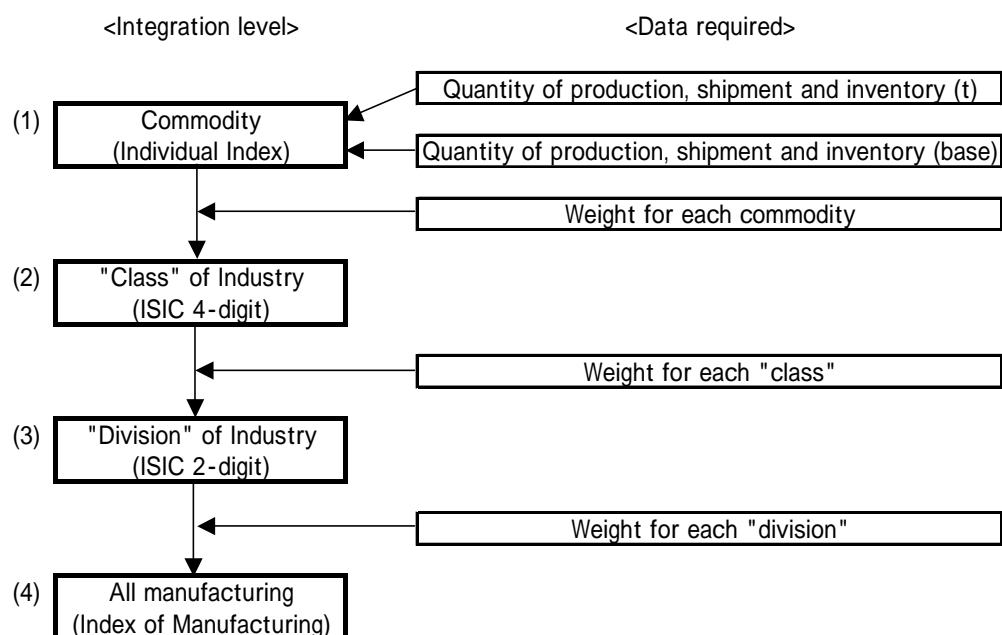
(2) Integration Levels and Data Required

The Industrial Indices of the IIC has three integration levels: Individual Index, Index of ISIC 4-digit, 2-digit, and Index of Manufacturing.

The integration levels and required data are as shown in Figure 2.2.

Figure 2.2 Integration Levels and Data Required

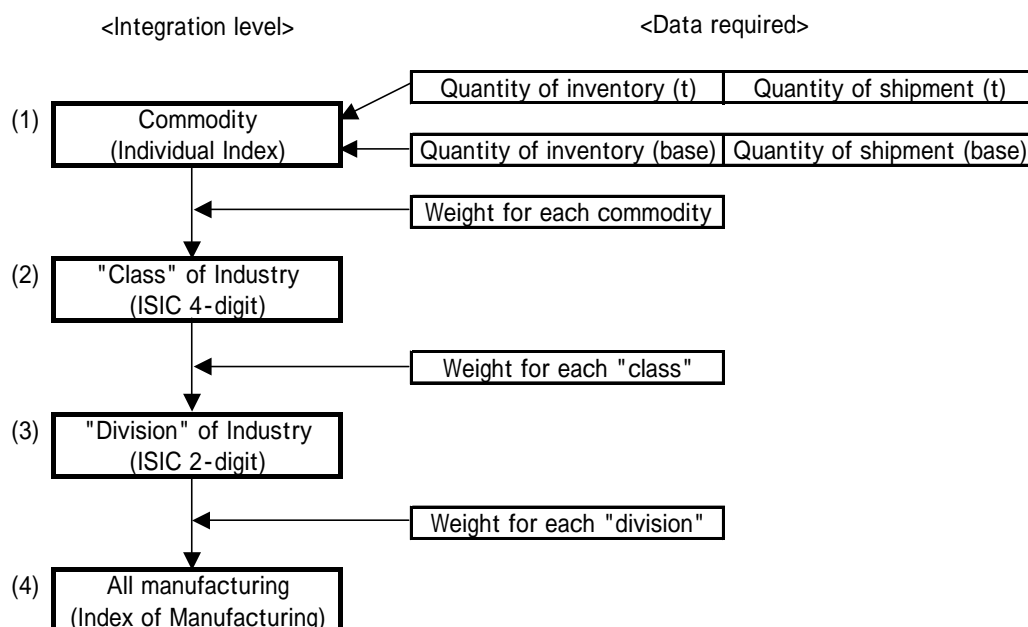
1) Production Index, Shipment Index and Finished-goods Inventory Index



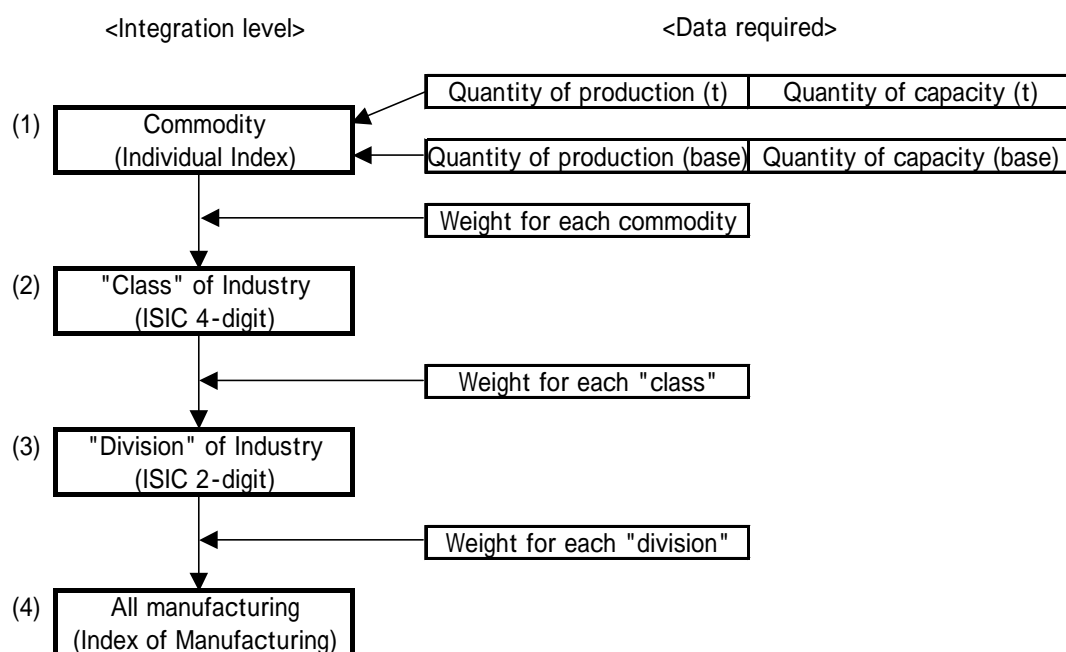
(To be continued to the next page.)

Figure 2.2 Integration Levels and Data Required (continued)

2) Inventory Ratio Index



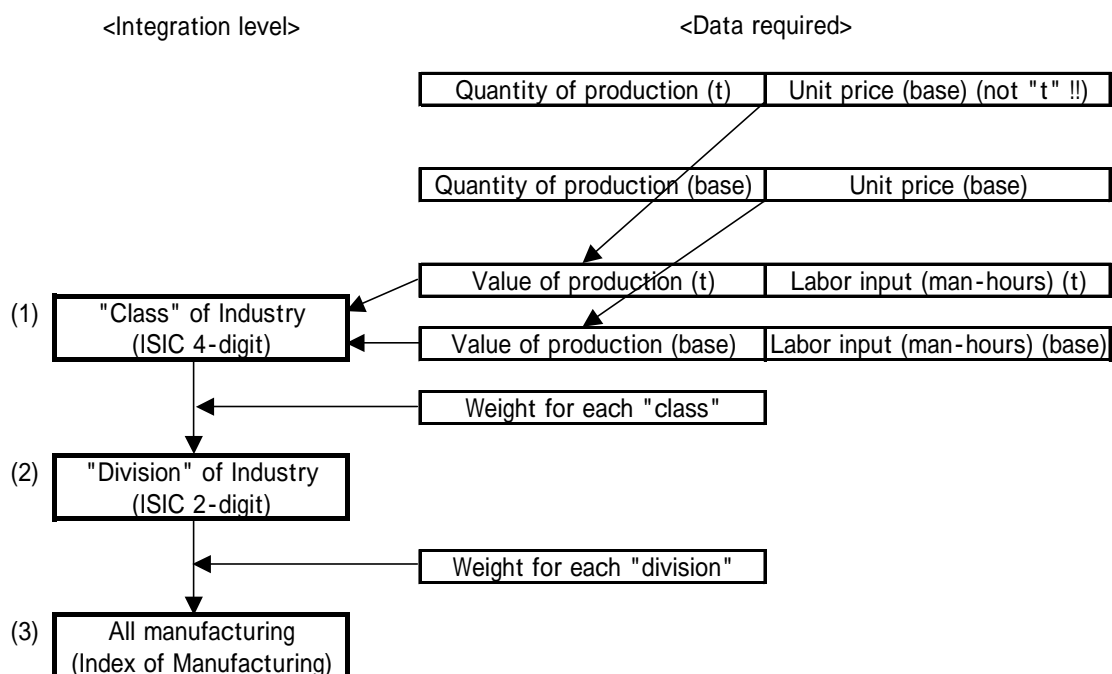
3) Capacity Utilization Index



(To be continued to the next page.)

Figure 2.2 Integration Levels and Data Required (continued)

4) Labor Productivity Index



(3) Calculation Process of Index Integration

Although the index integration is executed by the computer system, it is very important to understand the process of index integration.

The following is the calculation process to integrate the individual indices into the index at the level of ISIC 4-digit.

1) Sample data

Supposing that the IIC obtained the data on each question item as shown in Table 2.2.

2) Calculation Process of index integration

By using the data in Table 2.2, the index integration is to be executed as described after the table.

Table 2.2 Sample Data for Index Integration

- Finished Goods (Quantity & Value)

Questionnaire Code	Commodity	Weight	Establishment	Beginning Inventory	Production	Receipts	Shipment			Month-end Inventory	c) Shipment (value)	Unit Price = c / (a + b)
							a) Sales	b) Export	Others			
1512-01	010 Tuna	5.0	1	100 (80)	50 (40)	60 (48)	15 (12)	20 (16)	25 (20)	150 (120)	5,000 (4,000)	142.86 (178.57)
			2	10 (20)	5 (10)	6 (12)	2 (4)	2 (4)	3 (6)	14 (28)	450 (900)	112.50 (112.50)
			3	20 (30)	10 (15)	14 (21)	8 (12)	6 (9)	5 (7.5)	25 (37.5)	900 (1,350)	64.29 (64.29)
	020 Sardine	4.0	1	200 (160)	100 (80)	120 (96)	30 (24)	40 (32)	50 (40)	300 (240)	6,000 (4,800)	85.71 (85.71)
			2	30 (20)	15 (30)	18 (36)	6 (12)	6 (12)	9 (18)	42 (84)	760 (1,520)	63.33 (63.33)
			3	250 (375)	125 (187)	150 (225)	37.5 (57)	50 (60)	62.5 (70)	375 (600)	7,500 (11,000)	85.71 (94.02)
	030 Prawn	3.0	1	300 (200)	150 (300)	180 (150)	45 (80)	60 (100)	75 (150)	450 (320)	7,000 (6,000)	66.67 (33.33)
			2	120 (150)	60 (80)	72 (60)	18 (30)	24 (40)	30 (35)	180 (185)	3,400 (3,700)	80.95 (52.86)
			3	600 (500)	300 (200)	360 (300)	90 (50)	120 (100)	150 (120)	900 (730)	15,000 (15,000)	71.43 (100.00)

- Labor (Quantity)

Questionnaire Code	Commodity	Weight	Establishment	Labor Input for the survey Commodities
1512-01	010 Workers	-	1	100 (120)
			2	50 (80)
			3	80 (90)
	020 Hours	-	1	8 (8)
			2	7 (7)
			3	9 (8)
	030 Days	-	1	20 (20)
			2	19 (20)
			3	22 (20)

- Raw Materials (Quantity)

Questionnaire Code	Commodity	Weight	Establishment	Month-end Inventory
1512-01	010 Tuna	-	1	60 (80)
			2	20 (35)
			3	40 (50)
	020 Sardine	-	1	100 (100)
			2	60 (70)
			3	250 (220)
	030 Prawn	-	1	220 (150)
			2	85 (50)
			3	450 (300)

- Production Capacity (Quantity)

Questionnaire Code	Commodity	Weight	Establishment	Monthly Capacity
1512-01	010 Ton	5.0+4.0 = 9.0	1	490 (400)
			2	60 (80)
			3	370 (100)
	020 Kg	3.0	1	280 (200)
			2	180 (120)
			3	770 (300)

Note : The figures in parentheses are those at the base period.

Production Index at the level of ISIC 4-digit

$$= \left(\frac{W_{i0}}{W_i} \times \left(\frac{q_{it}}{q_{i0}} \right) \right) \times 100 \quad ; q = \text{Quantity of Production}$$

$$= \left(\frac{5}{5+4+3} \times \frac{50+5+10}{40+10+15} + \frac{4}{5+4+3} \times \frac{100+15+125}{80+30+187} + \frac{3}{5+4+3} \times \frac{150+60+300}{300+80+200} \right) \times 100$$

Weight for
Individual index
Commodity 020
Commodity 030

Commodity 010
for commodity 010

↓

Index for

Aggregation Range 5

Shipment Index at the level of ISIC 4-digit

$$= \left(\frac{W_{i0}}{W_i} \times \left(\frac{q_{it}}{q_{i0}} \right) \right) \times 100 \quad ; q = \text{Quantity of Shipment (Sales + Export)}$$

$$= \left(\frac{5}{5+4+3} \times \frac{(15+2+8) + (20+2+6)}{(12+4+12) + (16+4+9)} + \frac{4}{5+4+3} \times \frac{(30+6+37.5) + (40+6+50)}{(24+12+57) + (32+12+60)} + \frac{3}{5+4+3} \times \frac{\overset{\text{Sales}}{\downarrow} (45+18+90) + \overset{\text{Export}}{\downarrow} (60+24+120)}{\overset{\text{Sales}}{\downarrow} (80+30+50) + \overset{\text{Export}}{\downarrow} (100+40+100)} \right) \times 100$$

Weight for
Sales
Export
Commodity 020
Commodity 030

Commodity 010
Individual index for Commodity 010

Finished- goods Inventory Index at the level of ISIC 4-digit

$$= \left(\frac{W_{i0}}{W_{i0}} \times \left(\frac{q_{it}}{q_{i0}} \right) \right) \times 100 \quad ; q = \text{Quantity of Month End Inventory}$$

$$= \left(\frac{5}{5+4+3} \times \frac{150+14+25}{120+28+37.5} + \frac{4}{5+4+3} \times \frac{300+42+375}{240+84+600} + \frac{3}{5+4+3} \times \frac{450+180+900}{320+185+730} \right) \times 100$$

Inventory Ratio Index at the level of ISIC 4-digit

$$= \left(\frac{W_{i0}}{W_{i0}} \times \left(\frac{q^I_{it} / q^S_{it}}{q^I_{i0} / q^S_{i0}} \right) \right) \times 100 \quad ; q^I = \text{Quantity of Month End Inventory}$$

$$q^S = \text{Quantity of Shipment (Sales + Export)}$$

$$= \underbrace{\frac{5}{5+4+3}}_{\text{Weight for}} \times \underbrace{\frac{150+14+25}{120+28+37.5}}_{\text{Inventory}} / \left\{ \underbrace{\frac{(15+2+8)}{(12+4+12)}}_{\text{Sales}} + \underbrace{\frac{(20+2+6)}{(16+4+9)}}_{\text{Export}} \right\} \begin{matrix} \leftarrow \text{this month} \\ \leftarrow \text{Base period} \end{matrix}$$

Commodity 010

Individual index for Commodity 010

$$+ \frac{4}{5+4+3} \times \frac{(300+42+375)}{(240+84+600)} / \left\{ \frac{(30+6+37.5)}{(24+12+57)} + \frac{(40+6+50)}{(32+12+60)} \right\}$$

$$+ \frac{3}{5+4+3} \times \frac{(450+180+900)}{(320+185+730)} / \left\{ \frac{(45+18+90)}{(80+30+50)} + \frac{(60+24+120)}{(100+40+100)} \right\}$$

Labor Productivity Index at the level of ISIC 4-digit

$$\begin{aligned}
 &= \frac{\left(\frac{V_{it}^P}{l_{et}} \right)}{\left(\frac{V_{i0}^P}{l_{e0}} \right)} ; V^P = \text{Value of Production} = (\text{Unit price}) \times (\text{Quantity of Production}) \\
 &\quad l = \text{Labor input} = (\text{Number of workers}) \times (\text{Hours}) \times (\text{Days}) \\
 &\quad * e = \text{establishment} \quad * i = \text{commodity} \\
 &= \frac{\left(\frac{\text{Unit Price}_{i0} \times q_{it}}{\text{Workers}_t \times \text{Hours}_t \times \text{Days}_t} \right)}{\left(\frac{\text{Unit Price}_{i0} \times q_{i0}}{\text{Workers}_0 \times \text{Hours}_0 \times \text{Days}_0} \right)} \\
 &= \frac{\frac{(50 \times 178.57 + 5 \times 112.50 + 10 \times 64.29 + \dots + 300.00 \times 100.0)}{(100 \times 8 \times 20 + 50 \times 7 \times 19 + 80 \times 9 \times 22)}}{\frac{(40 \times 178.57 + 10 \times 112.50 + 15 \times 64.29 + \dots + 200.00 \times 100.0)}{(120 \times 8 \times 20 + 80 \times 7 \times 20 + 90 \times 8 \times 20)}}
 \end{aligned}$$

Capacity Utilization Index at the level of ISIC 4-digit

$$\begin{aligned}
 &= \frac{\left(\frac{W_{j0}}{W_{j0}} \times \left(\frac{q_{jt}^P / q_{jt}^C}{q_{j0}^P / q_{j0}^C} \right) \right)}{\left(\frac{q_{j0}^P / q_{j0}^C}{q_{j0}^P / q_{j0}^C} \right)} ; q^P = \text{Quantity of Production} \\
 &\quad q^C = \text{Capacity} \\
 &= \frac{5+4}{5+4+3} \times \frac{\left\{ \frac{(50+5+10) + (100+15+125)}{(40+10+15) + (80+30+187)} \right\} / (490+60+370)}{\left\{ \frac{(40+10+15) + (80+30+187)}{(300+80+200)} \right\} / (200+120+300)} \\
 &\quad \begin{array}{ccc} \uparrow & \uparrow & \uparrow \\ \text{commodity 010} & \text{commodity 020} & \text{capacity for commodity 010 \& 020} \end{array} \\
 &+ \frac{3}{5+4+3} \times \frac{(150+60+300) / (280+180+770)}{(300+80+200) / (200+120+300)}
 \end{aligned}$$

3. Calculation of the Weight

Fundamental Matters

Kinds of Weight in Accordance with the Index Items

To calculate the Index of Manufacturing for each index item based on the Weighted Average Method, the weight at the baseline period is necessary as explained in above 2. Weighting standards differ in type in accordance with the index items and they should be prepared based on the weighting standards shown in Table 3.1.

Table 3.1 Weighting Standards by Index Items

Index items	Weighting standards
a) Basic indices	
1) Production Index	a) Value-added b) Gross production value
2) Shipment Index	Shipment value
3) Finished-goods Inventory Index	Finished-goods inventory value
4) Inventory Ratio Index	Finished-goods inventory value
b) Other indices	
1) Production Capacity Index	Estimated value-added based on capacity (*1)
2) Capacity Utilization Index	Value-added
3) Labor Input Index	--- (*2)
4) Labor Productivity Index	Value-added
5) Raw Material Consumption Index	Raw material consumption value
6) Raw Material Inventory Index	Raw material inventory value
7) Raw Material Inventory Ratio Index	Raw material inventory value

*1 Estimated value-added based on capacity

= (Value-added per unit by commodity) * (Capacity by commodity)

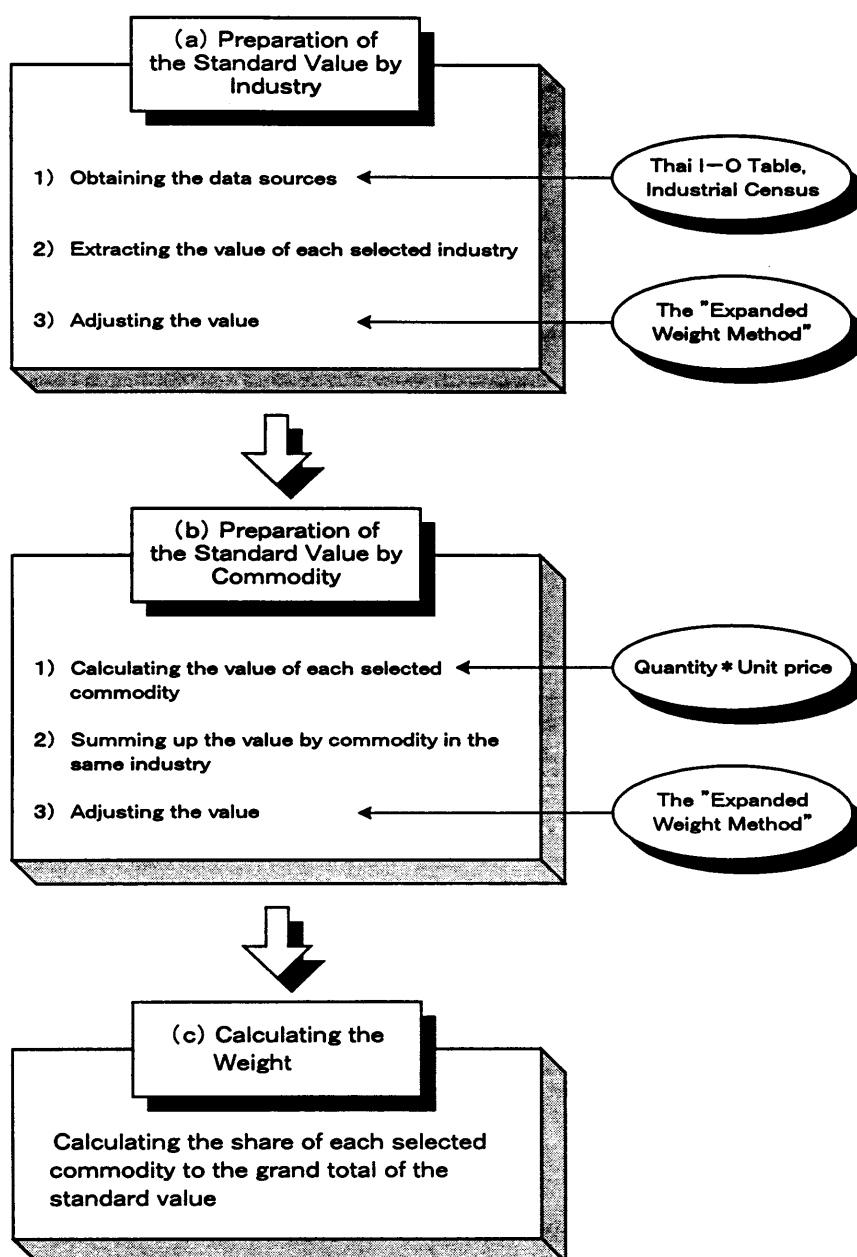
*2 Weight is not necessary for the Labor Input Index since the unit of labor input is identical for all selected commodities (= man-hours).

Technical Guideline

(1) Basic Procedures of Weight Calculation

The weight should reflect the relative largeness among selected commodities in the total value of the weighting standard. To secure that, the weight calculation is required to follow the basic procedures shown in Figure 3.1.

Figure 3.1 Basic Procedures of Weight Calculation



(2) Process of Weight Calculation

a) Preparation of the standard value for the weight by industry

The “standard value” means the figure in terms of value for weight calculation.

In general, the point of time for the standard value should be the same as the baseline period of the Industrial Indices. Accordingly, the standard value should be re-calculated concurrently when the baseline period is revised.

Firstly, the standard value by “industry” at the ISIC 4-digit is to be prepared according to the following process.

1) Obtaining the data sources

In Thailand, the standard value by industry can be obtained from the two sources shown in Table 3.2.

The Industrial Census and the Thai Input-Output Tables have advantages and disadvantages respectively. The IIC should use both of them so that it could figure out more precise standard value.

Table 3.2 Data Sources for the Standard Value by Industry

Sources	Frequency	Remarks
Industrial Census (NSO)	Unknown	- Based on the ISIC. - Covering all the weighting standards. - Published not periodically.
Thai Input-Output Table (NESDB)	Every six years	- Based on the TSIC (*). - Only the gross production value and the value-added. - Five-year-lag.

* Thai Standard of Industrial Classification.

2) Extracting the value of each selected industry

The standard value of the industries selected for the Industrial Indices is extracted from the data sources.

3) Adjusting the value

The value of non-selected industries is distributed to the selected industries based on the Expanded Weight Method, which is explained in the next b).

b) Preparation of the standard value for the weight by commodity

Secondly, the standard value by “commodity” is to be prepared according to the following process.

1) Calculating the value of each selected commodity

The standard value of the commodities selected for the Industrial Indices is calculated based on the formula below.

$$\text{Standard value} = \text{Quantity} * \text{Unit price} \quad \text{--- (1)}$$

The unit price is derived from the quantity and the value of shipment obtained by the IIC’s Current Survey of Production based on the formula below.

$$\text{Unit price} = \text{Shipment value} / \text{Shipment quantity}$$

2) Summing up the value by commodity in the same industry

After calculating the standard value by commodity using the formula (1), the value of the commodities which are classified into the same industry (= ISIC 4-digit) is summed up.

3) Adjusting the value based on the Expanded Weight Method

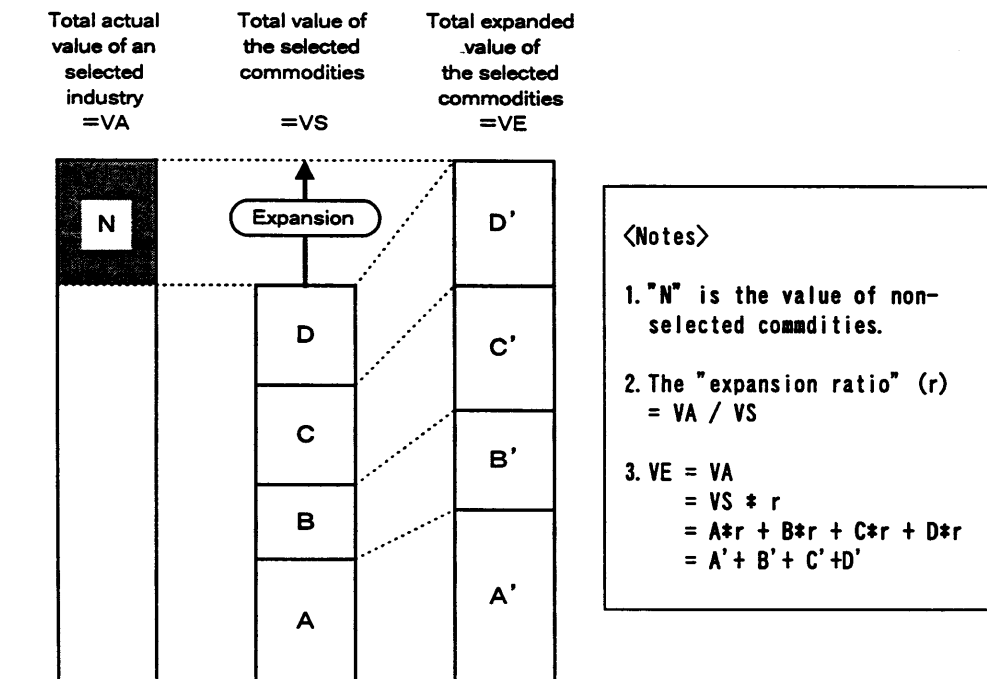
The total value of a selected industry that is calculated in above 2) is usually smaller than the actual value of the industry that is extracted in above a)-2), because all the existing commodities are not selected from the industry by the Current Survey of Production.

Accordingly, the total value from 2) should be expanded to equal the actual value from a)-2) in order to maintain the relative largeness among the selected industries.

Such an adjustment is to be executed as explained in Figure 3.2, where the total value of a selected industry is multiplied by a constant “expansion ratio”. Applying this way, the value of non-selected commodities can be distributed proportionally to the selected commodities.

If the expansion is not executed, the total weight of an industry that has more selected commodities will be excessively estimated to the other industries, ruining the consistency of relative largeness.

**Figure 3.2 Expansion of the Standard Value by Commodity
in a Selected Industry**



c) Calculation of the weight

Finally, once the standard value of all selected commodities completed, the weight can be obtained easily by calculating the share (percentage) of each commodity to the grand total of the standard value.

The grand total is to be 10,000 when calculating the share.

A sample of the weight calculation is shown in Annex 1, and the weight for the core 9 industries that consist of the Preliminary Indicators is shown in Annex 2.

4. Adjustment of Gap in Index

Fundamental Matters

(1) Gap in Time Series of the Industrial Indices

Usually, the selection of commodity for the Current Survey of Production is to be changed periodically according to change of the economic circumstances or the needs of statistical users. Definition of a commodity might be also changed with the progress of technology and so on.

Although the Industrial Indices are compiled from data obtained by the Current Survey of Production, the data can have some statistical discontinuity due to the factors as mentioned above. Such discontinuity is called “gap in time series of index”.

Change in the Industrial Indices must not include such a gap but reflect only the actual trend of industrial activity. Therefore, adjustment of the gap of index is required.

(2) Factors of the Gap

1) Change of the scale of the Current Survey of Production

The Current Survey of Production has some criteria for the selection of surveyed establishment such as “establishments with more than 20 employee”, “highly ranked establishments occupying the 70% portion of the total production” or so. If the criteria are changed, there will be the gap of index.

2) Including omitted establishments

When some important establishments that should have been surveyed are omitted for some reason, if those omitted are newly added into the survey, there will be the gap of index.

3) Changing the definition of a survey commodity

Expanding or reducing the range of definition for a commodity is a typical example of this type of adjustment. For example, a commodity produced through a complex process is difficult to be divided into the finished goods and the intermediate goods. If some of intermediate goods are newly included in a finished goods, it causes the gap of index.

Technical Guideline

Adjustment of the Gap by the “Link Coefficient”

In case the gap of index is found in an individual index, it should be adjusted by multiplying the series of absolute figure (not index) before/after the gap by a constant value called “link coefficient” to remove the discontinuity.

Main methods for calculation the link coefficient are as shown below.

Assume that the adjustment of the gap is executed for the linkage between December and January, since the gap happens due to the three “factors” mentioned above.

1) When changing the scale of the Current Survey of Production

If the criterion for establishment selection is revised in December from “establishments with more than 20 employee” to “establishments with more than 30 employee”, which means cutting off the surveyed establishment, the link coefficient (*l*) is calculated as follows.

$$l = \frac{(AF \text{ without cut off of Dec})}{(AF \text{ without cut off of Dec}) - (AF \text{ with cut off of Dec})}$$

AF: Absolute figure

Adjusted absolute figure after the gap

= Non-adjusted absolute figure after the gap * *l*

2) In case of including omitted establishments

If some omitted important establishments are newly covered by the survey in January, that means a sudden addition of the surveyed establishment. In this case, the link coefficient is calculated as follows.

$$l = \frac{(AF \text{ without addition of Jan}) - (AF \text{ with addition of Jan})}{(AF \text{ without addition of Jan})}$$

Adjusted absolute figure after the gap

= Non-adjusted absolute figure after the gap * *l*

3) When changing the definition of a surveyed commodity

If definition of a commodity is changed, the link coefficient is calculated as follows.

$$l = \frac{AF \text{ without definition change of Dec}}{AF \text{ with definition change of Dec}}$$

or,

$$l = \frac{AF \text{ without definition change of Jan}}{AF \text{ with definition change of Jan}}$$

Adjusted absolute figure after the gap

= Non-adjusted absolute figure after the gap * l

In this case, the provider of the Industrial Indices has to conduct surveys based on the new definition of the commodity of December or based on the old definition of January in order to derive the link coefficient using the above formulas.

5. Seasonal Adjustment of the Industrial Indices

Fundamentals

(1) Notion of Seasonal Adjustment

In general, any change of economic time series including the Industrial Indices consists of the following 4 factors (Figure 5.1).

- | |
|---|
| <ol style="list-style-type: none">1. Trend factor2. Cyclical factor3. Seasonal factor4. Irregular factor |
|---|

“Trend factor” means a continuous upward or downward effect to the original time series.

“Cyclical factor” means the undulation repeated every 5-10 years, which corresponds to the business cycle.

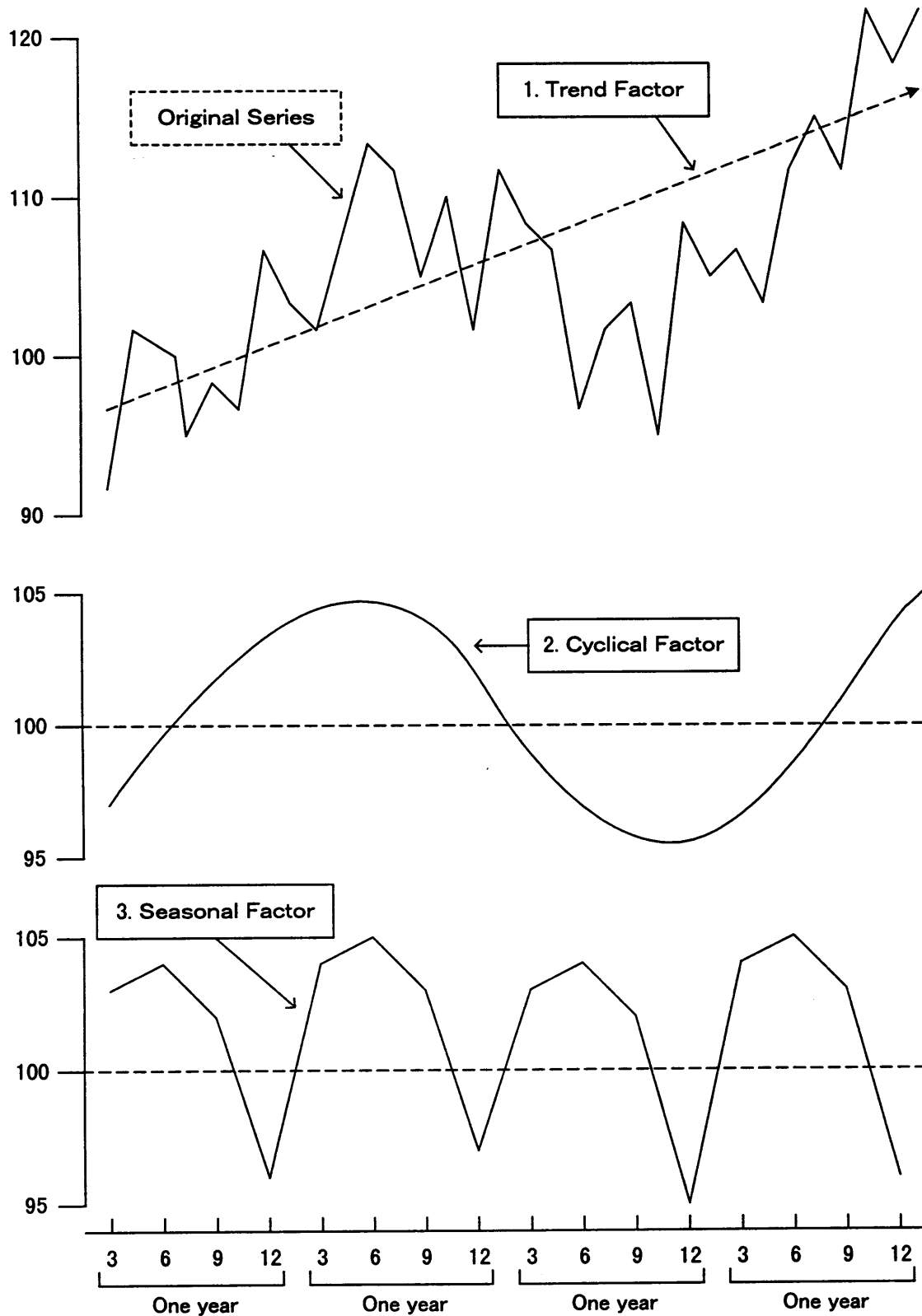
“Seasonal factor” represents a regular change repeated every year.

And “irregular factor” is the unexpected fluctuation which occurs in a very short period. It can be thought to be the residuum after the above-mentioned three factors.

The Industrial Indices can be used in many ways as one of the major measures for economic analyses. Particularly, it is used very often for research and study on the short-term economic trend on a monthly or quarterly basis.

To remove the seasonal factor, which is repeated in one-year-cycle, from the original series is convenient in many cases for the study on the short-term economic trend. In other words, when evaluating the short-term economy, a very plain and indisputable change factor should be adjusted in advance in order to focus on peculiar change factor in each period.

Figure 5.1 Change Factors of Time Series



(2) Methods of Seasonal Adjustment

Among various ways for the seasonal adjustment, major methods are as follows.

1) Comparison with the same month of the previous year

The simplest and most frequently used way of analyzing time series, including the seasonal factor, is to compare with the same month of the previous year.

Before the IIC introduces an official method for seasonal adjustment, this way should be adopted for its analytical works.

2) Dummy variable

In case of a regression analysis using quarterly or monthly time series, the dummy variable is often used to remove the seasonal factor.

For example, when estimating the “consumption” by the “disposable income”, there might be some difference in the pattern of seasonal change between them. In this case, by adding the dummy into the regression as an endogenous (independent) variable, the seasonal factor in both of the consumption and the disposable income can be absorbed into the dummy and the exact relation between them can be grasped.

3) Moving average

The idea behind the use of the moving average is very simple, “the seasonal factor can be removed by averaging the data for one year (4 quarters or 12 months)”.

This method intends to extract the mid-term or long-term trend out of the original time series.

The moving average itself is very simple, but it is a substantial framework of the international standard method for seasonal adjustment “X-12-ARIMA”, which is explained in the next part.

(3) X-12-ARIMA

The X-12-ARIMA was developed by the United States Census Bureau in the middle of the 1990's and has been modified/improved continuously. It is based on the formerly developed method named “X-11”, which was widely adopted in the 1960's and is still a major technique for the seasonal adjustment used throughout the world.

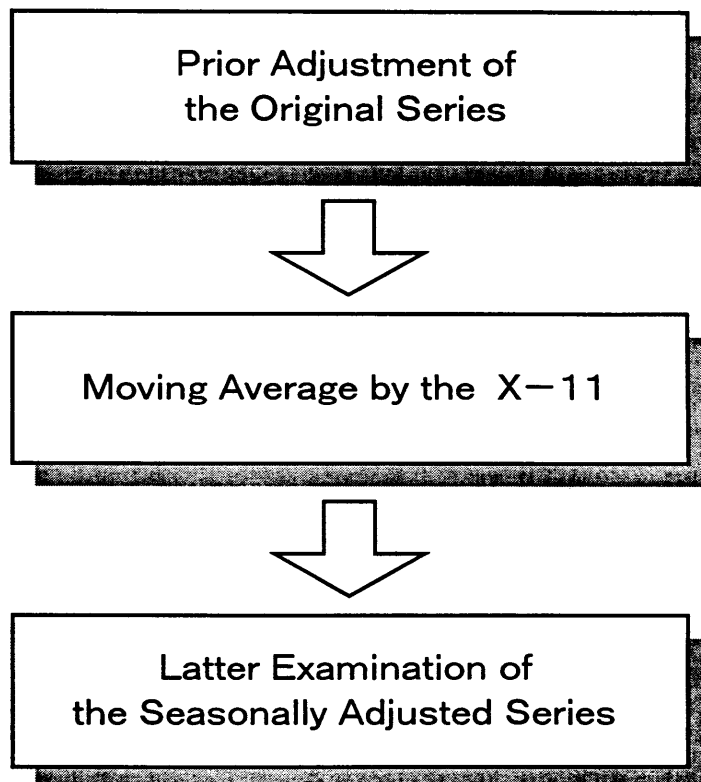
Major characteristics of the X-11 are as follows: 1) many options for selecting the order of calculation according to the purpose of seasonal adjustment, 2) automatic

selection of the order of calculation based on the statistical criteria which is built in the method.

The X-11 is a basic element of the X-12-ARIMA, which mainly implements the moving average, as shown in Figure 5.2. Difference between these two methods is that the X-12-ARIMA has “prior adjustment” and “latter examination” in addition to the X-11.

To execute only the X-11 among the programs of the X-12-ARIMA means that the seasonal adjustment based on the moving average is adapted to the original series without the prior adjustment and the latter examination.

Figure 5.2 Program Composition of the X-12-ARIMA



Technical Guideline

(1) Calculation of the Seasonally Adjusted Index

The seasonally adjusted index can be calculated by following the steps below (Figure 5.3).

1) Preparation of the original series

Original series means the time series of index before seasonal adjustment.

2) Applying the X-12-ARIMA to the original series

The X-12-ARIMA can be applied to the original series by executing computer programs that are provided by the U.S. Census Bureau. Necessary programs and detail explanations can be downloaded for free from the following Internet site of the U.S. Census Bureau.

<http://www.census.gov/srd/www/x12a/>

Data processing in the X-12-ARIMA consists of the following three steps:

1. Prior Adjustment

Decomposing the original series into “Prior-adjusted original series” and the other components including the level shift, abnormal figure, etc.

2. Moving average by the X-11

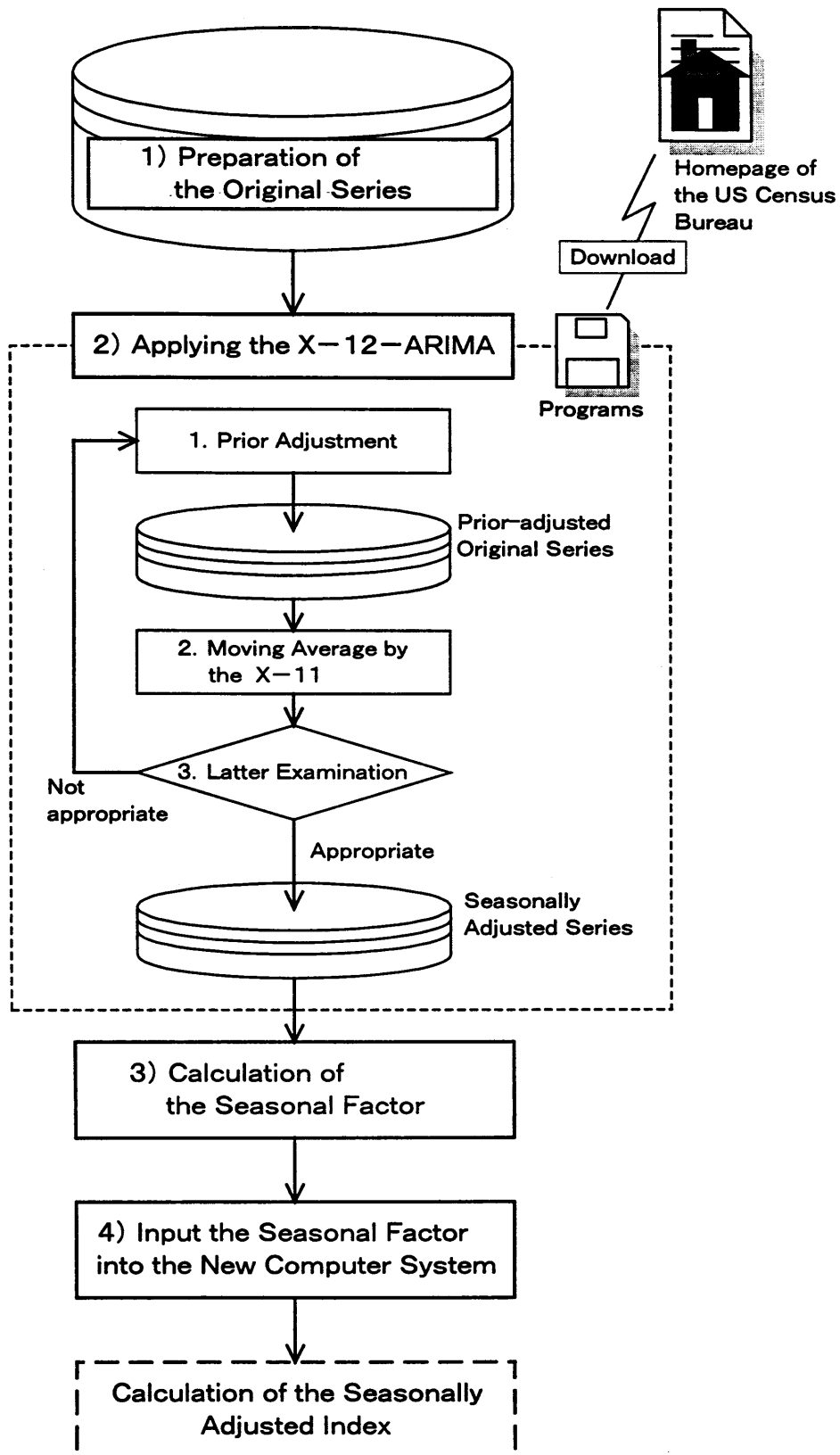
Applying the moving average by X-11 to the prior-adjusted original series obtained in the step 1, in order to derive the seasonally adjusted series.

3. Latter examination

Examining the seasonally adjusted series obtained in the step 2, in terms of accuracy, stability, etc.

If the results of this examination are not desirable, the former step 1 and 2 should be refined until appropriate results are obtained.

Figure 5.3 Process of Seasonal Adjustment



3) Calculation of the seasonal factor

Once both of the original series and the seasonally adjusted series have obtained, the seasonal factor can be derived by the following formula.

$$\text{Seasonal factor} = \frac{\text{Seasonally adjusted series}}{\text{Original series}}$$

4) Input the seasonal factor into the new computer system

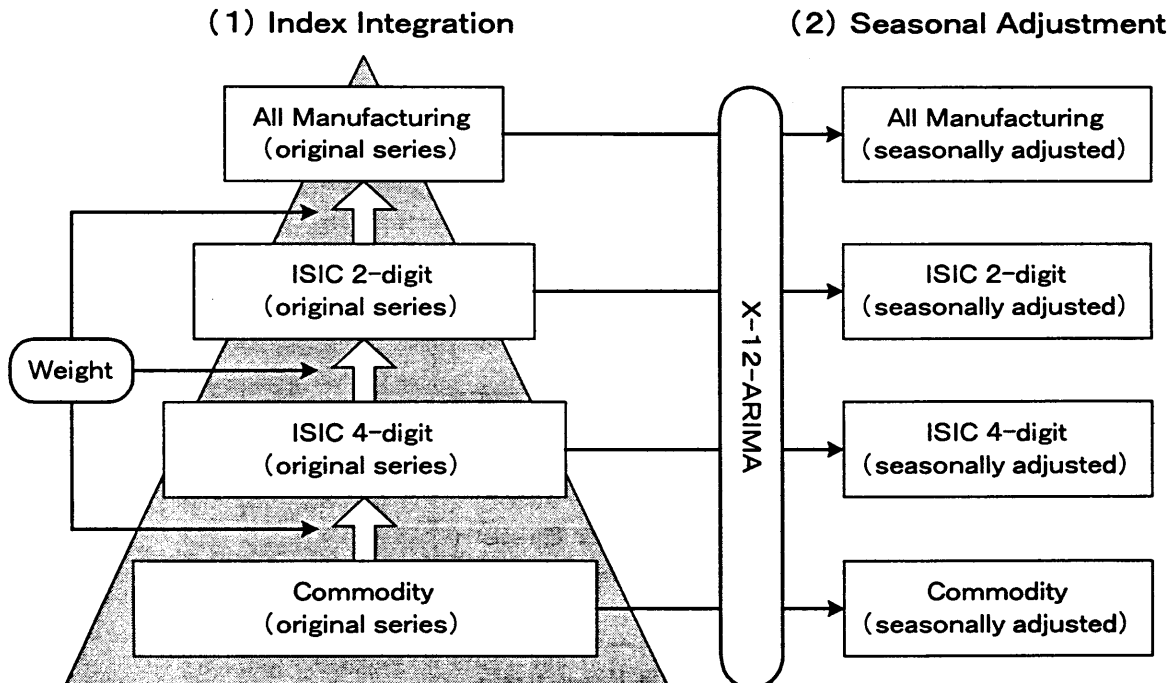
Seasonal factor of the last one year (= last 12 months) is used to calculate the seasonally adjusted index by the new computer system.

The new computer system has a table to hold the seasonal factor for each index item. Once the seasonal factor is input in the system, the seasonally adjusted index can be automatically calculated.

(2) Index Integration and Seasonal Adjustment

Seasonal adjustment should be done after the index integration at the each level of industrial classification, as shown in Figure 5.4.

Figure 5.4 Index Integration and Seasonal Adjustment



(3) Implementation Cycle of Calculating the Seasonal Factor

In principle, the seasonal factor should be re-calculated every time an index of the latest month is added into the time series. If the seasonal factor is re-calculated, the time series of seasonally adjusted index in the past should be also traced and re-calculated at the same time. However, it takes considerable time and effort.

Therefore, the re-calculation of seasonal factor is usually executed once a year at the same time as the annual revision of the Industrial Indices (usually in March every year). In this case, the seasonal factor for the future one year (= 12 month) cannot be known, so it is imperative to tentatively adapt the seasonal factor of the last one year to the future one year.

Annex 1 Sample of the Weight Calculation

Annex 1 Sample of the Weight Calculation

Industry	(1) Canned seafood				(2) Breweries				(3) Spinning				(4) Petroleum				(5) Automobile				(6) Other industries			
		Qty	Price	Value		Qty	Price	Value		Qty	Price	Value		Qty	Price	Value		Qty	Price	Value		Qty	Price	Value
Commodity	Tuna	500	1	500	Beer	200	2	400	Cotton yarn	500	1	500	Gasoline	200	2	400	Passenger car	500	1	500	Other commodities	50	2	100
	Sardine	500	3	1,500	Whisky	50	4	200	Silk yarn	100	3	300	Diesel oil	200	4	800	Light trucks	500	3	1,500				
	Salmon	100	5	500	Sake	50	6	300	Woolen yarn	500	5	2,500	Jet fuel	200	6	1,200	Big trucks	500	5	2,500				
	Prawn	500	7	3,500				Nylon	500	7	3,500	Kerosene	200	8	1,600	Busses	500	7	3,500					
	Crabs	500	9	4,500				Polyester	500	9	4,500	LPG	200	2	400	Tuktuk	100	9	900					
	Oyster	100	1	100				Vinylon	500	1	500	Asphalt	200	4	800									
	Baby clams	500	3	1,500							Naphtha	200	6	1,200										
	Squid	500	5	2,500																				
	Shark fin	100	7	700																				
TOTAL				15,300				900				11,800				6,400				8,900				100

Annex 2 Weight for the Core 9 Industries

Annex 2 WEIGHT FOR THE CORE 10 INDUSTRIES

(Derived from value based on the unit price as of January 1999 which is the baseline period.)

Products	Production Weight	Shipment Weight	Inventory Weight
ISIC : 1512 Processing and preserving of fish and fish products	1,091.3	1,090.8	2,237.3
Canned tuna	916.3	948.5	2,073.5
Canned sardine	175.0	142.3	163.8
ISIC : 1553 Manufacture of malt liquors and malt	349.9	345.6	77.4
Beer	349.9	345.6	77.4
ISIC 1711 : Preparation and spinning of textile fibers; weaving of textiles	1,120.2	1,086.3	2,785.6
Pure cotton yarn	505.5	550.7	2,082.5
Mixed cotton yarn	115.8	104.0	74.0
Pure polyester	203.6	206.1	283.0
Mixed polyester	111.5	93.1	80.0
Other synthetic fibers	98.2	97.4	212.5
Other mixed synthetic fibers	85.6	35.0	53.6
ISIC 1730 : Manufacture of knitted and crocheted fabrics and articles	76.6	75.8	100.8
Men's knitted outwears	37.3	36.4	51.3
Men's knitted underwears	3.8	3.8	5.6
Men's knitted other wears	4.3	4.1	2.9
Women's knitted outwears	11.3	11.4	15.6
Women's knitted underwears	19.9	20.1	25.4
ISIC 1810 : Manufacture of wearing apparel, except fur apparel	723.8	693.6	899.7
Men's woven outwears	385.2	374.4	574.0
Men's woven other wears	9.2	9.0	70.6
Women's woven outwears	276.7	258.1	227.4
Women's underwears	52.7	52.1	27.7
ISIC 2320 : Manufacture of refined petroleum products	1,374.1	1,383.8	820.4
Octane 87	7.7	7.5	10.6
Octane 91	125.7	125.3	117.7
Octane 95 up	259.7	265.5	160.1
High speed diesel oil	555.1	566.1	254.8
Low speed diesel oil	5.3	4.1	8.9
Jet fuel	138.5	145.0	94.5
Kerosene	2.8	2.7	4.8
Light fuel oil	29.9	30.2	12.6
Medium fuel oil	111.9	107.5	62.2
Heavy fuel oil-3	10.1	9.2	4.7
Heavy fuel oil-4	17.2	15.4	10.7
Heavy fuel oil-5	27.7	23.6	50.4
Liquefied petroleum gas (LPG)	38.9	39.0	7.5
Asphalt	19.3	17.7	16.7
Naphtha	24.3	25.0	4.2
ISIC 2694: Manufacture of cement, lime and planster	467.1	483.9	117.6
Portland cement	215.9	273.5	38.6
Mixed cement	113.8	147.3	18.8
Other cement	5.1	6.7	0.7
Clinkers	132.3	56.4	59.5
ISIC 3210: Manufacture of electronic valves and tubes and other electronic components	920.3	934.1	630.4
Cathode ray tubes for color TV	118.8	109.6	108.1
Cathode ray tubes for computers	106.2	101.4	41.9
Transistors	123.0	116.0	78.5
Monolithic integrated circuits	293.3	276.0	195.5
Other integrated circuits	279.0	331.1	206.4
ISIC 3230: Manufacture of TV, radio, sound or video recording and associated goods	832.4	822.4	453.7
Color TV receivers 20 inches and less	577.4	560.5	240.4
Color TV receivers 21 inches and more	121.0	119.2	95.2
Video tape recorders (floor type)	134.0	142.7	118.1
ISIC 3410: Manufacture of motor vehicles	3,044.3	3,083.7	1,877.1
Passenger car (engine capacity 1,800cc and less)	633.9	649.1	403.3
Passenger car (engine capacity 1,801 - 2,400cc)	432.5	453.1	506.4
Passenger car (engine capacity over 2,400 cc) including OPV	107.3	108.0	123.8
1-ton pick up truck (2WD, space cab)	1,870.6	1,873.5	843.6
TOTAL	10,000.0	10,000.0	10,000.0

Dissemination Manual

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2. Internal Procedures for Dissemination •••••	3 -
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Dissemination Manual

1. Preliminary Figure, Revised Figure and Annual Revision

(1) Preliminary and Revised Figures

The Industrial Indices are to be disseminated at the end of every month according to a monthly working cycle shown in Figure 1. The Industrial Indices include two kinds of index figures: the “preliminary figure” and the “revised figure”.

1) Preliminary figure

The preliminary figure of a survey month is calculated from the absolute figures obtained by 15th day of the next month.

2) Preliminary figure

The preliminary figure is re-calculated to obtain the revised figure two months after the survey month.

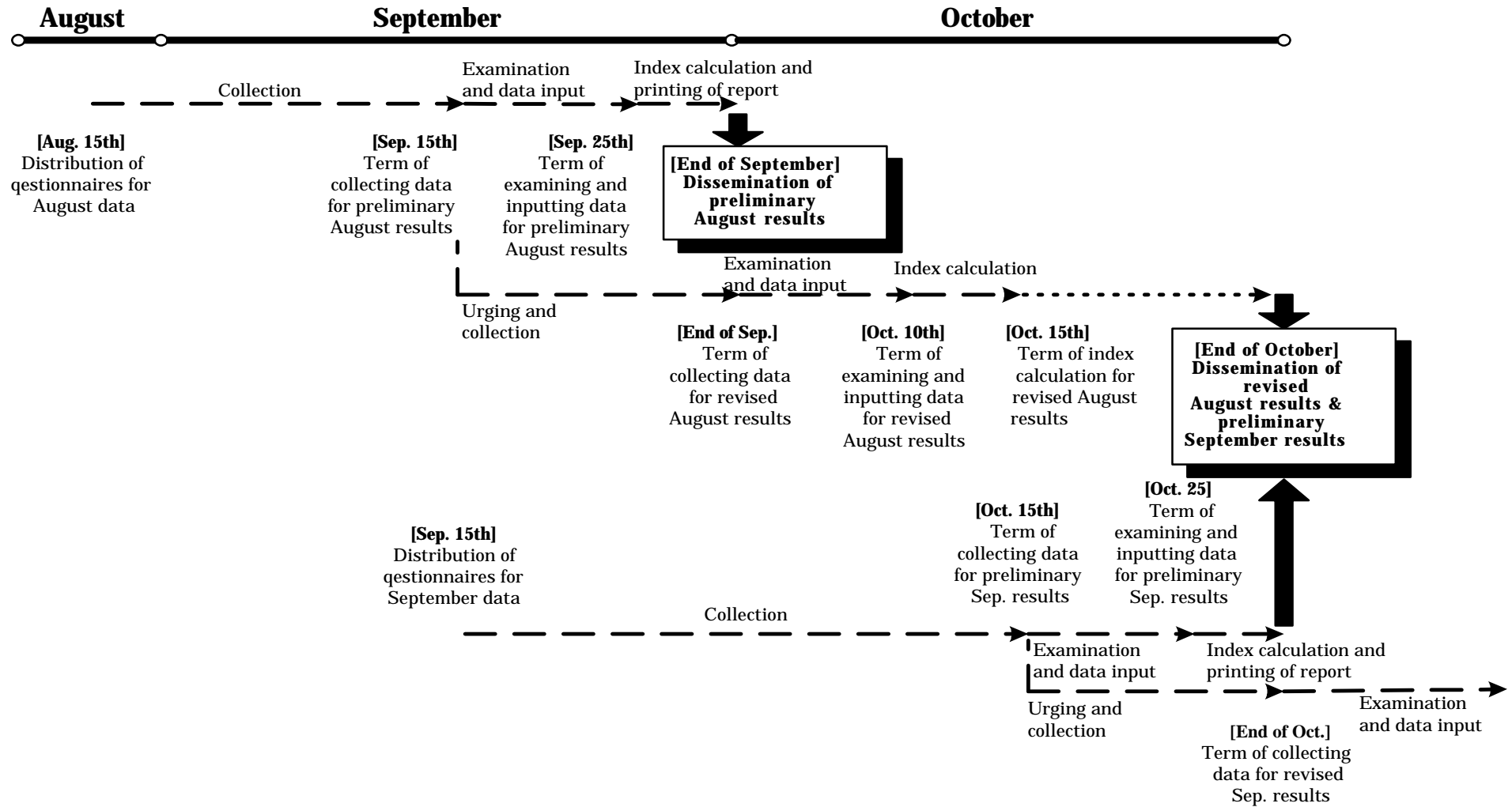
Usually there is a discrepancy between the preliminary and revised figures, because the former includes some estimated figures to compensate for missing figures that have not been found in the collected questionnaire.

(2) Annual Revision

Once the Industrial Indices of twelve months in one year have been completed, the annual revision is made. First of all, the absolute figures of twelve months are inspected and, if necessary, modified. Then, the indices of twelve months are re-calculated based on the modified absolute figures, from which the finally figures of the Industrial Indices are determined

In Japan, the annual revision is made when calculating the index of March every year. It is recommendable that it is at the same timing in Thailand.

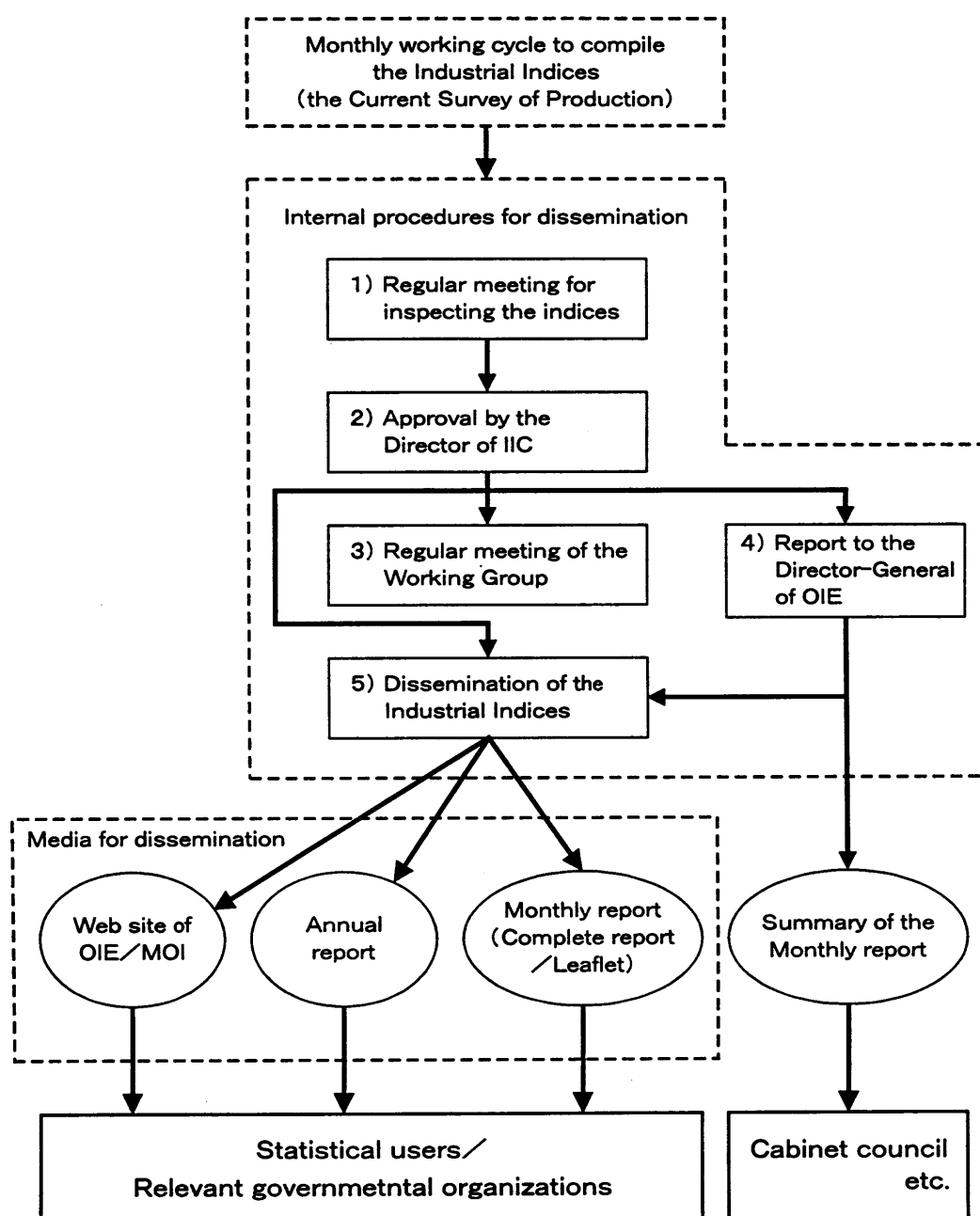
Figure 1 Monthly Working Cycle for the Industrial Indices (Preferable Time Schedule)



2. Internal Procedures for Dissemination

Once dissemination of the Industrial Indices starts, the procedure shown in Figure 2 should be regularly implemented inside the IIC/OIE every month, before releasing the indices.

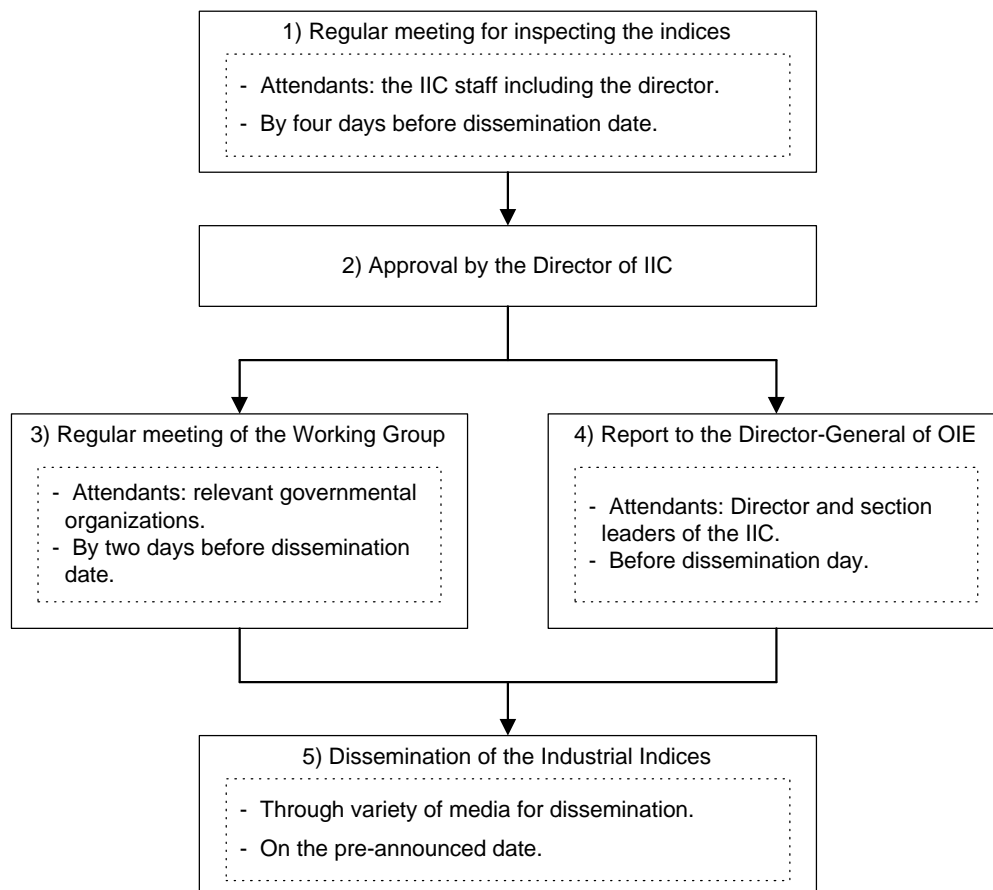
Figure 2 Procedures for Dissemination



(1) Procedures inside the IIC/OIE

See Figure 3.

Figure 3 Procedures before Dissemination inside the IIC/OIE



1) Regular meeting for inspecting the indices inside the IIC

Four days before dissemination date,

- (1) The IIC staff who is responsible for each selected industry/commodity submits reports on the trends in a particular survey month and the significant factor of change in the statistics (the absolute figures and the indices).
- (2) Attendants including the director of the IIC inspect the accuracy of information in the reports.
- (3) After the inspection, the statistics should be corrected immediately in case of any errors.

2) Approval by the Director of IIC

The Director of IIC shall approve the dissemination of index after final inspection, by the monthly regular meeting of the Working Group.

3) Regular meeting of the Working Group

Two days before dissemination date, the following issues should be discussed at the WG meeting.

- General condition of the manufacturing sector in Thailand
- Contribution ratios by industry
- Trends of production, shipment and inventory in the selected industries

At the same time, the Industrial Indices of the IIC and the Manufacturing Production Index (MPI) of the BOT should be compared.

The outline of the Working Group (WG) is as shown in Table 1.

Table 1 Outline of the Working Group

Purpose:	To inspect the monthly report of the Industrial Indices.
Issue:	(1) General condition of the manufacturing sector in Thailand (2) Contribution ratios by industry (3) Trends of production, shipment and inventory in the selected industries (including the comparison of the indices between the IIC and the BOT)
Member:	(4) The IIC (chair organization) (5) Long-term experts from the JICA (6) Bank of Thailand (7) National Economic and Social Development Board (8) National Statistical Office (9) Ministry of Commerce (10) Division II of the OIE
Frequency:	Monthly

4) Report to the Director General of OIE

By the dissemination date, the Director and the section leaders of IIC should report on the Industrial Indices for dissemination and the general condition of the Thai manufacturing sector to the Director General of OIE.

5) Dissemination of the Industrial Indices

After approval by the Director of IIC, the Industrial Indices are disseminated to the public and relevant governmental organizations (mainly the members of the WG) via several media on the pre-announced date.

(The media used for publication are explained in the next part.)

(2) Submission of the summary of index to the Cabinet Council, etc.

Summary of the index for dissemination should be compiled and then submitted to such important meeting of Thai Government as the Cabinet Council, after reported to the Director General of OIE.

3. Media and Contents for Dissemination

(1) Media for Dissemination

1) Reports

- Monthly report
 - Annual report
- { Complete report
Leaflet

2) Web site of the OIE/MOI

This should be revised every month coincidentally with the publication of the monthly report.

(2) Contents for Dissemination

1) Remarks

Simple explanatory notes on the Industrial Indices including such related information as the contact address, etc. --- Annex 1

2) Summary of the Industrial Indices

Explanatory notes in detail including the following items. --- Annex 2

1. Baseline period
2. Industrial classification
3. Selected industries
4. Selected commodities
5. Survey establishments and the basis of index calculation
6. Formulas for index calculation

7. The “Index of Manufacturing” (general index)
 8. Attentions for comparison with the MPI of the BOT
- 3) General condition of the industrial production in Thailand
Comments on the general trend of Thai manufacturing sector based on the Index of Manufacturing. --- Annex 3
 - 4) Contribution ratios to the Index of Manufacturing by industry
Ranking the selected industries in order of the contribution ratio to the Index of Manufacturing so that the remarkably growing/stagnating industries are clarified.
--- Annex 4
 - 5) Trends of production, shipment and inventory in the selected industries
Charts and comments on the trend of each selected industry. The charts should show all the items of index including the basic indices. --- Annex 5
 - 6) Others (tables of the details of indices)
 1. Indices by industry and commodity --- Annex 6
 2. Index of Manufacturing (integrated index) --- Annex 7
- (3) Correspondence between the Media and the Contents
As shown in Table 2 below.

Table 2 Contents by Media

	Monthly report		Annual report	Web site
	Complete	Leaflet		
1) Remarks				
2) Summary				
3) General condition				
4) Contribution ratios				
5) Trends in industries				
6) Others				

4. Recipients of the Monthly Report

- a) Ministry of Industry
 - 1) Office of Permanent Secretary
 - Office of Cane and Sugar Board
 - Foreign Relations Division
 - Office of Planning and Cooperation
 - 2) Department of Mineral Resources
 - Mineral Fuels Division
 - Technical and Planning Division
 - Petroleum Industry Division
 - 3) Department of Industrial Works
 - Policy and Planning Group
 - One-stop Service Center
 - 4) Department of Industrial Promotion
 - Bureau of Industrial Promotion Policy and Planning
 - Bureau of Industrial Promotion Administrator
 - 5) Thai Industrial Standards Institute
 - International Relations Division
 - Promotion and Training Division
- b) Relevant governmental agencies
 - 1) National Economic and Social Development Board
 - National Accounts Division
 - Economic Analysis and Project Division
 - 2) Bank of Thailand
 - Economic Research Department
 - 3) Ministry of Commerce
 - Bureau of Trade and Economic Indices

- 4) National Statistical Office
 - Economic Statistics Division

- c) Cooperative establishments

Annex 1 Remarks for Dissemination

Annex 1 Remarks for Dissemination

REMARKS

1. This book contains the indices called “*Preliminary Indicators (PI)*” on industrial production, shipment and inventory in Thailand, which are based on the data obtained by the Monthly Current Survey of Production that is conducted by the Industrial Information Center (IIC) of the Ministry of Industry (MOI) since January 1999.
2. The indices in this book should be treated as the first step towards the full-scale industrial indices, as the coverage of the Current Survey of Production is not enough at present in terms of the number of industries and establishments.
3. The indices include the Production Index, the Shipment Index, the Finished-goods Inventory Index, and the Inventory Ratio Index. Each index item is calculated at the both levels of “commodity” and “industry”. In addition, the integrated index, which is called “Index of Manufacturing”, is calculated based on the selected 10 major industries in Thailand.
4. The baseline period of index is January 1999, and the indices are not seasonally adjusted.
5. This book will be published every month, containing the preliminary figures of the latest survey month and the revised figures of the previous survey months.
6. Please contact the following division for more information:
Industrial Information Center (IIC),
Office of Industrial Economics, Ministry of Industry
Rama VI Road, Rajathevee, Bangkok 10400, Thailand
Telephone: 02-202-4347-50 / Fax: 02-202-4346, 4356
(URL) <http://www.oie.go.th/>
7. For citation, please write as follows.
“Monthly report of industrial indices (Preliminary Indicators), Industrial Information Center, Ministry of Industry.”

<Publication Schedule>

The next report will be on June 9th, 2000.

Annex 2 Summary of the Industrial Indices

Annex 2 Summary of the Industrial Indices

SUMMARY OF THE “*PRELIMINARY INDICATORS (PI)*”

1. Baseline period

The baseline period of the “*Preliminary Indicators (PI)*” is January 1999 when the Current Survey of Production by the IIC started.

2. Industrial classification

Industrial classification is based on the 4-digit (“Class” level) of the International Standard Industrial Classification (ISIC), revision 3.

3. Selected industries for the PI

10 industries shown in Table 1 were selected as they are major ones in the manufacturing sector of Thailand according to the share in total production value and total employment. The 10 industries cover around 30% of the total value-added of manufacturing sector.

Table 1: Selected Industries for the PI and Coverage

Selected industries (based on the ISIC 4-digit classification)	Coverage, %
1512: <i>Processing and preserving of fish and fish products</i>	2.34
1553: <i>Manufacture of malt liquors and malt</i>	2.53
1711: <i>Preparation and spinning of textile fibers; weaving of textiles</i>	2.69
1730: <i>Manufacture of knitted and crocheted fabrics and articles</i>	0.37
1810: <i>Manufacture of wearing apparel, except fur apparel</i>	2.37
2320: <i>Manufacture of refined petroleum products</i>	3.25
2694: <i>Manufacture of cement, lime and plaster</i>	1.97
3210: <i>Manufacture of electronic valves and tubes and other electronic components</i>	2.34
3230: <i>Manufacture of TV, radio, sound or video recording and associated goods</i>	2.30
3410: <i>Manufacture of motor vehicles</i>	10.43
TOTAL of the selected industries	30.59

Note: Coverage is calculated based on the results of *1997 Industrial Census* by the National Statistical Office (NSO).

4. Selected commodities for the PI

49 commodities were selected for index as shown in Table 2.

Table 2: Selected Commodities for the PI

Selected industries (ISIC 4-digit)	Selected commodities
1512: <i>Processing and preserving of fish and fish products</i>	1) Canned tuna 2) Canned sardine
1553: <i>Manufacture of malt liquors and malt</i>	3) Beer
1711: <i>Preparation and spinning of textile fibers; weaving of textiles</i>	4) Pure cotton yarn 5) Mixed cotton yarn 6) Pure polyester 7) Mixed polyester 8) Other pure synthetic fibers 9) Other mixed synthetic fibers
1730: <i>Manufacture of knitted and crocheted fabrics and articles</i>	10) Men's knitted outwears 11) Men's knitted under wears 12) Men's knitted other wears 13) Women's knitted outwears 14) Women's knitted under wears
1810: <i>Manufacture of wearing apparel, except fur apparel</i>	15) Men's woven outwears 16) Men's woven other wears 17) Women's woven outwears 18) Women's woven under wears
2320: <i>Manufacture of refined petroleum products</i>	19) Octane 87 20) Octane 91 21) Octane 95 up 22) High speed diesel oil 23) Low speed diesel oil 24) Jet fuel 25) Kerosene 26) Light fuel oil 27) Medium fuel oil 28) Heavy fuel oil-3 29) Heavy fuel oil-4 30) Heavy fuel oil-5 31) Liquefied petroleum gas (LPG) 32) Asphalt 33) Naphtha
2694: <i>Manufacture of cement, lime and plaster</i>	34) Portland cement 35) Mixed cement 36) Other cement 37) Clinkers

Table 2: Selected Commodities for the PI (Continued)

Selected industries (ISIC 4-digit)	Selected commodities
3210: <i>Manufacture of electronic valves and tubes and other electronic components</i>	38) Cathode ray tubes for color TV 39) Cathode ray tubes for computers 40) Transistors 41) Monolithic integrated circuits 42) Other Integrated circuits
3230: <i>Manufacture of TV, radio, sound or video recording and associated goods</i>	43) Color TV receivers 20 inches and less 44) Color TV receivers 21 inches and more 45) Video tape recorders (floor type)
3410: <i>Manufacture of motor vehicles</i>	46) Passenger car (engine capacity 1,800 cc and less) 47) Passenger car (engine capacity 1,801-2,400 cc) 48) Passenger car (engine capacity over 2,400 cc) including off-road passenger vehicle (OPV) 49) 1-ton pick up truck (2WD, space cab)

5. Surveyed establishments

Surveyed establishments were selected from the factory registration list of the MOI, in order of the number of employment in each selected industry in order to choose major establishments representing the respective industries in Thailand. The number of surveyed establishments and the share of surveyed establishments in the total employment by industry are shown in Table 3.

Table 3: Number of surveyed establishments and share of survey establishments in the total employment

Selected industries (ISIC 4-digit)	Number of surveyed establishments	Share in the total employment
1512: <i>Processing and preserving of fish and fish products</i>	40	60.6%
1553: <i>Manufacture of malt liquors and malt</i>	8	75.2%
1711: <i>Preparation and spinning of textile fibers; weaving of textiles</i>	54	34.6%
1730: <i>Manufacture of knitted and crocheted fabrics and articles</i>	166	46.4%
1810: <i>Manufacture of wearing apparel, except fur apparel</i>		
2320: <i>Manufacture of refined petroleum products</i>	6	85.1%
2694: <i>Manufacture of cement, lime and plaster</i>	13	49.1%
3210: <i>Manufacture of electronic valves and tubes and other electronic components</i>	57	38.8%
3230: <i>Manufacture of TV, radio, sound or video recording and associated goods</i>	18	14.2%
3410: <i>Manufacture of motor vehicles</i>	15	56.2%
TOTAL	377	---

6. Formulas for index and weights

The indices are calculated by the Laspeyres Formula using fixed weights as of the baseline period, as shown below.

$$Q_t = \sum_{i=1}^n \left(\frac{w_{i0}}{\sum_{i=1}^n w_{i0}} \times \left(\frac{q_{it}}{q_{i0}} \times 100 \right) \right)$$

Weight of commodity i
Individual index of commodity i

- Q : “Index of Manufacturing” (= integrated index)
 q : Quantity
 w : Standard value for weight
 0 : Baseline period
 t : Compared period
 i : Selected commodities ($i = 1, 2, 3, \dots, n$)

In case of the Inventory Ratio Index, the individual index is calculated as follows.

$$R_t = \sum_{i=1}^n \left(\frac{w_{i0}}{\sum_{i=1}^n w_{i0}} \times \left(\frac{r_{it}}{r_{i0}} \times 100 \right) \right), \text{ where } \frac{r_{it}}{r_{i0}} = \frac{q_{it}^I / q_{it}^S}{q_{i0}^I / q_{i0}^S}$$

r : Ratio of inventory to shipment

q^I : Quantity of inventory

q^S : Quantity of shipment

The weights are derived from the sectoral values of gross output, shipment and inventory in the *Report of the 1997 Industrial Census: Whole Kingdom* by the National Statistical Office (NSO).

Weighting standards according to index items are as shown in Table 4.

Table 4: Weighting Standards According to Index Items

Index items	Weighting standards
Production Index	Gross production value
Shipment Index	Shipment value
Finished-goods Inventory Index	Finished-goods inventory value at the end of the baseline period
Inventory Ratio Index	

The weights by industry are as shown in Table 5.

Table 5: Weights by Industry

Selected industries (ISIC 4-digit)	Weights		
	Production	Shipment	Inventory
Processing and preserving of fish	1,091.3	1,090.8	2,237.3
Malt liquors and malt	349.9	345.6	77.4
Spinning of textile fibers	1,120.2	1,086.2	2,785.5
Knitted fabrics and articles	76.5	75.9	100.8
Wearing apparel	723.9	693.7	899.7
Refined petroleum products	1,374.0	1,383.8	815.2
Cement, lime and plaster	467.4	484.1	122.8
Electronic valves and tubes, etc.	920.2	933.8	630.4
TV, radio, sound or video, etc.	832.4	822.5	453.8
Motor vehicles	3,044.3	3,083.6	1,877.1
TOTAL	10,000.0	10,000.0	10,000.0

7. Attentions for comparison with the Manufacturing Production Index (MPI) of the Bank of Thailand (BOT)

Most of the selected 10 industries of the PI are basically common with those covered in the MPI of the BOT.

When comparing the PI with the MPI, the statistical users, who may find some discrepancy between them, need to pay attentions to the following points.

- 1) The selection of the surveyed establishments is not always the same between the PI and the MPI, depending on products.
- 2) All the indices of the PI are calculated based on actual figures that were directly collected from the manufacturing establishments. On the other hand, some indices of the MPI are based on estimated figures from relevant information such as the trade statistics, etc.

Annex 3 General Condition of the Industrial Production in Thailand

Annex 3 General Condition of the Industrial Production in Thailand (Sample)

< Preliminary Figures of the "Preliminary Indicators (PI) " for March 2000 >

For March 2000, production, shipment and inventory index has increased from the previous month as a result of the changes in Automobile Industry, Spinning of textile fibers and TV-radio. It is expected that the production might increase in the coming period because the growth rate of shipment is higher than growth of stocks.

January 1999 = 100, Not seasonally adjusted.

	March 2000	
	Indices (*)	Growth rate to the previous month
Production	163.6	11.3 %
Shipment	165.8	11.8 %
Finished-goods Inventory	121.9	4.3 %
Inventory Ratio	85.5	-2.4 %

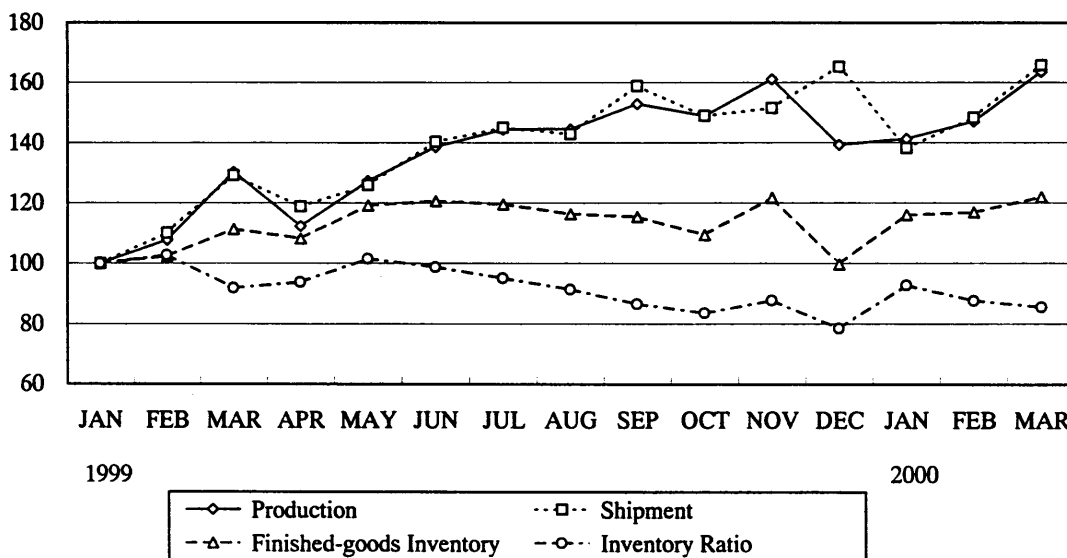
(*) Tentative "Index of Manufacturing" based on the selected 10 industries.

< Changes of the Indices on Production, Shipment and Finished-goods Inventory >

January 1999 = 100, Not seasonally adjusted.

Indices	1999												2000		
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
Production	100.0	107.7	130.2	112.3	127.3	138.6	144.3	144.4	152.9	148.8	161.1	139.2	141.2	147.0	163.6
Shipment	100.0	110.1	129.2	118.8	125.9	140.3	145.0	142.8	158.9	148.9	151.5	165.3	138.2	148.3	165.8
Finished-goods Inventory	100.0	102.4	111.3	108.3	119.1	120.6	119.6	116.4	115.4	109.4	121.7	99.7	116.1	116.9	121.9
Inventory Ratio	100.0	102.8	91.9	93.8	101.5	98.8	95.1	91.4	86.6	83.6	87.8	78.5	92.8	87.6	85.5

Note : Figures of March 2000 are preliminary.



Annex 4 Contribution Rations by Industry to the Index of Manufacturing

Annex 4 Contribution Ratios by Industry to the Index of Manufacturing

Industries which mainly contributed to the change in the Index of Manufacturing (Sample)

--- March 2000 ---

Industries which mainly affected to the change in the Index of Manufacturing	Contribution ratio (%)
Growth rate of the "Index of Manufacturing Production" to the previous month (%)	(11.3)
<Positive contribution>	
1) ISIC 3410: Manufacture of motor vehicles	61.0
2) ISIC 1711: Preparation and spinning of textile fibers and weaving of textiles	17.9
<Negative contribution>	
1) ISIC 2320: Manufacture of refined petroleum products	-3.5
2) ISIC 3230: Manufacture of TV, radio, sound or video recording	-0.4
Growth rate of the "Index of Manufacturing Shipment" to the previous month (%)	(11.8)
<Positive contribution>	
1) ISIC 3410: Manufacture of motor vehicles	58.9
2) ISIC 1711: Preparation and spinning of textile fibers and weaving of textiles	15.2
<Negative contribution>	
1) ISIC 3230: Manufacture of TV, radio, sound or video recording	-3.1
Growth rate of the "Index of Manufacturing Inventory" to the previous month (%)	(4.3)
<Positive contribution>	
1) ISIC 3410: Manufacture of motor vehicles	62.0
2) ISIC 3230: Manufacture of TV, radio, sound or video recording	31.8
<Negative contribution>	
1) ISIC 2320: Manufacture of refined petroleum products	-14.5
2) ISIC 1711: Preparation and spinning of textile fibers and weaving of textiles	-13.5

Note : "Contribution Ratio" indicates to what extent (percentage) each industry contributes to the growth rate of the Index of Manufacturing.

Annex 5 Trends of Production, Shipment and Inventory in the Selected Industries (Sample)

Annex 5 Trends of Production, Shipment and Inventory in the Selected Industries (Sample)

< Trend of Industrial Indices on "Processing and Preserving of Fish and Fish Products" >

Year : 2000

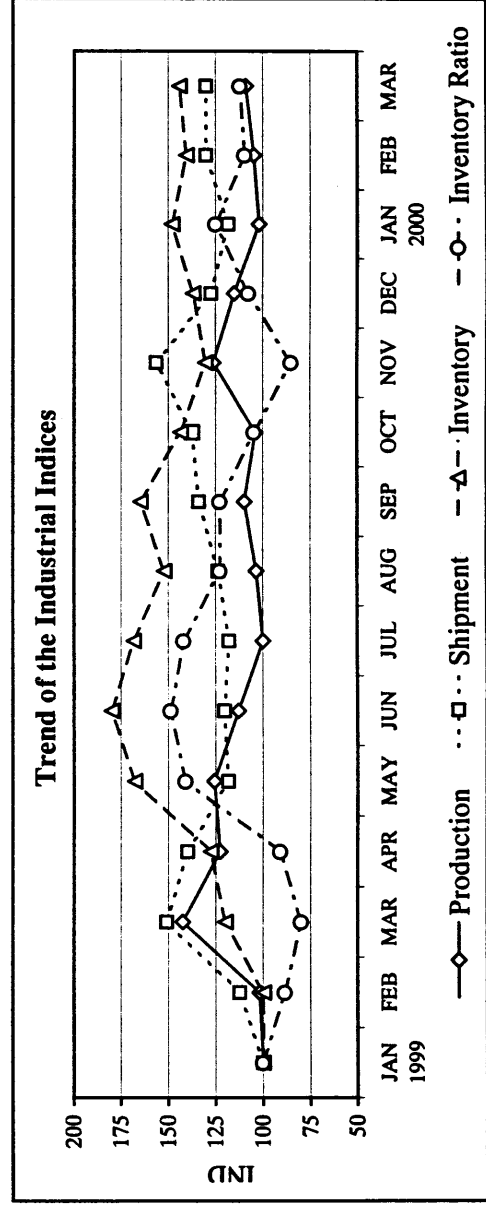
Month : March

ISIC : 1512 (Processing and Preserving of Fish and Fish Products)

January 1999 = 100, not seasonally adjusted.

Indices	1999												2000		
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
Production	100.0	101.9	142.6	122.7	125.6	112.9	100.0	103.6	109.9	104.1	126.2	115.0	102.1	104.7	109.0
Shipment	100.0	112.3	150.9	139.9	118.3	120.3	117.9	123.6	134.0	137.5	156.4	127.3	118.3	130.0	130.1
Inventory	100.0	99.7	120.0	127.6	167.6	179.9	168.3	152.2	164.7	143.6	130.4	136.8	147.9	140.3	144.1
Inventory Ratio	100.0	88.5	79.8	90.8	140.9	148.6	141.8	122.7	122.7	104.6	84.9	107.4	124.9	109.5	112.0

Change from the Previous Month (%)	1999												2000		
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
Production	---	1.9	39.9	-14.0	2.4	-10.1	-11.4	3.6	6.1	-5.3	21.2	-8.9	-11.2	2.5	4.1
Shipment	---	12.3	34.4	-7.3	-15.4	1.7	-2.0	4.8	8.4	2.6	13.7	-18.6	-7.1	9.9	0.1
Inventory	---	-0.3	20.4	6.3	31.3	7.3	-6.4	-9.6	8.2	-12.8	-9.2	4.9	8.1	-5.1	2.7
Inventory Ratio	---	-11.5	-9.8	13.8	55.2	5.5	-4.6	-13.5	0.0	-14.8	-18.8	26.5	16.3	-12.3	2.3



* Comments on the trend of each selected industry.

Annex 6 Indices by Industry and Commodity

Annex 6 INDICES BY INDUSTRY AND COMMODITY (Sample)

< PRODUCTION INDEX >

(January 1999 = 100, Not seasonally adjusted)

(P) Preliminary figure

Products	Weight	1999												2000		
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	(P) Mar
ISIC 1512: Processing and preserving of fish and fish products		100.0	101.9	142.6	122.7	125.6	112.9	100.0	103.6	109.9	104.1	126.2	115.0	102.1	104.7	109.0
Canned tuna	916.3	100.0	105.0	149.3	122.4	126.2	112.7	97.2	101.7	105.6	102.1	127.9	116.1	99.3	102.0	103.0
Canned sardine	175.0	100.0	85.8	107.4	124.6	122.3	113.5	114.2	113.8	132.3	114.8	117.1	109.0	117.1	118.6	140.8
ISIC 1553: Manufacture of malt liquors and malt		100.0	96.7	112.7	117.7	91.3	101.0	105.6	101.1	103.0	103.6	117.9	132.4	121.0	110.4	127.3
Beer	349.9	100.0	96.7	112.7	117.7	91.3	101.0	105.6	101.1	103.0	103.6	117.9	132.4	121.0	110.4	127.3
ISIC 1711 : Preparation and spinning of textile fibers; weaving of textiles		100.0	98.5	113.7	110.9	113.6	124.2	126.6	117.4	127.4	124.7	126.5	117.8	124.3	110.0	136.6
Pure cotton yarn	505.5	100.0	95.2	109.5	91.4	106.1	110.3	113.8	117.3	119.7	117.9	130.1	117.6	120.1	109.9	119.9
Mixed cotton yarn	115.8	100.0	115.0	128.4	176.8	149.7	151.8	130.8	135.0	153.6	154.9	142.2	132.9	152.7	79.0	259.0
Pure polyester	203.6	100.0	92.1	115.3	100.2	117.0	119.3	124.0	107.0	129.0	136.7	125.8	124.3	111.9	109.5	125.8
Mixed polyester	111.5	100.0	108.2	116.5	92.5	102.8	104.7	106.4	115.0	107.7	106.5	105.8	94.7	105.1	100.0	104.6
Other synthetic fibers	98.2	100.0	95.6	119.9	194.4	105.0	173.5	185.5	100.2	132.8	108.5	95.6	102.0	155.0	139.6	132.5
Other mixed synthetic fibers	85.6	100.0	101.6	104.2	90.6	125.6	149.6	162.1	142.3	152.7	137.1	148.6	130.8	130.3	132.6	142.0
ISIC 1730 : Manufacture of knitted and crocheted fabrics and articles		100.0	95.1	103.1	89.5	95.1	101.2	105.5	94.0	92.5	96.0	107.7	96.0	108.8	106.7	116.4
Men's knitted outwears	37.3	100.0	100.0	102.6	94.2	94.9	93.6	102.1	90.8	84.4	94.5	106.4	74.7	103.3	103.0	107.9
Men's knitted underwears	3.8	100.0	99.7	135.2	110.4	119.6	124.5	129.6	112.0	127.2	125.2	135.6	134.1	141.0	138.7	157.4
Men's knitted other wears	4.3	100.0	123.3	121.6	98.8	81.3	127.3	155.9	138.5	114.9	121.9	126.4	150.4	186.1	194.8	132.3
Women's knitted outwears	11.3	100.0	76.9	74.0	77.7	73.6	87.5	133.8	63.1	68.5	73.4	78.7	97.7	74.2	79.5	90.5
Women's knitted underwears	19.9	100.0	89.4	110.6	81.2	105.8	113.1	80.5	104.4	109.9	100.5	117.1	115.9	116.0	104.2	135.7
ISIC 1810 : Manufacture of wearing apparel, except fur apparel		100.0	92.0	92.6	83.8	103.1	103.2	110.2	108.5	101.4	107.8	120.4	123.7	121.0	121.8	126.2
Men's woven outwears	385.2	100.0	97.2	99.7	91.5	105.4	106.9	114.4	106.5	99.9	110.5	119.6	121.6	127.6	123.0	137.9
Men's woven other wears	9.2	100.0	153.0	80.0	89.4	75.8	129.7	134.0	205.8	129.5	104.3	131.6	155.4	113.2	107.7	106.1
Women's woven outwears	276.7	100.0	84.8	81.9	72.7	99.8	93.6	101.0	107.0	101.8	105.1	125.4	129.9	115.5	110.9	106.9
Women's underwears	52.7	100.0	80.5	98.8	84.6	108.6	122.0	123.7	114.2	105.3	103.0	97.6	100.7	103.7	127.2	145.7
ISIC 2320 : Manufacture of refined petroleum products		100.0	97.8	108.7	114.6	112.2	108.6	105.4	104.6	99.9	102.0	103.2	94.7	97.2	106.2	102.0
Octane 87	7.7	100.0	65.1	132.5	88.8	74.3	31.7	87.2	123.0	106.7	87.9	108.3	180.6	90.3	108.3	162.5
Octane 91	125.7	100.0	102.9	106.5	139.9	112.8	120.3	114.2	133.8	132.3	130.7	142.9	143.4	129.6	135.5	117.0
Octane 95 up	259.7	100.0	100.3	114.4	114.6	105.4	107.7	109.0	116.2	80.3	104.6	104.0	81.9	87.5	103.3	90.3
Hich speed diesel oil	555.1	100.0	93.8	107.1	112.6	112.6	102.9	88.6	93.4	90.7	87.9	87.0	81.6	91.6	104.8	97.8
Low speed diesel oil	5.3	100.0	208.8	41.2	52.6	105.6	26.3	73.8	90.6	92.5	58.7	141.6	48.8	112.6	112.0	141.7
Jet fuel	138.5	100.0	124.7	123.8	141.0	156.5	149.1	169.5	128.3	154.8	126.0	134.3	117.8	102.8	102.5	119.6
Kerosene	2.8	100.0	15.2	25.1	73.1	9.3	17.0	56.5	31.8	4.9	62.2	18.4	23.2	62.6	81.7	29.0
Light fuel oil	29.9	100.0	83.3	102.5	94.4	84.2	122.0	111.0	78.3	95.5	93.3	94.8	86.8	69.8	70.2	67.5
Medium fuel oil	111.9	100.0	78.9	98.8	100.0	98.6	96.2	107.9	91.9	99.3	85.2	104.4	90.2	104.2	88.3	93.9
Heavy fuel oil-3	10.1	100.0	119.0	77.7	134.5	78.8	113.9	61.1	109.2	76.0	161.9	154.7	95.2	52.4	47.6	72.1
Heavy fuel oil-4	17.2	100.0	117.5	92.1	123.9	139.2	111.8	127.2	109.8	115.8	212.0	43.1	114.1	116.6	142.4	64.7
Heavy fuel oil-5	27.7	100.0	53.6	112.2	64.7	74.1	58.0	42.6	43.6	64.0	57.6	47.0	73.6	58.1	56.2	62.1
Liquefied petroleum gas (LPG)	38.9	100.0	145.8	155.9	136.8	154.0	164.0	165.0	145.9	139.2	169.8	186.8	172.1	170.3	197.2	225.6
Asphalt	19.3	100.0	114.6	115.4	110.9	99.3	107.3	103.5	128.2	97.4	84.7	71.3	60.4	69.7	97.5	86.7
Naphtha	24.3	100.0	23.2	17.5	8.2	21.6	17.1	22.5	27.5	34.6	72.8	64.2	80.5	89.1	83.7	102.7
ISIC 2694: Manufacture of cement, lime and planster		100.0	96.7	109.6	95.1	104.1	114.3	116.4	117.2	112.8	100.8	79.7	87.1	105.3	99.1	122.3
Portland cement	215.9	100.0	102.6	107.8	94.3	110.8	135.2	131.4	129.5	119.3	90.9	68.7	82.2	102.4	89.2	109.5
Mixed cement	113.8	100.0	92.1	108.0	88.9	92.4	75.1	76.3	76.9	95.2	98.2	76.3	92.5	99.0	101.6	126.3
Other cement	5.1	100.0	101.6	92.1	129.2	261.6	240.4	236.8	327.7	297.6	364.6	326.5	378.4	484.6	561.0	641.6
Clinkers	132.7	100.0	90.8	114.6	100.4	97.4	109.2	121.8	123.9	110.1	109.2	91.1	79.4	101.0	95.4	120.0
ISIC 3210: Manufacture of electronic valves and tubes and other electronic components		100.0	110.7	141.0	111.7	122.5	145.2	140.0	143.9	161.4	136.2	152.3	162.3	156.8	156.4	174.0
Cathode ray tubes for color TV	118.8	100.0	80.3	106.7	103.9	101.2	127.8	141.7	154.7	150.8	157.5	157.5	150.1	154.7	159.1	184.9
Cathode ray tubes for computers	106.2	100.0	141.7	153.6	108.3	135.2	132.3	153.0	153.7	201.5	160.3	167.2	194.3	149.8	128.7	88.1
Transistors	123.0	100.0	107.3	119.9	101.3	124.5	133.1	136.2	131.6	130.7	120.4	130.8	130.6	148.4	136.9	132.3
Monolithic integrated circuits	293.3	100.0	109.9	151.9	125.2	132.2	161.6	158.1	163.2	167.5	129.8	172.9	174.3	175.8	186.5	214.3
Other integrated circuits	279.0	100.0	114.2	148.6	106.8	115.7	145.5	116.8	120.8	157.9	131.6	132.1	156.8	144.0	142.8	178.1
ISIC 3230: Manufacture of TV, radio, sound or video recording and associated goods		100.0	130.0	177.9	114.4	143.0	181.2	195.8	166.3	184.0	189.8	183.2	158.8	163.2	190.4	189.5
Color TV receivers 20 inches and less	577.4	100.0	99.5	126.8	90.3	124.3	136.4	156.3	154.3	156.1	165.4	171.9	138.0	160.5	179.4	185.5
Color TV receivers 21 inches and more	121.0	100.0	114.7	114.9	100.4	104.0	131.2	126.3	118.3	139.5	157.3	155.4	169.4	150.8	141.4	170.2
Video tape recorders (floor type)	134.0	100.0	275.2	455.2	231.3	258.7	419.0	428.7	261.4	344.4	324.2	257.1	238.7	186.1	282.0	224.4
ISIC 3410: Manufacture of motor vehicles		100.0	117.7	139.9	116.9	151.2	170.5	189.3	199.9	216.2	211.1	237.6	177.0	183.9	198.1	231.4
Passenger car (engine capacity 1,800cc and less)	633.9	100.0	113.8	179.7	148.0	197.7	261.1	299.7	305.1	398.1	342.1	347.7	225.5	248.9	293.3	322.5
Passenger car (engine capacity 1,801 - 2,400cc)	432.5	100.0	137.3	192.1	127.7	198.7	195.4	209.0	255.4	228.0	288.4	300.7	229.1	266.3	235.9	313.1
Passenger car (engine capacity over 2,400 cc) including OPV	107.3	100.0	91.3	71.2	108.4	79.9	109.8	127.4	133.7	124.6	137.0	133.7	86.4	127.6	132.1	129.3
1-ton pick up truck (2WD, space cab)	1,870.6	100.0	116.0	118.3	104.3	128.5	137.6	150.9	155.1	157.2	153.1	191.6	153.8	146.1	160.8	187.4

Annex 7 Index of Manufacturing

Annex 7 TENTATIVE "INDEX OF MANUFACTURING" BASED ON THE SELECTED 10 INDUSTRIES (Sample)

(January 1999 = 100, Not seasonally adjusted)

(P) Preliminary figure

	Weight	1999												2000		
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	(P) Mar
Index of Manufacturing based on the selected 10 industries																
Production Index	10,000.0	100.0	107.7	130.2	112.3	127.3	138.6	144.3	144.4	152.9	148.8	161.1	139.2	141.2	147.0	163.6
Shipment Index	10,000.0	100.0	110.1	129.2	118.8	125.9	140.3	145.0	142.8	158.9	148.9	151.5	165.3	138.2	148.3	165.8
Finished-goods Inventory Index	10,000.0	100.0	102.4	111.3	108.3	119.1	120.6	119.6	116.4	115.4	109.4	121.7	99.7	116.1	116.9	121.9
Inventory Ratio Index	10,000.0	100.0	102.8	91.9	93.8	101.5	98.8	95.1	91.4	86.6	83.6	87.8	78.5	92.8	87.6	85.5
ISIC 1512: Processing and preserving of fish and fish products																
Production Index	1,091.3	100.0	101.9	142.6	122.7	125.6	112.9	100.0	103.6	109.9	104.1	126.2	115.0	102.1	104.7	109.0
Shipment Index	1,090.8	100.0	112.3	150.9	139.9	118.3	120.3	117.9	123.6	134.0	137.5	156.4	127.3	118.3	130.0	130.1
Finished-goods Inventory Index	2,237.3	100.0	99.7	120.0	127.6	167.6	179.9	168.3	152.2	164.7	143.6	130.4	136.8	147.9	140.3	144.1
Inventory Ratio Index	2,237.3	100.0	88.5	79.8	90.8	140.9	148.6	141.8	122.7	122.7	104.6	84.9	107.4	124.9	109.5	112.0
ISIC 1553: Manufacture of malt and liquors																
Production Index	349.9	100.0	96.7	112.7	117.7	91.3	101.0	105.6	101.1	103.0	103.6	117.9	132.4	121.0	110.4	127.3
Shipment Index	345.6	100.0	119.5	117.8	124.6	92.7	108.1	110.7	111.1	110.3	114.7	121.9	137.7	115.4	114.2	144.4
Finished-goods Inventory Index	77.4	100.0	68.1	76.3	79.2	86.1	85.3	94.6	71.8	74.4	45.8	60.0	57.8	124.4	122.0	48.8
Inventory Ratio Index	77.4	100.0	57.0	64.7	63.5	92.9	78.9	85.5	64.7	67.5	39.9	49.2	42.0	107.8	106.8	33.8
ISIC 1711: Preparation and spinning of textile fibers and weaving of textiles																
Production Index	1,120.2	100.0	98.5	113.7	110.9	113.6	124.2	126.6	117.4	127.4	124.7	126.5	117.8	124.3	110.0	136.6
Shipment Index	1,086.2	100.0	105.7	125.6	105.3	134.1	130.4	126.7	122.6	152.0	147.0	135.2	120.8	134.1	139.4	163.8
Finished-goods Inventory Index	2,785.5	100.0	95.1	93.0	80.2	70.4	71.4	71.5	72.0	60.5	54.1	51.9	57.5	59.9	54.3	51.9
Inventory Ratio Index	2,785.5	100.0	93.3	80.5	79.7	57.8	57.9	57.7	60.7	44.2	41.0	45.8	54.8	50.8	44.2	40.7
ISIC 1730 : Manufacture of knitted and crocheted fabrics and articles																
Production Index	76.5	100.0	95.1	103.1	89.5	95.1	101.2	105.5	94.0	92.5	96.0	107.7	96.0	108.8	106.7	116.4
Shipment Index	75.9	100.0	96.0	106.8	90.9	96.0	104.6	111.1	91.7	94.0	96.1	111.3	118.3	106.8	113.6	124.6
Finished-goods Inventory Index	100.8	100.0	130.4	122.7	109.6	137.3	143.1	156.4	152.1	177.8	192.0	206.5	129.4	198.4	190.1	217.9
Inventory Ratio Index	100.8	100.0	142.8	123.9	126.5	150.9	151.1	146.9	187.1	211.2	197.8	191.4	111.7	190.6	174.0	178.9
ISIC 1810: Manufacturing of wearing apparel, except fur apparel																
Production Index	723.9	100.0	92.0	92.6	83.8	103.1	103.2	110.2	108.5	101.4	107.8	120.4	123.7	121.0	121.8	126.2
Shipment Index	693.7	100.0	90.0	82.5	89.7	101.0	99.5	114.6	106.0	105.1	108.1	130.0	138.3	123.0	124.8	130.9
Finished-goods Inventory Index	899.7	100.0	96.8	127.8	114.7	125.4	135.1	137.7	141.3	144.2	150.9	151.9	135.0	130.3	131.8	143.1
Inventory Ratio Index	899.7	100.0	106.9	153.9	121.2	124.4	137.5	120.7	132.1	135.9	138.2	116.3	96.2	107.3	109.6	111.5
ISIC 2320: Manufacture of refined petroleum products																
Production Index	1,374.0	100.0	97.8	108.7	114.6	112.2	108.6	105.4	104.6	99.9	102.0	103.2	94.7	97.2	106.2	102.0
Shipment Index	1,383.8	100.0	88.7	107.4	97.0	92.7	89.4	92.0	101.0	91.5	88.2	93.7	92.6	87.1	94.0	98.1
Finished-goods Inventory Index	815.2	100.0	124.4	111.9	127.1	144.2	149.1	138.4	119.7	124.9	133.7	146.4	116.9	114.8	130.0	121.2
Inventory Ratio Index	815.2	100.0	146.3	100.3	127.9	163.2	165.8	154.4	118.5	140.5	159.5	165.1	132.9	133.6	149.3	129.8
ISIC 2694: Manufacture of cement, lime and plaster																
Production Index	467.4	100.0	96.7	109.6	95.1	104.1	114.3	116.4	117.2	112.8	100.8	79.7	87.1	105.3	99.1	122.3
Shipment Index	484.1	100.0	102.9	118.7	89.9	113.2	113.9	122.6	120.0	113.3	87.7	75.9	93.4	106.3	104.0	120.8
Finished-goods Inventory Index	122.8	100.0	96.5	89.8	92.7	81.3	74.1	69.7	75.7	72.1	91.5	97.7	91.1	90.9	86.5	89.6
Inventory Ratio Index	122.8	100.0	102.4	76.0	101.3	69.9	65.4	58.7	74.1	76.6	116.2	182.5	124.2	87.3	97.8	95.5
ISIC 3210: Manufacture of electric valves, tubes and other electric components																
Production Index	920.2	100.0	110.7	141.0	111.7	122.5	145.2	140.0	143.9	161.4	136.2	152.3	162.3	156.8	156.4	174.0
Shipment Index	933.8	100.0	116.8	146.7	120.2	128.6	150.3	141.8	150.8	171.9	151.3	161.7	180.2	184.2	178.9	201.7
Finished-goods Inventory Index	630.4	100.0	111.4	129.1	120.3	131.0	152.1	164.0	162.2	161.3	115.5	142.3	155.5	159.6	178.3	179.4
Inventory Ratio Index	630.4	100.0	102.1	99.6	103.7	106.7	105.7	117.8	111.5	100.7	82.0	93.0	96.6	100.3	102.5	96.6
ISIC 3230: Manufacture of TV, radio, sound or video recording																
Production Index	832.4	100.0	130.0	177.9	114.4	143.0	181.2	195.8	166.3	184.0	189.8	183.2	158.8	163.2	190.4	189.5
Shipment Index	822.5	100.0	137.5	175.9	127.0	155.2	193.2	191.0	169.4	180.2	191.4	181.5	169.6	156.9	192.1	185.5
Finished-goods Inventory Index	453.8	100.0	103.3	93.0	185.0	191.1	142.0	192.0	168.7	196.6	185.8	241.8	171.4	276.5	264.8	299.4
Inventory Ratio Index	453.8	100.0	95.0	67.2	144.9	134.8	93.6	113.6	105.5	121.2	105.0	140.7	115.4	176.7	145.0	160.2
ISIC 3410: Manufacture of motor vehicles																
Production Index	3,044.3	100.0	117.7	139.9	116.9	151.2	170.5	189.3	199.9	216.2	211.1	237.6	177.0	183.9	198.1	231.4
Shipment Index	3,083.6	100.0	116.1	128.6	134.4	144.1	174.4	188.7	182.5	217.1	192.7	191.5	243.1	162.4	178.4	211.7
Finished-goods Inventory Index	1,877.1	100.0	106.7	120.3	95.2	101.4	91.2	85.9	100.8	86.0	99.2	153.1	58.5	99.1	110.8	127.1
Inventory Ratio Index	1,877.1	100.0	114.9	93.8	73.7	71.5	51.3	44.9	55.3	40.8	51.5	81.9	28.6	63.8	63.9	63.4