

REPORT UM-HSRI 79-86  
CONTRACT DOT-TSC-1616

ECONOMIC STATISTICS AND INFORMATION  
CONCERNING THE JAPANESE AUTO INDUSTRY

FINAL REPORT

Gary R. Saxonhouse

Prepared for:

U.S. Department of Transportation  
Transportation Systems Center  
Kendall Square  
Cambridge, Massachusetts 02142

November 10, 1979

Highway Safety Research Institute  
University of Michigan



Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Economic Statistics and Information Concerning the Japanese Auto Industry		5. Report Date November 10, 1979	6. Performing Organization Code
		8. Performing Organization Report No. UM-HSRI-79-86	
7. Author(s) Gary R. Saxonhouse		10. Work Unit No. (TRAIS)	
9. Performing Organization Name and Address Highway Safety Research Institute University of Michigan Ann Arbor, Michigan 48109		11. Contract or Grant No. DOT-TSC-1616	
		13. Type of Report and Period Covered Final Report	
12. Sponsoring Agency Name and Address U.S. Department of Transportation Transportation Systems Center Kendall Square Cambridge, Massachusetts 02142		14. Sponsoring Agency Code	
		15. Supplementary Notes	
16. Abstract This is the final report of a project that had four objectives: 1. <u>Locate Statistics</u> --Identify the Japanese agencies that receive statistical data on the automobile industry; determine the rules and laws governing public accessibility to the data; identify when, where, and how the data is published; identify the private sources of business statistics; and compare reports published in Japanese with those available in English. 2. <u>Determine Research and Development and Capital</u> --Present statistics relating to research and development expenditures and capital investment by the Japanese automobile industry. 3. <u>Identify Government Incentives</u> --Identify and present details on tax advantages and incentives given to industry; identify research and development projects financed by Japanese government. 4. <u>Survey Japanese Economic and Business Literature</u> --Survey Japanese literature to locate forecast of auto demand and predictions of capacity changes; evaluate the reliability of the forecasts and the techniques utilized; interview Japanese economists and industrial consultants relative to the forecasts.			
17. Key Words Japanese Auto Industry International Competition Government Regulation Research and Development Investment Incentives		18. Distribution Statement	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 238	22. Price



## PREFACE

This document is the final report for a study entitled "Economic Statistics and Information Concerning the Japanese Auto Industry." The study was conducted by The University of Michigan's Highway Safety Research Institute in association with The University's Department of Economics and the Center for Japanese Studies, and selected consultants. The Transportation Systems Center of the U.S. Department of Transportation sponsored the study as part of its support of the automotive fuel economy program of the National Highway Traffic Safety Administration.

Since 1967 Japan has been the second largest producer of motor vehicles in the world. During the 15-year period from 1961 to 1976 inclusive, Japanese motor vehicle production increased 963 percent, a compounded annual growth rate of 16.3 percent. (By comparison, U.S. production during the same period increased 172 percent for an annual compounded growth rate of only 3.7 percent.) In 1978 Japan produced over 9 million vehicles, which was over 70 percent of U.S. production in the same year.

In its motor vehicle exports Japan has advanced more rapidly than any other country in the world. It moved into sixth place in 1959; fifth place in 1963; fourth place in 1965; third place in 1968; second place in 1971; and first place in 1974. It has held that position since, and is continuing to increase its relative share. In the United States, three Japanese firms are among the top four importers. And the Japanese products are generally considered as among the best designed and attractively priced vehicles available in the United States.

Because of the increasing importance of the Japanese-produced vehicle in the United States, there has been a need to more carefully evaluate "...the impact of the U.S. fuel economy, safety, and emissions control regulations on the Japanese companies and to provide a data base for comparing the performance of the U.S. automobile industry with the Japanese automobile industry..."\*

There is generally available in the United States, and to U.S. government officials, information on the Japanese auto industry. However, much additional information exists only in Japan and in the Japanese language. This is especially true of detailed statistical information on capital investment and research and development in the industry. Also, the American policymakers do not have the benefit of much information that is found in the Japanese trade press and other local sources within Japan. It is important that these policymakers be aware of the current sentiment within Japan towards that nation's automobile industry. Such information is important in the continuing evaluation of the U.S. government's policy decisions that impact Japan's auto industry.

---

\*RFP TSC/322-0014-GTF, Statement of Work.

The penetration into the U.S. of the Japanese passenger automobile requires more reliable and detailed information on Japan's automobile industry. Because of the unique peculiarities of the Japanese language, and the shortage of persons within the United States having a working knowledge of Japanese, unusual steps had to be taken to collect the necessary information. This has been done by organizing a team of Japanese-speaking specialists with a background and understanding of the automobile industry. They have identified Japanese statistical data sources, collected the information, and presented it in usable form. This final report presents the results of this effort.

This study was divided into four task objectives:

Task 1--Locate Statistics. This task involved the identification of Japanese agencies that receive statistical data on the automobile industry; a determination of the rules and laws governing public accessibility of the data; the identification of when, where, and how the data is published; the identification of private sources of business statistics; and a comparison of reports published in Japanese with those made available in English.

Task 2--Determination of Research and Development and Capital Investment Procedures. First, known statistics relating to research and development expenditures by the Japanese auto industry were collected; the same detailed analysis was then made on capital investment by the Japanese auto industry.

Task 3--Identification of Governmental Incentives. In this task, the assignment was to identify tax advantages and incentives given to industry and to identify research and development projects financed by government.

Task 4--Survey Japanese Economic and Business Literature. This task involved a survey of Japanese literature to locate forecasts of auto demand and predictions of capacity changes; there was then an evaluation of the forecasts for reliability and techniques utilized; and, finally, there were interviews with Japanese economists and industrial consultants relative to the forecasts.

In the accomplishment of the study objectives the project was divided into three separate phases:

Phase I--Initial Literature Research. The literature search involved an examination of the reference bibliography cards at The University of Michigan Japanese language library. Significant data were extracted and filed for compilation into final reports.

Phase II -- Field Investigation in Japan. This phase included contacting governmental agencies and private organizations in Japan for information pertinent to the study. Appendix A shows the organizations that were contacted.

Phase III -- Documentation Development and Presentation. The final phase was the documentation development and presentation. There were two major reports: the interim report, published mid-way through the project, and the final report, which is this document. The interim report was completely incorporated into the final report.

The project director for the study was Professor Howard M. Bunch, Associate Professor of Transportation Management and Research Project Manager, Highway Safety Research Institute. Professor Bunch had the overall responsibility for the study. The principal investigator was Professor Gary R. Saxonhouse, Associate Professor of Economics. Professor Saxonhouse had the responsibility for the study's literature search and field investigations. Richard Woodworth, Susumu Saito, Donna Vandenbrink, and Daniel Citrin have also made substantial contributions to the preparation of this report. And the support and valuable advice received from Mr. Bruce Weiers, Transportation Systems Center, Department of Transportation, is gratefully acknowledged.





## CONTENTS

PREFACE . . . . .	iii
CONTENTS . . . . .	vii
LIST OF TABLES . . . . .	ix
1. INTRODUCTION TO JAPANESE GOVERNMENT STATISTICAL ORGANIZATION . . . . .	1-1
1.1 Coordinating Activities . . . . .	1-1
1.2 Government Agencies Compiling Automobile-Related Statistics . . . . .	1-4
1.3 Statistical Work of Local Branch Offices of National Ministries, Prefectural Governments and City, Town, and Village Governments . . . . .	1-6
2. LEGISLATION CONCERNING THE GOVERNMENT'S COLLECTION OF STATISTICS . . . . .	2-1
2.1 Introduction . . . . .	2-1
2.2 Laws Governing the Procedures of Statistical Activities . . . . .	2-1
2.3 Classes of Statistical Surveys . . . . .	2-1
3. AUTOMOBILE INDUSTRY-RELATED STATISTICS REGULARLY SUBMITTED TO JAPANESE GOVERNMENT . . . . .	3-1
3.1 Prime Minister's Office, Bureau of Statistics . . . . .	3-1
3.2 Kagaku gijyūshō (Science and Technology Agency) . . . . .	3-7
3.3 Tsūshōsangyōshō (Ministry of International Trade and Industry) Daijin kanbo (Minister's Secretariat) . . . . .	3-8
3.4 Keizai kikakucho (Economic Planning Agency) . . . . .	3-16
3.5 Okurashō (Ministry of Finance) . . . . .	3-17
3.6 Unyūshō (Ministry of Transportation) . . . . .	3-26
3.7 Kensei-sho (Ministry of Construction) Dōrō kyoku (Highway Bureau) . . . . .	3-38
3.8 Nihon tokkyōchō (National Patent Agency) . . . . .	3-38
3.9 Keisatsūchō (National Police Agency) Kōtsū kyoku (Traffic Bureau) . . . . .	3-38
4. PRIVATE SOURCES OF AUTOMOBILE INDUSTRY-RELATED STATISTICS . . . . .	4-1
4.1 Nihon jidōsha kōgyō kai jikōkai (Japan Automobile Manufacturers Association) . . . . .	4-1
4.2 Nihon jidōsha buhin kyokai (Japan Auto Parts Industry Association) . . . . .	4-2
4.3 Nihon jidōsha kaigishō (Japan Automobile Chamber of Commerce, JACC) . . . . .	4-8

4.4	Nihon kaithatsu ginko (Japan Development Bank)	4-14
4.5	Toyota hanbai kabushiki kaisha (Toyota Motor Sales, Inc.)	4-14
4.6	Nihon keizai shimbun (Japan Economic Journal)	4-22
5.	INVESTMENT AND CAPITAL STOCK SERIES FOR THE JAPANESE AUTOMOBILE INDUSTRY	5-1
6.	RESEARCH AND DEVELOPMENT EXPENDITURE SERIES FOR THE JAPANESE AUTOMOBILE INDUSTRY	6-1
7.	GOVERNMENT INCENTIVES FOR CAPITAL INVESTMENT IN THE JAPANESE AUTOMOBILE INDUSTRY.	7-1
8.	GOVERNMENT AUTOMOTIVE RESEARCH AND DEVELOPMENT AND GOVERNMENT INCENTIVES AND SUBSIDIES FOR PRIVATE AUTOMOTIVE RESEARCH AND DEVELOPMENT.	8-1
8.1	Research Conducted By Japanese Government	8-1
8.2	Research Sponsored But Not Conducted By The Japanese Government	8-2
8.3	Tax Incentives For Research and Development Expenditures	8-4
9.	SURVEY ON THE ESTIMATES OF INCREASES IN THE DEMAND FOR JAPANESE AUTOMOBILES, DOMESTICALLY AND ABROAD FOR THE PERIOD TO 1985	9-1
9.1	Domestic Demand for Automobiles	9-2
9.2	Japanese Demand for Automobile Imports	9-4
9.3	Foreign Demand for Japanese Automobiles	9-5
	FOOTNOTES	9-12
	APPENDIX A --Topical Index for Quantification Information on the Japanese Automobile Industry	A-1
	APPENDIX B --Questionnaire Forms, Census of Manufacturers	B-1
	APPENDIX C --Report of the Survey on R & D Activities of Private Enterprises	C-1

## LIST OF TABLES

<u>Table</u>	<u>Page</u>
1.1 Administrative Organization of Japanese Central Government . . . . .	1-2
1.2 Government Statistical Organizations Collecting Automobile Related Statistics . . . . .	1-3
3.1 English Translation of Japanese Government Form for 1978 Survey of Research and Development Questionnaire A (For Companies) . . . . .	3-2
3.2 Classification of Auto-Related Items in Japan's Current Production Survey . . . . .	3-10
3.2.A MITI Current Production Survey Form--Automobiles . . . . .	3-11
3.2.B MITI Current Production Survey Form--Automobile Parts . . . . .	3-12
3.3 Questionnaire Categories, Japan Census of Manufacturers . . . . .	3-13
3.4 Auto-Related Classifications Found in Japan's Foreign Trade Statistics . . . . .	3-19
3.5 Information Required to be Annually Submitted by Publically-Held Corporations by Japanese Government . . . . .	3-21
3.5.A Information Appearing in Automobile Assemblers Reports to Ministry of Finance . . . . .	3-22
3.5.B The Progress of Consolidated Financial Statements in Japan . . . . .	3-27
3.6 Automobile Model Classifications Found in Japan Vehicle Registration Data . . . . .	3-34
4.1 Survey Forms Used by Japan Auto Parts Industry Association to Collect Production Data . . . . .	4-4
4.2 Survey Forms Used by Japan Auto Parts Industry Association to Collect Financial Data . . . . .	4-5

LIST OF TABLES (Continued)

<u>Table</u>	<u>Page</u>
4.3 Survey Form Used by Japan Auto Parts Industry Association to Perform Management Analyses . . . . .	4-6
4.4 Environmental Protection Agency Survey Form . . . . .	4-10
4.5 Japan Development Survey Form, Survey File . . . . .	4-15
4.6 Japan Development Survey Form, Individual File . . . . .	4-18
5.1 MITI Survey on Automobile Industry Investment in Productive and in Research and Testing Facilities . . . . .	5-3
5.2 Japan Development Bank and MITI Survey Data on Automobile Industry Investment . . . . .	5-4
5.3 Several Major Japanese Industrial Indexes. . . . .	5-5
5.4 Assemblers and Their Parts Suppliers . . . . .	5-6
5.5.1 The Toyota Enterprise Group. . . . .	5-20
5.5.2 The Nissan Enterprise Group. . . . .	5-21
5.5.3 The Isuzu Enterprise Group . . . . .	5-22
5.5.4 The Mitsubishi Motors Enterprise Group . . . . .	5-23
5.6.1.1-3 Fuji Heavy Industries Plant and Equipment. . . . .	5-24
5.6.2.1-3 Toyota Plant and Equipment . . . . .	5-27
5.6.3.1-5 Toyo Kogyo Plant and Equipment . . . . .	5-30
5.6.4.1-3 Nissan Diesel Plant and Equipment. . . . .	5-35
5.6.5.1-3 Isuzu Plant and Equipment . . . . .	5-40
5.6.6.1-3 Honda Plant and Equipment . . . . .	5-43
5.6.7.1-3 Nissan Automobile Plant and Equipment . . . . .	5-47
5.6.8.1-3 Daihatsu Kogyo Plant and Equipment . . . . .	5-50
5.6.9.1-3 Suzuki Automobile Plant and Equipment . . . . .	5-55
5.6.10.1-3 Hino Plant and Equipment . . . . .	5-60
6.1 Regular Research Workers in Japanese Automobile Industry . . . . .	6-3
6.2 Regular Research Workers per 10,000 Total Employees in Japanese Automobile Industry . . . . .	6-4
6.3 Total R&D Expenditure by Japanese Automobile Industry (Disbursement Basis) . . . . .	6-5
6.4 Total R&D Expenditure by Japanese Automobile Industry (Cost Basis) . . . . .	6-6

LIST OF TABLES (Continued)

<u>Table</u>	<u>Page</u>
6.5 Automobile R&D Expenditure as Percentage of Total R&D Expenditure . . . . .	6-7
6.6 Automobile R&D Expenditure Per Regular Research Worker . . . . .	6-8
6.7 Automobile R&D Expenditure as Percentage of Sales . . . . .	6-9
6.8 Number of Persons Engaged in R&D, Expenditures on R&D, R&D Funds Received, and R&D Funds Paid Out, Cross Classified by Capitalization on Automobile Firms. . . . .	6-10
6.9 R&D Workers, Within Firm Expenditures on R&D, R&D Funds Received, R&D Funds Paid by Auto Industry Cross Classified by Size of Company Employment . . . . .	6-14
6.10 R&D Workers, Within Firm Expenditure on R&D in the Auto Industry Cross Classified by Total Sales . . . . .	6-18
6.11 R&D Workers, Within Firm Expenditures on R&D, R&D Funds Received and R&D Funds Paid in Auto Industry Cross Classified by Firm Regular Research Workers. . . . .	6-20
6.12 R&D Workers and Within Firm Expenditure on R&D in Auto Industry Cross Classified by Size of Operating Profits (Company) . . . . .	6-24
6.13 Regular Research in Auto Industry by Specialty (Companies) . . . . .	6-26
6.14 Within Firm Expenditure on R&D (Disbursement) in Auto Industry Cross Classified by Firm Capitalization and Type of R&D. . . . .	6-27
6.15 R&D Funds Received and R&D Funds Paid in Auto Industry, Cross classified by Firm Capitalization . . . . .	6-28
6.16 Within Firm Expenditure on R&D (Disbursement) by Auto Industry Firms, Cross Classified by Product Field . . . . .	6-30

LIST OF TABLES (Continued)

<u>Table</u>	<u>Page</u>	
6.17	Number of R&D Workers Within Firm Expenditure on R&D, R&D Funds Received, R&D Paid in Auto Industry, Cross Classified by Size of Firm R&D Expenditure . . . . .	6-33
6.18	Number of Cases of Technology Export and Receipts by Auto Industry . . . . .	6-37
6.19	Number of Cases of Technology Import and Payment by Auto Industry . . . . .	6-38
6.20	Number of Cases and Values of Technology Exchange by Industry and Technology. . . . .	6-39
6.21.1	Nissan Investment for R&D Facilities . . . . .	6-40
6.21.2	Toyota Investment for R&D Facilities . . . . .	6-41
6.21.3	Hino Investment for R&D Facilities. . . . .	6-42
6.21.4	Suzuki Investment for R&D Facilities . . . . .	6-43
6.22	Individual Automobile Assembler R&D as a percentage of sales 1979 . . . . .	
7.1	Major Types of Tax-Exempt Reserves . . . . .	7-3
8.1	Use and Provision for R&D Monies . . . . .	8-5
8.2	R&D Projects at Japan's National Laboratories . . . . .	8-6
8.3	Japan's Government-Affiliated Research Institutes . . . . .	8-12
8.4	Organization of National R&D Program System (Electric Vehicle Project) . . . . .	8-14
8.5	Research Grants Made by Ministry of Transportation . . . . .	8-15
9.1	Forecasts on Motor Vehicle Use . . . . .	9-7
9.2	Forecasts on Motor Vehicle Registration . . . . .	9-8
9.3	Forecasts on Motor Vehicle Demand . . . . .	9-9
9.4	Changes in the Environment of Passenger Cars and Adjustments of Consumers . . . . .	9-10
9.5	Regional Differences in Per Capita Automobile Registrations. . . . .	9-11

## 1. INTRODUCTION TO JAPANESE GOVERNMENT STATISTICAL ORGANIZATION<sup>1</sup>

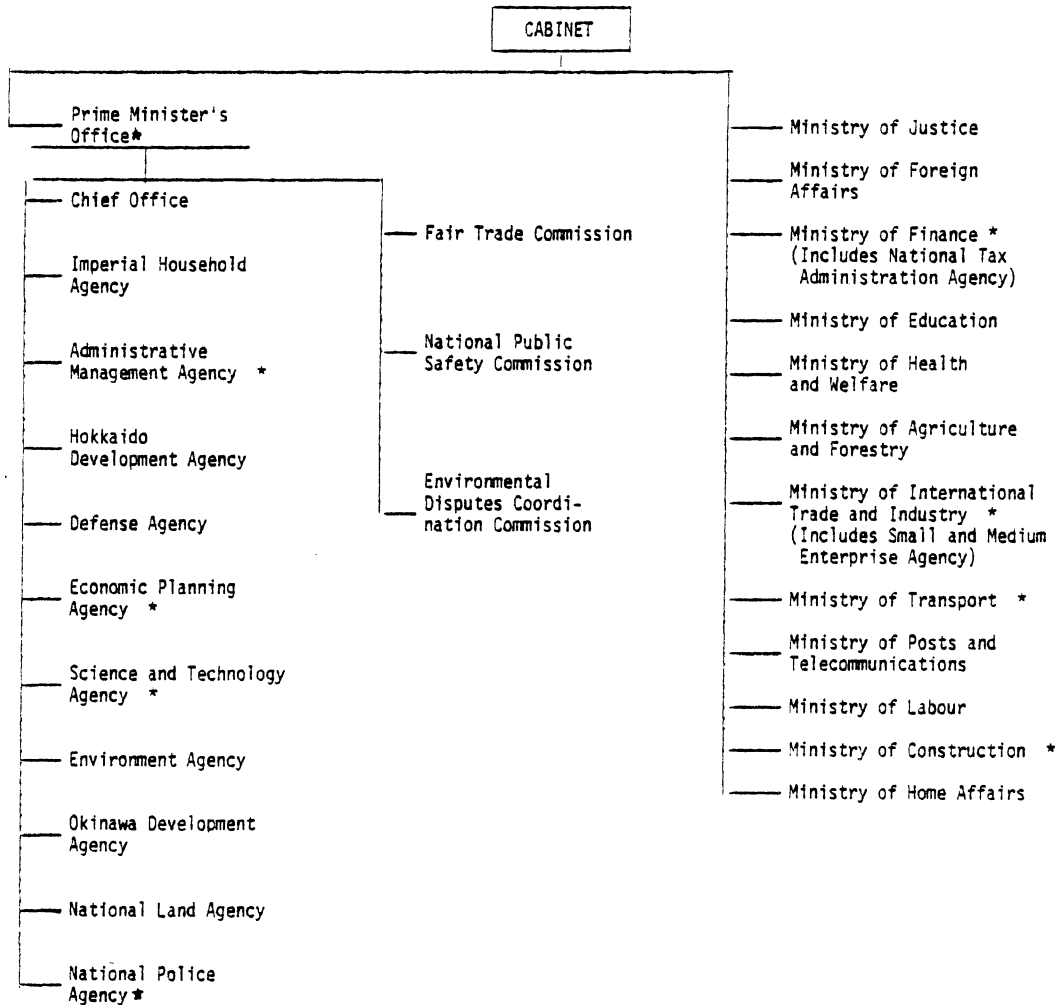
In Japan official statistics collecting and reporting is dispersed among a large number of government units. Virtually all government ministries and agencies, as well as the regional and local governments, have their own statistics organizations. Despite this decentralization, the Japanese government has exerted considerable effort to coordinate these disparate activities. Table 1.1 shows the organizational structure of the Japanese Central Government. Table 1.2 further expands the structure of those portions that collect automobile-related statistics.

### 1.1 COORDINATING ACTIVITIES

(1) Gyōsei kanri chō (Administrative Management Agency), Gyōsei kanri kyoku (Administrative Management Bureau). The Administrative Management Agency, an independent government agency, is responsible for the coordination and integration of Japanese statistical services. Legally, this agency has seven specific functions:

- (a) Long-range improvement and development of Japanese statistics and Japan's statistical system.
- (b) Examination and review of all statistics and statistical surveys, coordination of the collection of statistical reports and integration of statistical surveys.
- (c) Establishment of standard classifications and definitions for statistics.
- (d) Development of the system and method of statistical surveys.
- (e) Serve as the central point for liaison on international statistical affairs with international organizations and foreign governments and provision of the necessary resources for the Statistical Institute for Asia and the Pacific, ESCAP.
- (f) Initiation and coordination of input-output table compilation.
- (g) Provision of assistance and guidance to heads of local public entities regarding statistical organization, staffing, and financing. The Administrative Management Agency funds personnel expenses for statistical staffs in the prefectural governments.

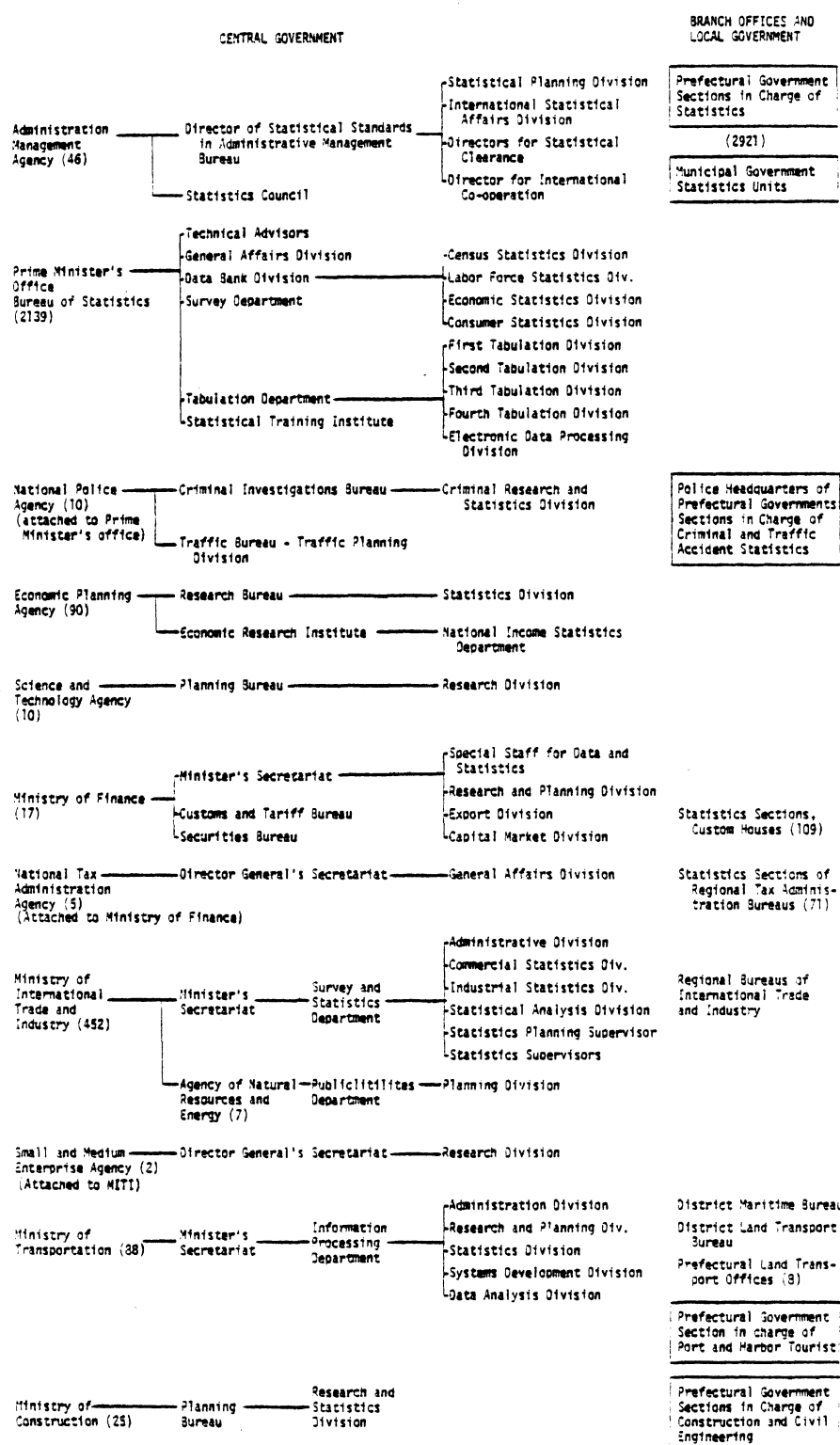
TABLE 1.1  
ADMINISTRATIVE ORGANIZATION OF JAPANESE CENTRAL GOVERNMENT



\* Agencies collecting automobile related statistics



TABLE 1.2  
GOVERNMENT STATISTICAL ORGANIZATIONS  
COLLECTING AUTOMOBILE-RELATED STATISTICS



SOURCE: Adapted from Gyosei kanri chō, op cit. pp. 4-5, ( ) indicates the number of statistical personnel

(2) Tōkei shingikai (Statistics Council). The Statistics Council is an advisory body for the Administrative Management Agency. It investigates and deliberates, at the request of the Director-General of the Administrative Management Agency, issues concerning the examination and clearance of statistical surveys, the establishment of statistical standards, the coordination of statistical surveys and the coordination of statistical reports. Opinions and proposals are sent to the Director-General on this subject. Council members include seven non-governmental statisticians and/or scholars, seven government officials drawn from the various ministerial agencies or local statistical organizations and four individuals representing statistical user interests. The Statistics Council generally meets once a month.

The Council has a considerable number of special committees. Three of these committees have responsibilities which, in part, relate to the collection and reporting of automobile-related statistics. These committees include:

- (a) Kōkōgyō kensetsu tōkeibukai (Mining, Manufacturing and Construction Statistics Committee). This committee advises on issues relating to the collecting and reporting of manufacturing, public utilities and construction statistics.
- (b) Unyu ryūtsu tōkeibukai (Transportation and Distribution Statistics Committee). This committee advises on issues relating to the collecting and reporting of distribution statistics including transport, communication, commerce, foreign trade and price.
- (c) Kigyō tōkeibukai (Incorporated Enterprises Statistics Committee). This committee advises on issues related to the collection, reporting and use of data obtained from incorporated enterprises in Japan.

To accomplish its coordination function, the Administrative Management Agency employs forty-six professional statisticians.<sup>2</sup>

## 1.2 GOVERNMENT AGENCIES COMPILING AUTOMOBILE-RELATED STATISTICS

(1) Sōrifu (Prime Minister's Office), Tōkei kyoku (Bureau of Statistics). The Bureau of Statistics conducts and analyzes the National Population Census. In addition to this primary function, it also conducts periodic surveys such as the Business Establishment Census, the Housing Survey, the Employment Status Survey and the National Price Survey as well as such regular surveys as the Labor Force Survey, the Family Income and Expenditure Survey, the Retail Price

Survey, the Unincorporated Enterprises Survey and the Survey of Research and Development. The Bureau of Statistics also tabulates some of the surveys conducted by other government ministries and agencies. The Bureau employs 2,139 statisticians.\*

(2) Keizai kikakuchō (Economic Planning Agency), Chōsa kyoku (Survey Bureau), Tokeika (Statistics Division). The Statistics Division of the Economic Planning Agency's Survey Bureau conducts several statistical surveys, including the Survey on Investment of Incorporated Enterprises. The Keizai kenkyūjō (Economic Research Institute) which is a separate bureau in the EPA compiles Japan's national income statistics and also conducts the National Welfare Survey. The Economic Research Institute also is engaged in fundamental research on national economic structure and business cycles. The Economic Planning Agency employs 90 statisticians.

(3) Ōkurashō (Ministry of Finance), Daijin kambo (Minister's Secretariat), Chōsa kikakuka (Research and Planning Division). The Research and Planning Division of the Minister's Secretariat coordinates the statistical reports produced by the Ministry of Finance. The two main statistical functions performed by this ministry are the conducting of the Survey of Incorporated Enterprises and compilation of international trade statistics. The Shoken kyoku (Securities Bureau) of this ministry also receives, under Japan's Securities Markets Law, annual reports from publicly-held enterprises. The Ministry of Finance employs seventeen professional statisticians. Another 109 are employed in the Statistics Section in the Customs Houses in Japanese ports.

(4) Tsushōsangyōshō (Ministry of International Trade and Industry), Daijin kambo (Minister's Secretariat), Chōsa tokeibu (Research and Statistics Division). The Research and Statistics Section of the Minister's Secretariat conducts statistical surveys on mining, manufacturing and commerce. Some of the major surveys conducted by this ministry are the Census of Manufactures, the Census of Commerce, and the Current Production Survey. MITI also collects commerce and distribution data and has developed a wide variety of indicators of business conditions. In addition, it conducts research on input-output tables. The Ministry of International Trade and Industry employs 452 statisticians.

(5) Unyushō (Ministry of Transportation), Daijin kambo (Minister's Secretariat), Jōhō kanribu (Information Processing Section). The Information Processing Section of the Minister's Secretariat conducts statistical surveys on transport and other matters related to this ministry. The major statistical work of this ministry includes the Port and Harbor Survey, Ships and Seamen Survey, Automobile Transport Statistics and Coast-Wise Vessel Transport Statistics. The Ministry of Transportation employs 88 statisticians.

---

\*All references to the number of statisticians employed refer to 1976 as reported in Reference (1).

(6) Kensetsushō (Ministry of Construction), Keikaku kyoku (Planning Bureau), Chōsa tōkeika (Survey Statistics Division). The Survey Statistics Division of the Planning Bureau conducts a number of important surveys, including Statistics of Building Works Started, Statistical Survey Construction Works, Survey of Construction Work Orders Received and Statistical Survey of Private Engineering Works

### 1.3 STATISTICAL WORK OF LOCAL BRANCH OFFICES OF NATIONAL MINISTRIES, PREFECTURAL GOVERNMENTS AND CITY, TOWN AND VILLAGE GOVERNMENTS

(1) Local Branch Offices of National Ministries and Agencies. Many of the national ministries and agencies use their local branch offices to do the field work in connection with many of their surveys. For example, each of the local Customs Houses attached to the Export Division of the Ministry of Finance has a Statistics Section which collects trade data. The Regional Bureaus of International Trade and Industry of the Ministry of International Trade and Industry participate in the Current Production Survey, and the District Land Transport Bureaus of the Ministry of Transportation are responsible for Current Production Statistics of Rolling Stock, and Monthly Transport Statistics on Privately-Operated Railways, among other surveys.

(2) Local Governments--Prefecture. The field work for a large number of important national surveys are entrusted to the statistical division or section of Japan's prefectural governments. The Central Government allocates 2921 statisticians to the prefectural governments for this work. Among the surveys whose field work are conducted by these personnel are the National Population Census (for the Bureau of Statistics, Prime Minister's Office), Census of Establishments (for the Bureau of Statistics, Prime Minister's Office), and the Census of Commerce (for the Ministry of International Trade and Industry). Apart from the statistical divisions, other divisions or sections of the prefectural governments carry out the field work for such automobile-related surveys as Automobile Transport Statistics (for the Ministry of Transportation) and Statistical Survey of Construction Works (for the Ministry of Construction).

(3) Local Governments--City, Town, or Village. Governments of cities, towns and villages participate in the field work of such statistical surveys as the National Population Census, the Census of Commerce, the Census of Manufactures, and the Census of Establishments. They also play an important role in the selection, appointment, and guidance of statistical enumerators and in confirming the reliability of surveys for which they have not done the field work. Compared, however, to the statistical sections of the prefectural or central government, the training of the statistical personnel at the sub-prefectural level is relatively weak. Many of the cities, towns and villages do not have special divisions or sections for statistical surveys and in many of the cities, towns and villages, statistical affairs are dealt with by officials whose main responsibilities lie in other areas.

## 2. LEGISLATION CONCERNING THE GOVERNMENT'S COLLECTION OF STATISTICS

### 2.1 INTRODUCTION

Legislation concerning the Government's collection of statistics includes:

- (1) Statistical Organization Laws delineating the character and powers of statistical organizations (for example, the Law Establishing the Administrative Management Agency and the Law Establishing the Prime Minister's Office).
- (2) Laws governing the procedures of statistical activities (for example, the Statistics Law, the Statistical Reports Coordination Law and the prefectural by-laws concerning statistical surveys).
- (3) Substantive laws concerning the conduct of individual surveys (for example, regulations on designated statistical surveys of central government ministries and regulations on the statistical surveys of local governments).

### 2.2 LAWS GOVERNING THE PROCEDURES OF STATISTICAL ACTIVITIES

(1) Statistics Law. The Statistics Law (Law No. 18 of 1947) which took effect in May, 1947 aims at "securing the truthfulness of statistics, eliminating the duplication of statistical surveys, consolidating the system of statistics and planning to improve and develop the statistical system." The law stipulates systems of Designated Statistics and Notified Statistics.

(2) Statistics Reports Coordination Law. The Statistics Reports Coordination Law (Law No. 148 of 1952) took effect in August 1952 with the aim "to relieve the burden imposed in connection with making statistical reports and to contribute to the increase in the efficiency of survey administration." This law stipulates that the Director-General of the Administrative Management Agency shall coordinate the collection of statistical reports. An additional class of statistical reports, "Approved Statistics," are created by this legislation.

### 2.3 CLASSES OF STATISTICAL SURVEYS

(1) Designated Statistics. Designated statistics are those statistics whose collection has been initiated by the central government or local governments and which have been "designated and notified to the public" by the Director-General of the Administrative Management Agency. Only statistics which are essential for policy-making are classified under this heading. (Specific examples are the Census of Manufacturers Designated Statistics #10, and Survey of Research and Development Designated Statistics #61. These and others are discussed in subsequent sections of this report.)

(a) Approval of Designated Statistical Surveys. The surveys conducted to compile Designated Statistics are called Designated Statistical Surveys. The agency which is going to conduct a Designated Statistical Survey submits the survey plan for approval to the Director-General of the Administrative Management Agency.

(b) Obligation to Report. The agency which conducts a Designated Statistical Survey may impose the obligation to report on the responding person or juridical person. Penal regulations including imprisonment are provided for the non-observance of this obligation. Only Designated Statistical Surveys can impose such obligations.

(c) Confidentiality. While the obligation to respond is imposed on the respondents, the confidentiality of the response is strictly protected. If the personnel who are engaged in the statistical survey reveal the confidential responses they are liable to punishment.

The questionnaire forms collected for the purpose of compiling Designated Statistics should not be used for purposes other than those of a statistical nature which are described in Article 15 of the Statistics Law. It should be noted, however, that much of the information obtained as a result of Designated Statistical Surveys, while administratively most important, may be tabulated by area and classification in ways which are often unhelpful for any but the original purpose for which the survey was conceived. In order to promote administrative efficiency and decrease the burden of respondents, it was considered desirable to open a way for making use of the questionnaires for other than their original purpose. To this end, Item 2, Article 15 of the Statistics Law provides that completed questionnaires can be used for other purposes with the approval of the Director-General of the Administrative Management Agency and provided that public announcement of these new purposes is made. On occasion an agency other than the one conducting the survey may gain access to the disaggregated data, but not to the primary questionnaire.

---

(d) Publication of Survey Results. Unless the Director-General of the Administrative Management Agency grants an exception, the results of Designated Statistical Surveys should be published as quickly as possible. Prior to and during the World War II, statistics which showed the actual situation in Japan were generally kept secret and not made public. In reaction to this practice, the Statistics Law contains this explicit provision. Survey results are published either in Japan's Official Register or in other publications readily available to the public. In order to encourage wider use of survey results at an earlier stage, the possibility of releasing magnetic tapes of survey results is currently under discussion.

(2) Approved Statistical Reports. The Statistical Reports Coordination Law stipulates that national administrative branches of the central government should obtain prior approval of the Director-General of the Administrative Management Agency when they collect statistical reports from ten or more persons or juridical persons (Article 4, the Statistical Reports Coordination Law). During 1976, 547 statistical reports were approved. A total of 10,985 reports have been approved since the law first went into effect in 1952. The most numerous approved statistical reports are agricultural cost surveys.

(3) Notified Statistics. In cases where the branches of the central government, the three largest public corporations, prefectural governments, city governments, the Bank of Japan, and the Chamber of Commerce and Industry of Japan wish to conduct statistical surveys other than those for Designated Statistics and Approved Statistical Reports, they must first notify the Director-General of the Administrative Management Agency (Article 8, Statistics Law, Article 2, Cabinet Order relating to Statistical Survey Notification Requirements). Note that both the Bank of Japan and the Chamber of Commerce and Industry of Japan are also under the application of this Cabinet order. This is because the statistical surveys conducted by these two entities are in size and importance comparable to central government activities. It is not normally the intention, however, of the central government to intervene or control statistics collected by private groups.

For the most part, statistical surveys conducted by the administrative organs of the central government are under the application of the Statistical Reports Coordination Law and the statistical surveys approved by the Director-General of the Administrative Management Agency are exempt from notification. Notification of 134 surveys was made during calendar year 1976.

When necessary, the Director-General of the Administrative Management Agency may request the surveying agency to suspend or change a Notified Statistical Survey.

Inevitably, there is some overlap in the three classes of statistical surveys. Of the three classes, Designated Statistics clearly includes the most important Japanese materials. As noted above, only Designated Statistical Surveys can impose this obligation to respond. Responses to Notified Statistical Surveys and to Approved Statistical Surveys are entirely voluntary. Unlike the other two classes, Designated Statistics assume regular, continuous surveying and approval by the Administrative Management Agency is not needed each time a survey is conducted. By comparison, Approved Statistical Reports (ASR) are typically just one survey. Where ASR surveying continues on a regular basis, each survey must be separately approved. In an intermediate position, Notified Statistics may refer to a multiple but limited statistical undertaking.





### 3. AUTOMOBILE INDUSTRY-RELATED STATISTICS REGULARLY SUBMITTED TO JAPANESE GOVERNMENT

#### 3.1 PRIME MINISTER'S OFFICE, BUREAU OF STATISTICS

The Bureau of Statistics of the Prime Minister's Office conducts Kagaku gijutsu kenkyū chōsa (Survey of Research and Development).<sup>3</sup> Under the Statistics Law this survey is Designated Statistics No. 61. As with all such surveys, a special ordinance was promulgated (Prime Minister's Ordinance No. 38), specifying the coverage, survey data, subject of survey, kind of survey, survey items, obligation of reporting results, personnel to be engaged in the survey, and the further use and maintenance of questionnaires.

The survey is conducted April 1st of each year for the settlement period nearest to that date. Among many other companies, the survey covered all the Japanese automobile and truck assemblers. It also surveys all auto parts manufacturers with a capitalization of over ¥ 3 million reporting research and development in the two most recent surveys. For other auto parts companies the survey uses stratified sampling procedures. All auto parts companies with a capitalization of over ¥ 100 million are sampled. In addition, a 14 percent sample is taken of auto parts companies with capitalization between ¥ 30 million and ¥ 100 million; a 7 percent sample is taken of auto parts companies with capitalization between ¥ 100 million and ¥ 30 million; and a 1 percent sample is taken of auto parts companies having a capitalization between ¥ 3 million and ¥ 10 million. Auto parts companies capitalized at less than ¥ 3 million are not sampled at all. Table 3.1 is a translation of the questionnaire used in the survey.

Completed survey questionnaires are tabulated by the Bureau of Statistics. In the resulting statistical tables, companies are classified by industry and size (amount of capital, number of persons employed, amount of sales, amount of operating profits, number of researchers or expenditures on R & D). Thus, all the information collected in the survey questionnaire translated above is available in aggregate for the automobile industry. This information for the automobile industry is also disaggregated by the following size classes:

<u>Classes of Regular Researchers</u>	<u>Classes of Total Employees</u>
(1) 0 employed	(1) 1-299
(2) 1-29 employed	(2) 300-999
(3) 30 - 90 employed	(3) 1000-2999
(4) 100 or more employed	(4) 3000-9999
	(5) 10000 or more

TABLE 3.1.-ENGLISH TRANSLATION OF JAPANESE GOVERNMENT FORM FOR  
1978 SURVEY OF RESEARCH AND DEVELOPMENT QUESTIONNAIRE  
A (FOR COMPANIES).



DESIGNATED #61  
STATISTICS

THIS SHALL NOT BE USED FOR ANY  
PURPOSE SUCH AS TAXATION. YOU  
ARE THEREFORE REQUESTED TO PRO-  
VIDE VALID INFORMATION

BUREAU OF STATISTICS  
PRIME MINISTER'S OFFICE

AS OF APRIL 1st, 1978

YOU ARE KINDLY REQUESTED TO COMPLETE THIS PAGE OF THE QUESTIONNAIRE AND RETURN IT TO THE BUREAU NOT LATER THAN JUNE 15TH WHETHER OR NOT YOU ARE ENGAGING IN RESEARCH ACTIVITIES. GIVE INFORMATION AS OF APRIL 1ST, 1978 ABOUT EMPLOYEES AND FOR A YEAR ENDING ON THE LATEST SETTING DAY PRIOR TO APRIL 1ST, 1978 ABOUT FINANCIAL STATUS. UNIT IN CHARGE: SURVEY OF RESEARCH AND DEVELOPMENT UNIT, ECONOMIC STATISTICS SECTION, SURVEY DIVISION, TELEPHONE 202-1111 EXT. 312

	PRESENT STATUS OF COMPANY				
	DESCRIPTION OF BUSINESS (1977 FISCAL YEAR)				
PERSON REPRESENTING THE COMPANY			PRODUCTS OR KIND OF BUSINESS (IN ORDER OF SALES)		
PERSON REPRESENTING THE COMPANY	TITLE	NAME	(1)	(2)	(3)
PERSON FILLING OUT THE QUESTIONS	SECTION NAME	NAME	TELEPHONE ( )		
TOTAL NUMBER OF PERSONS ENGAGED (AS OF APRIL 1ST)	CAPITAL (AS OF APRIL 1ST)	TOTAL SALES (1977 FISCAL YEAR)	OPERATING PROFIT (1977 FISCAL YEAR)		
NUMBER OF PERSONS	¥ MILLIONS	¥ MILLIONS	¥ MILLIONS		

THE TOTAL NUMBER OF PERSONS ENGAGED: REFERS TO ALL EMPLOYEES OF THE COMPANY WHETHER OR NOT ENGAGED IN RESEARCH INCLUDING THOSE IN BRANCH OFFICES AND IN FACTORIES, REGARDLESS OF OCCUPATIONS, WHETHER FULL-TIME OR OR PART-TIME AND REGULAR AS WELL AS TEMPORARY OR DAILY EMPLOYEES IF EMPLOYED FOR AT LEAST A MONTH. OPERATING PROFIT: REFERS TO THE PROFIT EARNED BY BUSINESS WHICH IS COMPUTED BY DEDUCTING PURCHASE COST, GENERAL MANAGEMENT COST AND SALES EXPENSES FROM TOTAL SALES. IF THE PROFIT IS A DEFICIT PLEASE ENTER

(1) ENGAGED IN INTERNATIONAL EXCHANGE OF TECHNOLOGY,

YES NO

ENTER THE NUMBER OF CASES AND THE AMOUNT OF TECHNOLOGY EXCHANGE IN ACCESS TO OR ACQUIRING OF PATENTS, KNOW-HOW, AND TECHNICAL GUIDANCE BY COUNTRY OR TERRITORY OF DESTINATION OR ORIGIN DURING THE 1977 FISCAL YEAR. THE NUMBER OF CASES IS IRRESPECTIVE OF ACTUAL MONETARY TRANSACTIONS.

	COUNTRY OR TERRITORY OF DESTINATION OR ORIGIN	NEW PROGRAMS			CONTINUED PROGRAMS		
		CODE	NUMBER OF CASES	AMOUNT ¥ TEN THOUSAND	CODE	NUMBER OF CASES	AMOUNT ¥ TEN THOUSAND
TECHNOLOGY EXPORT	150 TOTAL TECHNOLOGY EXPORTS	151	152	153	154		
		151	152	153	154		
		151	152	153	154		
		151	152	153	154		
		151	152	153	154		
		151	152	153	154		
TECHNOLOGY IMPORT	155 TOTAL TECHNOLOGY IMPORTS	156	157	158	159		
		156	157	158	159		
		156	157	158	159		
		156	157	158	159		
		156	157	158	159		
		156	157	158	159		

TABLE 3.1. (CONT.)

(2) WHETHER CONDUCTING R&D, YES OR NO, CIRCLE THE APPROPRIATE NUMBER

- 1. CONDUCTING INTRAMURAL R&D ..... GO TO PAGE 2
- 2. CONDUCTING INTRAMURAL R&D AND FUNDING EXTERNAL R&D ..... GO TO PAGE 4
- 3. FUNDING EXTERNAL R&D ..... GO TO PAGE 4
- 4. NOT CONDUCTING R&D ..... END OF QUESTIONNAIRE

FILL IN RESEARCH LABORATORIES, RESEARCH DIVISIONS, RESEARCH SECTIONS OF THE COMPANY

NAME	LOCATION

(3) INDIVIDUALS ENGAGED IN R&D (AS OF APRIL 1st)

TOTAL (003 007)	INDIVIDUALS	CODE	TOTAL	FEMALE
		001		
RESEARCHERS	REGULAR	003		
	EXTERNAL CONSULTANTS	004		
	ASSISTANT RESEARCH WORKERS	005		
	TECHNICIANS	006		
	CLERICAL AND OTHER SUPPORTING	007		
	INTERNAL CONSULTANTS	008		

(3) INDIVIDUALS ENGAGED IN R&D: ALL EMPLOYEES WHO ARE MAINLY ENGAGED IN THE WORK OF RESEARCH UNITS (INCLUDING BOTH CLERICAL AND OTHER WORKERS). INTERNAL CONSULTANTS ARE NOT INCLUDED.

RESEARCHERS: INDIVIDUALS WHO HOLD A UNIVERSITY DEGREE (OR INDIVIDUALS WHO HAVE AN EQUIVALENT OR MORE KNOWLEDGE OF A SPECIALITY) WHO HAVE RESEARCH EXPERIENCE OF AT LEAST TWO YEARS AND WHO ARE WORKING ON THEIR OWN RESEARCH PROJECTS.

REGULAR: RESEARCHERS WORKING PRIMARILY FOR THE COMPANY.

EXTERNAL CONSULTANTS: RESEARCHERS ENGAGED BY THE COMPANY WHERE PRIMARY WORK IS OUTSIDE THE COMPANY.

ASSISTANT RESEARCH WORKERS: INDIVIDUALS WHO ASSIST RESEARCHERS AND WHO ARE ENGAGED IN RESEARCH ACTIVITIES UNDER THEIR DIRECTION AND WHO HAVE THE POSSIBILITY OF BECOMING RESEARCHERS IN THE FUTURE. FOR EXAMPLES, INDIVIDUALS WHO HOLD A UNIVERSITY DEGREE OR ITS EQUIVALENT BUT WHO HAVE RESEARCH EXPERIENCE OF LESS THAN TWO YEARS OR PERSONS WHO HOLD A UNIVERSITY DEGREE OR ITS EQUIVALENT WHO HAVE RESEARCH EXPERIENCE OF TWO YEARS BUT WHO ONLY ASSIST RESEARCHERS.

TECHNICIANS: INDIVIDUALS OTHER THAN RESEARCHERS AND ASSISTANT RESEARCH WORKERS, WHO ARE ENGAGED IN TECHNICAL SERVICES RELATED TO RESEARCH ACTIVITIES UNDER THE GUIDANCE AND SUPERVISION OF RESEARCH AND ASSISTANT RESEARCH WORKERS.

CLERICAL AND OTHER SUPPORTING PERSONNEL: EXCEPTING THOSE MENTIONED ABOVE, INDIVIDUALS WHO ARE ENGAGED IN MISCELLANEOUS ACTIVITIES, CLERICAL WORK, ACCOUNTING, ETC. RELATING TO RESEARCH ACTIVITIES. AS TO THE INDIVIDUALS ENGAGED IN THE ADMINISTRATION OF RESEARCH ACTIVITIES, INDIVIDUALS WITH RESEARCH EXPERIENCE ARE INCLUDED AS RESEARCHERS AND THE REST ARE IN "CLERICAL AND OTHER SUPPORTING PERSONNEL."

INTERNAL CONSULTANTS: INDIVIDUALS WHO ARE ENGAGED IN R&D ACTIVITIES PART-TIME WHILE REGULARLY PERFORMING SOME OTHER PRIMARY FUNCTION FOR THE COMPANY.

(4) NUMBER OF REGULAR RESEARCHERS BY SPECIALITY

TOTAL (010 025)		CODE	TOTAL	FEMALE
		009		
NATURAL SCIENCE	PHYSICAL SCIENCE	MATHEMATICS AND PHYSICS	010	
		CHEMISTRY	011	
		BIOLOGY	012	
		GEOLOGY	013	
	ENGINEERING SCIENCE	MACHINERY SHIP-BLDG & AERONAUTICS	014	
		ELECTRICITY & COMMUNICATIONS	015	
		CIVIL ENG. & ARCHITEC.	016	
		METALLURGY & METAL ENG.	017	
		TEXTILE ENG.	018	
	AGRICULTURAL SCIENCE	AGRICULTURE & FORESTRY	019	
		VETERINARY SCIENCE AND ANIMAL HUS.	020	
		FISHERY	021	
		MEDICAL SCI. DENTISTRY	022	
HEALTH SCIENCE	PHARMACY	023		
	OTHER NATURAL SCIENCE	024		
SOCIAL SCI./HUMANITIES		025		

(4) CLASSIFY THE NUMBER OF REGULAR RESEARCHERS (CODE 003) ENTERED IN [3] BY SPECIALITY.

TABLE 3.1.-(CONT.)

EVEN IF EXPENDITURE ON R&D IS NOT SEPARATED IN COMPANY ACCOUNTS, SEGREGATE AND REPORT IT. EXPENDITURE AND RECEIPT IN KIND SHOULD ALSO BE INCLUDED BY ESTIMATING IT FROM CURRENT PRICES

( 5 ) INTRAMURAL EXPENDITURE ON R&D

TOTAL (029, 030, 032, 036)		CODE	¥ 10,000
		027	
WAGES AND SALARIES		029	
MATERIALS		030	
EXPENDITURE ON TANGIBLE FIXED ASSETS		032	
ITEMS	LANDS, BUILDINGS, ETC.	033	
	MACHINERY, UTENSILS, EQUIPMENT, ETC.	034	
	OTHER TANGIBLE FIXED ASSETS	035	
OTHER EXPENSES		036	
DEPRECIATION OF TANGIBLE FIXED ASSETS		031	

( 5 ) ENTER EXPENDITURES ON R&D PERFORMED IN THE COMPANY DURING THE LAST YEAR, INCLUDING WHAT IS FINANCED BY OUTSIDE FUNDS.

WAGE AND SALARIES: WAGES AND SALARIES AND OTHER ALLOWANCES (BEFORE DEDUCTING TAXES AND INSURANCE) PAID TO INDIVIDUALS ENGAGED IN R&D (EXCLUDING INTERNAL CONSULTANTS) DURING THE YEAR INCLUDING RETIREMENT PAYMENTS, BONUSES, ETC.

MATERIALS: EXPENSES ON RAW MATERIALS, PROCESSED MATERIALS, PARTS, ETC. NEEDED FOR R&D.

EXPENDITURE ON TANGIBLE FIXED ASSETS: EXPENDITURES ON TANGIBLE FIXED ASSETS INCLUDES ALL THE FOLLOWING FIXED ASSETS NEEDED FOR R&D:

•LAND, BUILDINGS, ETC. LAND, BUILDINGS (INCLUDING AUXILIARY STRUCTURES, CONSTRUCTION, SHIPS

•MACHINERY, UTENSILS, EQUIPMENT: MACHINERY, EQUIPMENT OTHER TRANSPORT EQUIPMENT AND TOOLS, IMPLEMENTS AND FIXTURES WHICH ARE DURABLE FOR ONE YEAR OR MORE AND COST AT LEAST ¥100,000.

•OTHER TANGIBLE FIXED ASSETS: CONSTRUCTION IN PROCESS.

OTHER EXPENSES: INCLUDES ELECTRICITY, FUEL AND WATER, TRAVEL, COMMUNICATION, INSURANCE, PRINTING, OFFICE SUPPLIES, FIXTURES, ETC.

DEPRECIATION OF TANGIBLE FIXED ASSETS: TOTAL AMOUNT OF DEPRECIATION ON SUCH TANGIBLE FIXED ASSETS USED IN R&D AS BUILDINGS, STRUCTURES, SHIPS, MACHINERY, APPARATUS EQUIPMENT, VEHICLES, TRANSPORT, EQUIPMENT, ETC.

( 6 ) EXPENDITURE ON R&D BY TYPE

TOTAL (039-041)	CODE	¥ 10,000
	037	
BASIC RESEARCH	039	
APPLIED RESEARCH	040	
DEVELOPMENT	041	

( 6 ) ALLOCATE "TOTAL (CODE 027)" OF [5] ACCORDING TO THE TYPE OF RESEARCH.

BASIC RESEARCH: RESEARCH UNDERTAKEN PRIMARILY FOR THE ADVANCE OF SCIENTIFIC KNOWLEDGE. SPECIFIC PRACTICAL APPLICATION ONLY SOUGHT INDIRECTLY.

APPLIED RESEARCH: RESEARCH UNDERTAKEN PRIMARILY FOR THE ADVANCE OF SCIENTIFIC KNOWLEDGE WITH A SPECIFIC PRACTICAL APPLICATION AIMED AT DIRECTLY.

DEVELOPMENT: USE OF AVAILABLE KNOWLEDGE OBTAINED AS THE RESULT OF BASIC AND APPLIED RESEARCH AND/OR PRACTICAL EXPERIENCE WHICH IS DIRECTED TO THE INTRODUCTION OF NEW MATERIALS, EQUIPMENT, PRODUCTS, SYSTEMS AND PROCESSES, ETC. OR THE IMPROVEMENT OF WHAT IS ALREADY AVAILABLE.

NOTES ON FILLING OUT:

1. CLASSIFICATION IF MADE IN PRINCIPLE FOR EACH RESEARCH PROJECT. OTHERWISE EITHER OF THE FOLLOWING MAY BE ADOPTED:

(1) CLASSIFICATION IS MADE FOR EACH RESEARCHER OR RESEARCH UNIT (2) CLASSIFICATION IS MADE ON THE BASIS OF RESEARCHER OPINION AND SYNTHETIC JUDGMENT.

2. RESEARCH ON NEW PRODUCTS UNDERTAKEN IN VARIOUS COMPANIES IS INCLUDED IN "DEVELOPMENT."

TABLE 3.1 (CONT.)

(7) R&D FUNDS RECEIVED FROM OUTSIDE THE COMPANY

TOTAL (044 054) (057 067)		TOTAL INTRAMURAL EXPENDITURES OF R&D FUNDS RECEIVED			
		CODE	¥ 10,000	CODE	¥ 10,000
		042		055	
FROM CENTRAL AND LOCAL GOVERNMENTS	FROM CENTRAL GOVT.	044		057	
	FROM LOCAL GOVT.	045		058	
	FROM NATIONAL AND PUBLIC UNIVERSITIES AND COLLEGES	046		059	
	FROM NATIONAL AND PUBLIC RESEARCH INSTITUTES	047		060	
	FROM OTHERS	048		061	
FROM PRIVATELY OWNED	FROM OTHER COMPANYS	050		063	
	FROM PRIVATE UNIV. AND COLLEGES	051		064	
	FROM PRIVATE RESEARCH INSTITUTES	052		065	
	FROM INDIVIDUALS AND OTHERS	053		066	
FROM FOREIGN COUNTRIES		054		067	

(7) ENTER ALL THE FUNDS ON R&D RECEIVED SUCH AS TRUST MONEY, SUBSIDIES, ALLOCATIONS, INVESTMENT, DUES, CONTRIBUTIONS, ETC. IN THE RIGHT COLUMN ENTER THOSE INTRAMURALLY EXPENDED.

OTHER COMPANIES INCLUDE THE JAPAN NATIONAL RAILWAY, THE NIPPON TELEGRAPH AND TELEPHONE PUBLIC CORPORATION, THE JAPAN MONOPOLY CORPORATION, AND THE METROPOLITAN EXPRESSWAY CORPORATION IN ADDITION TO RESEARCH INSTITUTIONS WITH COMPANY SLATERS AND RESEARCH UNITS OF COMPANIES.

PRIVATE RESEARCH INSTITUTIONS ARE CORPORATIONS PRIMARILY ENGAGED IN RESEARCH AND RESEARCH ASSOCIATIONS ESTABLISHED BY INDUSTRIAL GROUPS.

HOSPITALS ATTACHED TO UNIVERSITIES AND GENERAL HOSPITALS ARE INCLUDED SEPARATELY IN "UNIVERSITIES AND COLLEGES AND RESEARCH INSTITUTIONS."

(8) EXTERNAL R&D SUPPORTED COMPANY FUNDS

TOTAL (070 078) (081 089)		TOTAL OF WHICH SELF-FINANCED			
		CODE	¥ 10,000	CODE	¥ 10,000
		068		079	
TO CENTRAL AND LOCAL GOVERNMENTS	TO NATIONAL AND PUBLIC UNIV. AND COLLEGES	070		081	
	TO NATIONAL AND PUBLIC RESEARCH INSTITUTIONS	071		081	
	TO OTHERS	072		083	
TO PRIVATELY OWNED	TO OTHER COMPANYS	074		085	
	TO PRIVATE UNIV. AND COLLEGES	075		086	
	TO PRIVATE RESEARCH INSTI.	076		087	
	TO INDIVIDUALS & OTHERS	077		088	
TO FOREIGN COUNTRIES		078		089	

TABLE 3.1.-(CONT.)

( 9 ) EXPENDITURE ON R&D BY KIND OF PRODUCT

TOTAL (093-123)	CODE	¥ 10,000
	091	
AGRICULTURE, FORESTRY AND FISHERY	093	
MINING PRODUCTS	094	
BUILDING CONST./CIVIL ENGINEERING	095	
FOOD PRODUCTS	096	
TEXTILE PRODUCTS	097	
PULP AND PAPER PRODUCTS	098	
PRINTING AND PUBLISHING	099	
CHEMICAL FERTILIZERS & INORGANIC & ORGANIC CHEMICAL PRODUCTS	100	
CHEMICAL FIBERS	101	
OIL AND PAINTS	102	
DRUGS AND MEDICINE	103	
MISCELLANEOUS CHEMICAL PRODUCTS	104	
PETROLEUM PRODUCTS	105	
RUBBER PRODUCTS	106	
CERAMIC PRODUCTS	107	
IRON AND STEEL	108	
NON-FERROUS METAL	109	
FABRICATED METAL PRODUCTS	110	
ORDINARY MACHINERY	111	
HOUSEHOLD ELECTRICAL APPLIANCES	112	
ELECTRONIC COMMUNICATION EQUIPMENT AND ELECTRIC GAUGES	113	
OTHER ELECTRIC EQUIPMENT	114	
AUTOMOBILES	115	
SHIPS	116	
AIRCRAFT	117	
OTHER VEHICLES	118	
OTHER TRANSPORT EQUIPMENT	119	
PRECISION INSTRUMENTS	120	
OTHER MANUFACTURING PRODUCTS	121	
ELECTRICITY AND GAS	122	
OTHER (SPECIFY)	123	

( 9 ) THIS QUESTION EXAMINES ALLOCATION OF EXPENDITURE IN (5) BY KIND OF PRODUCTS. IN CASE OF EXPENDITURES WHICH ARE DIFFICULT TO IDENTIFY BY TYPE OF PRODUCT, DIVIDE EXPENDITURES PROPORTIONALLY ON THE BASIS OF THE NUMBER OF RESEARCHERS.

( 10 ) EXPENDITURE ON R&D BY SPECIAL PURPOSE

TOTAL	CODE	¥ 10,000
SPACE DEVELOPMENT	132	
MARINE DEVELOPMENT	133	
INFORMATION	134	
PROTECTION OF ENVIRONMENT	135	

( 10 ) IF YOUR COMPANY CONDUCTS ANY R&D ON SPACE DEVELOPMENT, OCEAN DEVELOPMENT, INFORMATION, OR PROTECTION OF THE ENVIRONMENT, ENTER THOSE EXPENDITURES.

SPACE DEVELOPMENT: INCLUDES RESEARCH ON ROCKETS AND ARTIFICIAL SATELLITES AS WELL AS RESEARCH ON TRACING OR COMMUNICATION STATIONS FOR THEM.

MARINE DEVELOPMENT: INCLUDES OCEANIC RESEARCH AND TECHNICAL DEVELOPMENTS RELATING TO UTILIZATION OF SEA-WATER MINERAL RESOURCES AND OCEAN-SPACE.

INFORMATION: INCLUDES RESEARCH ON HARDWARE AND SOFTWARE.

PROTECTION OF THE ENVIRONMENT: INCLUDES RESEARCH ON THE EFFECT OF POLLUTED NATURAL ENVIRONMENT ON LIFE/LIFE CYCLE AND PROPERTY, PROTECTION OF THE NATURAL ENVIRONMENT FROM POLLUTION AND DESTRUCTION AND ACHIEVEMENT OF NON-POLLUTED ENVIRONMENT.

### Capital Size Classes

- (1) ¥ 3 ~ ¥ 10 million
- (2) ¥ 10 ~ ¥ 100 million
- (3) ¥ 100 million ~ ¥ 1 billion
- (4) ¥ 1 billion ~ ¥ 10 billion
- (5) greater than ¥ 10 billion
- (6) public corporation

### Total Sales Classes

- (1) under ¥ 100 million
- (2) ¥ 100 million-¥ 1 billion
- (3) ¥ 1 billion-¥ 10 billion
- (4) ¥ 10 billion or more

### Operating Profits Classes

- (1) Under ¥ 10 million
- (2) ¥ 10 million-¥ 100 million
- (3) ¥ 100 million-¥ 1 billion
- (4) ¥ 1 billion or more

The tabulated survey is published in March of the year following the survey year by the Bureau of Statistics under the title Kagaku gijutsu kenkyu chōsa hōkoku (Report on the Survey of Research and Development). This report contains the most comprehensive quantitative information on Japanese company research and development available anywhere. Most other Japanese government and private reports on Japanese research and development rely on this report as their primary source. For example, the Science and Technology Agency's annual white paper Kagaku gijutsu hakushō (Science and Technology White Paper) and the Ministry of International Trade and Industry's Institute of Industrial Technology annual survey Waga kuni no kenkyū kaihatsu katsudo dōkō (The State of National R & D) both heavily analyze the Bureau of Statistics' data but neither report provides primary data of its own. This is also true of the Science and Technology Agency's statistical annual Kagaku gijutsu yoran (Indicators of Science and Technology) which is almost entirely a reprinting of relevant sections of the Bureau of Statistics Report.

### 3.2 KAGAKU GIJITSUCHŌ (SCIENCE AND TECHNOLOGY AGENCY)

(1) Keikaku kyoku (Planning Bureau). Almost every year the Planning Bureau of the Science and Technology Agency conducts a survey on the R & D activities of private enterprises. The survey, Minkan kigyō no kenkyū katsudō ni kansuru chōsa, deals with a different R & D topic each year. In 1974, for example, the survey emphasized energy R & D and R & D on environmental pollution controls. There was also considerable stress in the survey on how more Japanese technology might, in the future, rest on basic research conducted by Japanese. By contrast, the 1976 survey (an English translation of which together with automobile companies' responses is included in the appendix) dealt primarily with the use of imported technologies and the development of new products from existing technologies.

Because of its topical quality, this survey serves as a supplement to the more general Bureau of Statistics survey. It is particularly useful as a supplement because it tabulates its results using the industrial breakdown taken from the Bureau of Statistics survey. Thus, the results of each survey question for the automobile industry are available for each year that the survey has been conducted. Note that, unlike the almost 12,000 companies sampled for the Bureau of Statistics, the 1977 Minkan kigyō no kenkyū ni kansuru chōsa uses a sample of 663 companies. This sample does include all the automobile assemblers and the important parts suppliers.

(2) Kenkyū chosei kyoku (Research Coordination Bureau). The Research Coordination Bureau of the Science and Technology Agency each year compiles Kuni no shiken kenkyū gyōmu keikaku (National Research and Development Projects). This annual report is a complete census of all research and development projects being carried out in government facilities and/or by government personnel. The 1978 edition of this report comes in two volumes, the first volume of which gives an overview of government research and development activities and the second gives details of individual projects. Unfortunately, the first volume contains no summary of automotive-related research and development conducted by the government. The second volume is so comprehensive, however, giving budgetary and other details of individual research projects with budgets as small as \$500, that aggregate measures for government-conducted research in automobiles can be constructed. Kuni no shiken kenkyū gyōmu keikaku does not report details of government-financed research conducted by the private sector.

### 3.3 TSUSHŌSANGYŌSHŌ (MINISTRY OF INTERNATIONAL TRADE AND INDUSTRY) DAIJIN KANBO (MINISTER'S SECRETARIAT)

(1) Chōsa tōkeibu (Research and Statistics Department). The Ministry of International Trade and Industry conducts the monthly survey Tsushōsangyōshō seisan dōtai tōkei chōsa (Current Production Survey of Ministry of International Trade and Industry). In connection with this survey, reports are obtained on all automobile assemblies and all automobile parts by manufacturers employing more than fifty workers. The automobile and automobile parts industries are surveyed each month and the results of these surveys are published by the Ministry of International Trade and Industry on the twenty-fifth day of the second month following the survey in Kikai tōkei geppō (Machinery Statistics Monthly) [The monthly report is considered final and the same data subsequently appears in Kikai tōkei nenpō (Yearbook of Machinery Statistics)]. A preliminary version of the monthly survey data is released on the 24th day of the month following the survey in Kikai tōkei sokuhō (Preliminary Report on Machinery Statistics). The data collected in the Ministry of International Trade and Industry's Current Production Survey are Registered Statistics No.11 under the Statistics Law.



In general, the Current Production Survey includes items on the volume of production, the value of shipments, the value of inventory and where necessary raw materials, fuel, motive power, workers, machinery and equipment. For the automobile industry, there is industry data on both the volume and value of production, the volume and value of shipment and the value of auto parts production. Table 3.2 shows the specific classifications for automobile related items in the survey. A translation of the survey forms for the automobile and auto parts industries are included in Table 3.2.A and Table 3.2.B.

The volume of automobile production data and the shipments data which are published in the Ministry of International Trade and Industry reports are identical with the data published in Nihon jidōsha kōgyō kai (Japan Automobile Manufacturer's Association), Jidōsha tōkei geppō (Monthly Report on Automobile Statistics) and Jidōsha tōkei nenpō (Yearbook of Automobile Statistics). The Ministry of International Trade and Industry data on volume and value of automobile production and shipment and the volume of inventories also appears in Jidōsha nenkan (Automobile Yearbook), a joint publication of Nihon jidōsha kaigishō (Japan Automobile Chamber of Commerce) and the Nikkan jidōsha shimbunsha (Daily Automotive News).

The Current Production Survey also contains considerable information on automobile industry and auto parts industry consumption and inventory of raw materials, orders for machinery and employment of workers. In particular, for the automobile and automobile parts industries, the survey contains their monthly consumption of and inventories of standard steel and steel material and specialty steels. For the automobile industry, there is also data on consumption and inventory of tires and glass panes. All this inventory and consumption data are given in physical terms. The Current Production Survey also contains data on automobile industry orders of engines and motors, heavy electrical appliances, electronics and communication equipment, industrial machine tools, railway cars, airplanes, ships, cast metals, bearings, and electric wire and cables, all in value terms. Finally, for the automobile and automobile parts industries, the Current Production Survey contains export and import information as well as total numbers of regular employers and the month's total hours for all employees and an index of productive capacity.

The preliminary release of Current Production Survey results in Kikai Tōkai sokuhō is inevitably incomplete. This early release includes data on production, sales and inventory for light, small and ordinary passenger cars, for small and large buses, for light, small and ordinary (diesel and gasoline separately) trucks and for four-wheel drive vehicles. There is no preliminary release of data on auto parts and bodies.

(2) Daijin kanbo (Minister's Secretariat, Chōsa tōkeibu (Research and Statistics Department), Kōgyō tokeika (Industrial Statistics Division)). The Industrial Statistics Division of the Research and Statistics Department conducts Japan's Census of Manufactures. The Census of Manufactures is Designated Statistics No.10 under Japan's Statistics Law. The Census is conducted each year on the status of Japan's Manufacturing establishments as of December 31. The Census categories are shown in Table 3.3. Translations of the Census forms are included in the Appendix. The Census includes three different schedules depending upon the size and function of the manufacturing enterprise.

TABLE 3.2.-CLASSIFICATION OF AUTO-RELATED ITEMS IN JAPAN'S CURRENT PRODUCTION SURVEY.

Passenger Cars Light Passenger Cars (cylinder volume less than 550 cc) Small Passenger Cars (cylinder volume 550 cc to 2000 cc) Ordinary Passenger Cars (cylinder volume greater than 2000 cc)	Bus Chassis Small Bus (less than 30 passengers) Large Bus (30 passengers or more)
Tractors Special Automobiles Trailers	Truck Chassis Light Trucks Small Trucks Gasoline engine trucks Diesel engine trucks Four-wheel-Drive Trucks

There is also production, shipment and inventory data available on auto bodies. It is broken down as follows:

Bodies

Passenger Car Bodies Bus Bodies Small Bus Bodies Large Bus Bodies Truck Bodies Small Truck Bodies Cab of small truck Bed of small truck Standard Truck Bodies Cab of standard truck Bed of standard truck Specially Equipped Automobile Body Small specially equipped automobile body Freight-passenger automobile body Small dump truck body Small refrigerator truck body Small limousine Small fire engine body Other small specially equipped automobile bodies	Standard Size Specially Equipped Automobile Body Standard-size dump truck body Standard-size tanker truck body Standard-size refrigerator truck body Limousine Standard-size fire engine bodies Other standard-size specially equipped automobile bodies
---	--

The value of auto parts production is given by the following categories:

Automobile Parts

Engine Parts Piston Piston cylinder Cylinder liner Air in-take valve and exhaust valve Bearing nutal Bushings Gaskets Oil seals Fuel pumps Carburetor Fuel jet Air filter Oil filter Oil pump Radiator	Clutch, Transmission, Rear End and Steering System Parts Clutch Automatic transmission Universal joint Propeller shaft Wheel Steering wheel Steering system Tie rods and tie rod ends
Chassis and Body Parts Fuel tank Exhaust pipes and muffler Window frames Door hinge, handle and lock Power window system Seat	Suspension and Brake System Parts Shock absorber Power brake system Brake cylinder Brake pipe Brake shoes
	Other Parts Switches Gauges Windshield washer Horn Heating system

# TABLE 3.2.A

## MITI CURRENT PRODUCTION SURVEY FORM -- AUTOMOBILES

CONFIDENTIAL

MITI CURRENT PRODUCTION SURVEY  
(SECTION 41)

41 AUTOMOBILES  
(EXCLUDING MOTORCYCLES AND MILITARY VEHICLES)

( 1979 )

1-1 PRODUCTS

ITEMS	PRODUCTION		SHIPMENT			INVENTORY AT THE END OF THE MONTH
	QUANTITY (NO. OF UNITS)	VALUE (MILLIONS OF YEN)	SALES		OTHERS	QUANTITY (MILLIONS OF YEN)
			QUANTITY (NO. OF UNITS)	VALUE (MILLIONS OF YEN)	VALUE (NO. OF UNITS)	
	A	B	C	D	E	F
PASSENGER CARS INC. CHASSIS	Light Passenger Cars (Cylinder Volume < 550cc)	101				
	Small Passenger Cars (Cylinder 550-2000cc)	102				
	Standard Size Pass. Cars (Cylinder >2000cc)	103				
BUS CHASSIS INC. COMPLETE BUS	Small Bus	104				
	Large Bus	105				
TRUCK CHASSIS (INC. COMPLETE TRUCKS)	Light Trucks	106				
	Small Trucks	Gasoline Engine	107			
		Diesel Engine	108			
	Ordinary (stan. size) Trucks	Gasoline Engine	109			
		Diesel Engine	110			
	Four-wheel Drive Trucks	Gasoline Engine	111			
		Diesel Engine	112			
	Tractors	113				
Special Automobiles	114					
Trailers	115					

1-2. PRODUCTS

ITEMS	PRODUCTION		
	QUANTITY (NO. OF UNITS)	VALUE (1000 Yen)	
	A	B	
PASSENGER CAR BODY	116		
BUS BODY	Small Bus Body	117	
	Large Bus Body	118	
TRUCK BODY	Small Truck Cab of Small Truck Body	119	
	Small Truck Bed of Small Truck	120	
	Standard Truck Cab of Standard Truck Body	121	
	Standard Truck Bed of Standard Truck	122	
BODIES.	Freight-Pass. Auto. Body	123	
	SPECIALLY EQUIPPED AUTOMOBILE BODY	Small Dump Truck Body	124
		Small Refrigerator Truck Body	125
	STANDARD AUTO. BODY	Small Limousine	126
		Small Fire Engine Body (include Light)	127
	Others	128	
	SPECIALLY EQUIPPED TRUCK BODY	Standard Dump Truck Body	129
		Standard Tanker-Truck Body	130
	SMALL AUTO. BODY	Std. Refrigerator Truck Body	131
		Limousine	132
	Standard Fire Engine Body	133	
Others	134		

2. MATERIALS

Name of Material	Classification	Monthly Consumption of materials for quantities	Amount of Inventory at Factory at Month End
		A	B
Ordinary Steel	2 01		
Special Steel	2 02		
Springs for Suspension System	2 03		
Tire	2 04		
Windshield Washer	2 05		
Air Filter (cleaner)	2 06		

3. LABOR (PERSONNEL)

Classification	No. of Pers. Employed at the End of Month	Total Monthly Man-Days
		A
Work Force Directly Related to Production of Item in Ques.	3 01	
Total Work Force at the Factory	3 02	

4. PRODUCTION CAPACITY

Classification	Classification	Monthly Production Capacity
		A
Passenger cars	4 01	
Standard-size Autos	4 02	
Small Trucks (include light)	4 03	

NOTE: Standard-size automobiles (402) should include standard-size truck, four-wheel-drive automobiles, tractors and bus.

(THE REMARKS COLUMN)

NAME OF EMPLOYEE	ADDRESS OF HEADQUARTERS
NAME OF FACTORY	ADDRESS OF FACTORY
NAME & STAMP OF PERSON RESPONSIBLE FOR QUES. ANSWERS	POST & NAME OF PERSON WHO ANSWERED QUES.

( YEAR MONTH DAY )

SURVEY #	YEAR & MONTH	ENTRY IN NUMBER	CODE	CODE
2 4 1 0	5 4			

TABLE 3.2.B  
MITI CURRENT PRODUCTION SURVEY FORM --  
AUTOMOBILE PARTS

CONFIDENTIAL

MITI CURRENT PRODUCTION SURVEY  
MACHINES & TOOLS MONTHLY (SECTION 42)

42. AUTOMOBILE PARTS AND ELECTRIC PARTS OF ENGINE

( , 1979)

1. PRODUCTS

ITEMS	PRODUCTION		ITEMS	PRODUCTION			
	QUANTITY (NO. OF UNITS)	VALUE (1000 YEN)		QUANTITY (NO. OF UNITS)	VALUE (1000 YEN)		
	A	B		A	B		
Automobile Parts Engine Parts	Piston	101	Automobile Parts Suspension and Brake System Parts	Shock Absorber	125		
	Piston Ring	102		Power Brake System	126		
	Cylinder liner	103		Brake Cylinder	127		
	Air In-take Valve and exhaust Valve	104		Brake Pipe	128		
	Bearing metal	105		Brake Shoes	129		
	Bushings	106		Automobile Parts Chassis and Body Parts	Fuel Tank (excluding Fuel tank for LPG)	130	
	Gasket	107			Exhaust Pipes/Muffler	131	
	Oil Seals	108			Window Frames	132	
	Fuel Pumps	109			Door Hinge/Handle/Lock	133	
	Caburetor	110			Power Window System	134	
	Fuel Jet	111			Seat	135	
	Air Filter (cleaner)	112			Automobile Parts Other Parts	Switches	136
	Oil Filter	113				Gauges	137
	Oil Pump	114				Windshield Washer	138
	Water Pump	115				Horn	139
	Radiator	116		Heating System		140	
Automobile Parts Clutch, Transmission, Rear End, Steering System Parts	Clutch System	117	Automobile Parts Electric Parts of Engine (including tools)	Alternator		141	
	Automatic Transmission	118		Voltage Regulator or Alternator	142		
	Universal Joint	119		Starter	143		
	Propeller Shaft	120		Distributor	144		
	Wheel	121		Ignition Coil	145		
	Steering Wheel	122		Plug	146		
	Steering System	123					
	Tie Rods and Tie Rod Ends	124					

2. MATERIALS

	Monthly Consumption of materials for production of items in questionnaire	The amount of inventory at factory at end of month	
		A	B
SPECIAL STEEL	201		
ORDINARY STEEL	202		

3. LABOR (Personnel)

Classification	No. of Permanent Employees at end of Month	
	A	B
Work Force directly Related to Production of Items in Question	301	
Total Work Force at the Factory	302	

(THE REMARKS COLUMN)

NAME OF EMPLOYEE		ADDRESS OF HEADQUARTERS	
NAME OF FACTORY		ADDRESS OF FACTORY	
NAME & STAMP OF PERSON RESPONSIBLE FOR QUES. ANSWERS		POST & NAME OF PERSON WHO ANSWERED QUES.	

( YEAR MONTH DAY )

SURVEY #				YEAR & MONTH		ENTRY IN NUMBER				CODE	CODE
2	4	2	0	5	4						

TABLE 3.3.-QUESTIONNAIRE CATEGORIES, JAPAN CENSUS OF MANUFACTURES.

Schedule A (30 or Over Employees)

1. Name and location of establishment
2. Name and location of head office
3. Existence of other establishments
4. Type of organization
5. Value of capital or investment
6. Number of employees (by sex) (includes total number of regular workers, self-employed and unpaid family workers as of December 31)
7. Total number of regular workers at the end of each month
8. Total cash wages and salaries
9. Value of raw materials, fuels and electricity consumed and payment for contract production. (The value of raw materials consumed includes the consumption of principal materials, supplementary materials, parts purchased, receptacles, packing materials, and materials and other supplies to maintain factories. The value of electricity consumed means the value of electricity purchased only and excludes electricity self-generated. The payment for contract production includes the expenses paid or to be paid for contract and commission work by other enterprises on raw materials and products supplied by the contracting enterprise.)
10. Value of tangible fixed assets at the beginning of this year by kinds, acquisition, cost, liquidation and depreciation; increase or decrease in temporary construction accounts.
11. Value of manufactured products in stock, value of semi-manufactured products and of work in process and value of raw materials and fuels in stock. (The value of products/raw materials and fuels in stock and the value of semi-manufactured products and products in process are in book value or estimated city prices and include the value of supplies sent to other enterprises for contract production.)
12. Value of shipment and of stocks by commodities and receipts from contract work and for repairing. (Finished products are those products produced with raw materials owned by the establishment including what was produced by other establishments with by-products, scraps or raw materials supplied. The value of shipments is factory or selling prices or estimated market prices.
13. Value of excise duties
14. Principal raw materials
15. Manufacturing process
16. Land and building area
17. Area of land required
18. Amount of industrial water consumed by sources and by uses

Schedule B (29 or Less Employees)

1. Name and location of establishment
2. Name and location of head office
3. Existence of other establishments
4. Type of organization
5. Value of capital or investment
6. Number of employees
7. Total cash wages and salaries
8. Volume of raw materials, fuels and electricity consumed and payment for contract production
9. Value of shipments by commodity and receipts from contract work and for repairing
10. Value of excise duties
11. Principal raw materials and manufacturing process
12. Value of tangible fixed assets at the beginning of the year and acquisition cost, liquidation and depreciation (only for establishments with 10 or more employees).

Schedule C (Head Offices with Facilities in Different Places)

1. Name and location of head office
2. Name and position of enterprise representator
3. Relationship to manufacturing facilities
4. Type of organization
5. Value of capital or investment
6. Kind of business
7. Number of regular workers
8. Value of cash wages and salaries
9. Value of manufactured products, raw materials and fuels in stock
10. Value of tangible fixed assets at the beginning of the year by kinds, acquisition cost, liquidation and depreciation, increase or decrease in temporary construction accounts
11. List of manufacturing facilities

Schedule A is used for establishments with 30 or more employees (excluding head offices which have no direct relation to manufacturing processing or repairing), Schedule B for establishments with 29 or less employees (again excluding head offices), and Schedule C for head offices with one or more facilities in different places.

While the Census of Manufactures is conducted on the basis of shipment value, production value and value added are also calculated by the following formula:

$$\text{Value of production} = \text{Value of shipments} + (\text{value of products in stock at the end of the year} - \text{Value of products in stock at the beginning of the year}) + (\text{Value of semi-manufactured products and goods in process at the end of the year} - \text{Value of semi-manufactured products and goods in process at the beginning of the year})$$
$$\text{Value added} = \text{Value of production} - \text{Value of raw materials, fuels and electricity consumed and value of contract production} - \text{Value of excise duties} - \text{Value of depreciation}$$

The results of the Census of Manufactures are published in the following volumes:

Kōgyō tōkei hyō sangyō hen (Census of Manufactures Report by Industries)

Kōgyō tōkei hyō himmoku hen (Census of Manufactures Report by Commodities)

Kōgyō tōkei hyō kigyō hen (Census of Manufactures Report by Enterprises)

Kōgyō tōkei hyō yōchi yōsui hen (Census of Manufactures Report on Industrial Land and Water)

Kōgyō tōkei hyō bumpu sōkan hen (Census of Manufactures Report on Distribution)

Kōgyō tōkei hyō shi machi mura hen (Census of Manufactures Report by Cities, Towns and Villages)

Prior to the publication of these reports the results of tabulating the forms of establishments of 30 or more employees are published as Kōgyō tōkei sokuho (Preliminary Report on the Census of Manufactures). The results of Schedule A and B are also released in preliminary form as Kōgyō tōkei gaisū hyō (General Results on the Census of Manufacturers).

The Report by Industries consists of:

- (a) a general statistical table
- (b) statistical tables by industries
- (c) statistical tables by number of workers
- (d) statistical table by prefectures
- (e) statistical table on manufacturers per establishment and per worker.

Included in the Report by Commodities are:

- (a) statistical tables on shipments
- (b) statistical tables on receipts of processing for classified by commodities. The Report by Establishments presents detailed activity indicators by unit of enterprises.

The Report on Industrial Land and Water includes:

- (a) the number of establishments and workers, value of shipments, land and building area of establishments and area of land acquired
- (b) number of establishments, amount of consumption of industrial water by sources and by uses.

The Report on Distribution is designed to clarify quantitatively the structure of distribution of manufacturing products. It includes:

- (a) tables on principal indicators of distribution by number of establishments and number of workers
- (b) tables on distribution by number of establishments and cash payments per worker cross-classified by capitalization and by productivity per worker.

Finally, the Report by Cities, Towns and Villages shows tabulation of main survey items by cities, towns and villages.

All data in all the above reports are further cross-classified by 4 digit and 6 digit standard industrial classifications and automobile parts categories. For the automobile industry, twenty-five sectors are included.

(3) Sangyō seisaku kyoku (Industry Policy Bureau). The Industry Policy Bureau of the Ministry of International Trade and Industry twice each year (in February and September) surveys company investment programs. All the automobile assemblers are included in the survey as are all auto parts producers employing at least 300 workers. The survey asks the name of each company investment project, its expected starting month and year, its expected date of completion and its purpose. The survey also asks for funds necessary for equipment investment (amount of payments for the year before last and last year, amount of payment for next year and the year after next). This survey is called Setsubi toshi jisseki oyobi keikaku chōsa (Survey on Actual and Planned Equipment Investment). The Industry Policy Bureau also conducts a related survey Setsubi shikin chōtatsu jisseki oyobi keikaku chōsa (Survey on Actual and Planned Raising of Investment Funds).

The results of both these surveys are tabulated separately for automobile assemblers, auto body manufacturers and other auto parts manufacturers of special interest. The survey results separate for each of these industries investment in research and development facilities. Investment is also disaggregated by new projects, continuation of older projects and repairs and maintenance of existing equipment. For the last ten years, the results of these surveys have been published by the Industry Policy Bureau in Shuyō sangyō no setsubi toshi keikaku (Equipment Investment Plans of Principal Manufacturing Industries). These reports typically contain time series comparison of all major items included in the surveys. In addition the recent reports have contained medium term forecasts of energy use and pollution control investment among other interesting appendices.

#### 3.4 KEIZAI KIKAKUCHŌ (ECONOMIC PLANNING AGENCY)

(1) Chōsa kyoku (Research Bureau). Each quarter, the Research Bureau of the Economic Planning Agency surveys enterprises capitalized at ¥ 100 million or more on their investment plans. The same survey is carried out semi-annually for enterprises capitalized at less than ¥ 100 million but more than ¥ 10 million. The quarterly survey reaches all the more than 2,500 enterprises capitalized at more than ¥ 100 million. The semi-annual survey selects at random about 3000 enterprises from among those capitalized between ¥ 10 million and ¥ 100 million. The items in both these surveys include:

- (a) Equipment investment and its funding by quarter for the preceding year
- (b) Forecast on equipment investment and its funding for the current year
- (c) Qualitative response on whether equipment in the enterprise and the enterprise's industry is excessive in light of present and future demand
- (d) Present value of inventory
- (e) Forecast on value of inventory
- (f) Qualitative response on whether present inventory is excessive.



This survey is published as Hōjin kigyō toshi yosoku tōkei chōsa hokoku (Report on the Forecast Survey of Investment of Incorporated Enterprises).

In the past, as a means of checking the results of this survey, the Research Bureau at the end of March every year conducts the Hōjin kigyō toshi jisseki tōkei chōsa (Survey on the Actual Investment of Incorporated Enterprises). This survey is Designated Statistics No. 91. Enterprises to be surveyed are selected at random out of the enterprise registers compiled by the Establishment Census stratified by industry (including automobile industry) and size of capital. All firms capitalized at more than ¥ 1 billion are included. The amount of equipment investment covered by the survey is equivalent to approximately 70 percent of private producers durable equipment as shown in the national income accounts.

### 3.5 OKURASHŌ (MINISTRY OF FINANCE)

(1) Kanzei kyoku (Customs Bureau), Yūshutsu-ka (Export Division). Foreign trade statistics in Japan have been collected at a number of different points in the process between contract and final clearance of goods and settlement of accounts. Export statistics have been collected on (1) export contracts concluded, (2) letters of credit received, (3) certification of export declarations by foreign exchange banks, and (4) clearance of goods exported. Similarly, import statistics have been collected on (1) import contracts concluded, (2) import licenses approved, (3) opening of letters of credit for imports, and (4) clearance of imported goods.

Of the above four sets of statistics, the most continuously collected and the most generally useful are the data on the actual clearance of exports and imports. These data are compiled by the Statistics sections of the Customs Houses in Japan's ports which, in turn, submit them to the Export Division of the Customs Bureau of the Ministry of Finance. The statistics are compiled on the general trade system in conformity with the International Convention Concerning Economic Statistics. Re-exported and re-imported goods are shown, however, as separate series.

Statistics on external trade refer to the movement of goods through the border of a customs area. Even if ownership of goods is transferred across borders if goods themselves are not transferred, the transaction does not appear in the external trade statistics.

Presently, the customs area for Japan includes Honshu, Shikoku, Kyushu, Hokkaido and the islands which belong to these main islands, excluding the Habomai-gunti Archipelago and the islands of Shikotan, Kunashiri and Etorofu (all under the occupation of the Soviet Union).

The basic information for compiling the statistics includes for exports: (1) export declaration (including re-export declaration) and (2) re-shipment declarations; and for imports: (1) import declaration (including re-import declarations), (2) applications for approval of entrance of foreign goods into bonded warehouses, (3) applications for approval of entrance of foreign goods into bonded factories, and (4) application for receiving goods to be imported before formal approval.

(a) Dating of Transaction. Exports: the date of clearance of a loaded vessel or airplane. Imports: for foreign goods directly brought into domestic commerce it is the date of the import permit; for foreign goods brought into bonded warehouses and factories it is the date of entrance approval; and for foreign goods delivered prior to issuance of import permit it is the date of transaction approval.

(b) Classification of Commodities. The classification of commodities for the compilation of trade statistics generally conforms to the Standard International Trade Classification (SITC, Revised). Demands peculiar to Japan require the use of a six-digit classification system instead of the usual five-digit groups of SITC, Revised. Japan six-digit groups can be re-arranged easily to fit the five-digit SITC groups.

(c) Province and Destination. Exports are classified by countries or areas of destination while imports are classified by their primary source.

(d) Quantity Units. The quantity units of goods are in principle those widely employed in commerce. The quantum units for an individual commodity are presented in Yushutsunyū tōkei himmoku hyō (Commodity Classification for Foreign Trade Statistics).

(e) Valuation. The value of exports is based on f.o.b. value and for imports on c.i.f. value. The value is appraised at customs houses on the basis of the value reported. In tabulation, total values of goods imported or exported are presented, regardless of whether the payment of the goods is done at once or several times as a deferred payment.

Quite apart from ten-day press releases on preliminary foreign trade returns and delivery of updated computer tapes, foreign trade statistics are published monthly in Gaikoku bōeki gaikyō (Summary Report on Foreign Trade) and in Nihon bōeki geppōhyō (Annual Report on Japan's Foreign Trade).

The automobile classifications used in Japan's foreign trade statistics are shown in Table 3.4.

Table 3.4

AUTO-RELATED CLASSIFICATIONS

FOUND IN JAPAN'S FOREIGN TRADE STATISTICS

Passenger motor cars, unassembled or disassembled

Passenger motor cars with engines of a piston displacement of not more than 1000 cm<sup>3</sup>.

Passenger motor cars with engines of a piston displacement of more than 1000 cm<sup>3</sup> but not more than 2000 cm<sup>3</sup>.

Passenger motor cars with engines of a piston displacement of more than 2000 cm<sup>3</sup>.

Passenger motor cars, n.e.s.

Buses (trolley buses included), unassembled or disassembled

Buses (trolley buses included) with seating capacity of not more than 30 passengers.

Buses (trolley buses included) with seating capacity of more than 30 passengers.

Trucks, vans or lorries other than shuttle cars, unassembled or disassembled.

Trucks, vans or lorries other than shuttle cars, with engines of a piston displacement of not more than 360 cm<sup>3</sup>.

Trucks, vans or lorries other than shuttle cars, with engines of a piston displacement of more than 360 cm<sup>3</sup> but not more than 2000 cm<sup>3</sup>.

Trucks, vans or lorries other than shuttle cars, with engines of a piston displacement of more than 2000 cm<sup>3</sup>.

Trucks, vans or lorries other than shuttle cars n.e.s.

Motor Chassis fitted with cabs, ambulances or other special purpose motor cars.

Special purpose motor lorries and vans (such as breakdown lorries, fire-engines, fire-escapes, road-sweeper lorries, snow plows, spraying lorries, crane lorries, search-light lorries, mobile workshops and mobile radiological units).

Chassis fitted with engines for buses.

Chassis fitted with engines for trucks, vans or lorries with engines of a piston displacement of not more than 2000 cm<sup>3</sup>.

Chassis fitted with engines for trucks, vans or lorries with engines of a piston displacement of more than 2000 cm<sup>3</sup>.

Chassis fitted engines for passenger cars, buses, truck, lorries, vans and special purpose vehicles n.e.s.

Bodies for passenger cars, buses, trucks, lorry vans and special purpose vehicles n.e.s.

Parts and accessories for passenger cars, buses, trucks, lorries, vans and special purpose vehicles n.e.s.

While lacking a company-by-company breakdown, the Ministry of Finance external trade statistics on automobiles provide a far more detailed commodity and country breakdown than are available in the Japan Automobile Manufacturers Association's monthly Jidōsha tōkei geppō or in its annual Jidōsha tōkei nenpō. Unfortunately, the Ministry of Finance only publishes a single aggregate figure for auto parts external trade. The Nihon jidōsha buhin kōgyōkai (Japan Automobile Parts Industry Association) also only publishes this same single aggregate figure.

(2) Shukeikyoku (Budget Bureau) Sōmuka (General Affairs Division). In connection with its administrative responsibilities, the Ministry of Finance's Budget Bureau each year compiles a listing of all subsidies and grants paid by all agencies and ministries of the Japanese Government. This compilation is published each year as Hojokin benran (Compendium of Subsidies and Grants). Each listing includes the purpose or project for which the grant or subsidy was made, rate of subsidy (last year and this year), total size of grant or subsidy (last year and this year) and organization to which grant or subsidy was given. Among many other uses, Hojokin benran, because it gives project details on grants for research conducted outside the government, complements nicely the Science and Technology Agency's Kuni no shiken kenkyū gyōmu keikoku which gives project details only for R & D conducted in government facilities.

(3) Shoken kyoku (Security Bureau), Kigyōzaimuka (Enterprise Financial Records Division). In accordance with the provision of Securities Market Law No. 24, each year publicly-held Japanese corporations submit a comprehensive report on their business activities to the Securities Bureau. The Securities Market Law was passed in 1948 during the period of the American occupation of Japan and is modeled on American legislation. The annual comprehensive report is the Japanese equivalent of the 10-K Report which is submitted each year by American publicly-held companies to the Securities and Exchange Commission. The Ministry of Finance publishes these individual company reports in the series Yūka shōken hokukushō sōran (Report in Negotiable Securities). The required information for these reports is listed in Table 3.5.

With the exception of Mitsubishi Motors, which is not a publicly-held company, the reports on Negotiable Securities are available for all Japanese automobile assemblers and for a number of the parts suppliers. All the reports include most of the twenty-one items listed in Table 3.5, but only the report for Hino Motor Company includes all the items. Table 3.5A provides a guide to what information is actually available in 1978 auto assemblers and auto parts manufacturers reports. Even with a few items missing, these reports are invaluable sources of information about the Japanese automobile industry. As such, they are widely used in Japan for financial and technical analysis.

TABLE 3.5

INFORMATION REQUIRED TO BE ANNUALLY SUBMITTED BY  
PUBLICALLY-HELD CORPORATIONS TO JAPANESE GOVERNMENT

1. Education background, work history, and shareholdings of from fifteen to twenty of the company's leading officers.
2. Disaggregation of shareownership in company by six categories
  - a. Government institution
  - b. Bank and insurance companies
  - c. Securities companies
  - d. Other legal institutions
  - e. Foreigners
  - f. Individuals
3. Size distribution of shareownership in company.
4. Size, average age, experience and monthly compensation of labor force disaggregated by sex.
5. Specification of product line.
6. Organizational Chart
7. Technical Assistance Agreements with Foreign Firms - Technology purchased, from whom, summary terms of the agreement.
8. Actual Production
9. Production plans over the next six months.
10. Price of Various Company Products (Automobile model sales prices)
11. Raw Materials and Parts Use, Inventories and Prices (variously in value or physical units)
12. Sales by model and market including exports.
13. Present Capital Stock and New Investment Plans
  - a. Land (by area and value)
    1. Used in automobile assembly
    2. Used in auto parts production
    3. Used in research
  - b. Building (by area and value)
    1. Used in automobile assembly
    2. Used in auto parts production
    3. Used in research
  - c. Machinery (by value and type)
    1. Used in automobile assembly
    2. Used in auto parts production
    3. Used in research
  - d. New Investment Planned or In Process
    1. When will come on stream
    2. Location
    3. Value
    4. Purpose
  - e. Workers at each company facility
14. Balance Sheet
15. Income and Expenditure Statement
16. List of major shareholders
17. List of major lenders
18. Share holdings of assemblers in affiliated companies
19. Loans to affiliated companies
  - a. Capital
  - b. Managers
20. Names of other related companies

TABLE 3.5A - INFORMATION APPEARING IN AUTOMOBILE ASSEMBLERS' AND  
SUPPLIERS' REPORTS TO THE MINISTRY OF FINANCE<sup>1</sup>  
(1977 FISCAL YEAR)

<u>ASSEMBLERS</u>	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15	#16	#17	#18	#19	#20	R&D invest- ment	R&D current cost	
TOYOTA MOTOR CO.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	-	*	*	-	*	-	
DAIHATSU MOTOR CO.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	-	-
HINO MOTOR CO.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	-
HONDA MOTOR CO.	*	*	*	*	*	*	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	-	-
ISUZU MOTOR CO.	*	*	*	*	*	-	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	-
NISSAN MOTOR CO.	*	*	*	*	*	*	-	*	*	*	*	*	*	*	*	*	*	*	*	-	*	*	-
TOYO KOGYO MOTOR CO.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	-	*	-	-
SUZUKI MOTOR CO.	*	*	*	*	*	*	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
NISSAN DIESEL CO.	*	*	*	*	*	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	-	*
FUJI HEAVY INDUST.	*	*	*	*	*	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	-	*

<sup>1</sup>An asterisk (\*) in the R&D columns indicates the disaggregation of assembler investment down to the level of R&D investment. An asterisk in the R&D current costs column indicates the disaggregation of assembler costs down to the R&D level. Otherwise all column headings in Table 3.5A refer to the items in Table 3.5.

TABLE 3.5A INFORMATION APPEARING IN AUTOMOTIVE ASSEMBLERS' AND SUPPLIERS' REPORTS TO THE MINISTRY OF FINANCE. (Continued)

Suppliers	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	R&D investment	R&D current cost	#14	#15	#16	#17	#18	#19	#20
YAMADA YUKI	*	*	*	*	*	*	*	*	*	*	*	*	*	-	-	*	*	*	*	*	-	-
NITTAN VALVE	*	*	*	*	*	*	*	*	*	*	*	*	*	-	-	*	*	*	*	*	-	-
SHIROKI CORP.	*	*	*	*	*	*	*	*	*	*	*	*	*	-	*	*	*	*	*	*	-	-
ICHIKOH INDUSTRIES, LTD.	*	*	*	*	*	*	*	*	*	*	*	*	*	-	*	*	*	*	*	*	*	*
PACIFIC INDUSTRIAL CO. LTD.	*	*	*	*	*	*	*	*	*	*	*	*	*	-	*	*	*	*	*	*	*	*
TOYO RADIATOR CO. LTD.	*	*	*	*	*	*	*	*	*	*	*	*	*	-	*	*	*	*	*	*	*	*
PRESS KOGYO CO. LTD.*	*	*	*	*	*	*	*	*	*	*	*	*	*	-	*	*	*	*	*	*	*	*
KANTO AUTO WKS. LTD.*	*	*	*	*	*	*	*	*	*	*	*	*	*	-	*	*	*	*	*	*	*	*
OSAKA MOTOR WHEEL CO. LTD.	*	*	*	*	*	*	*	*	*	*	*	*	*	-	*	*	*	*	*	*	*	*
TOCHIGI FUGI INDUSTRIAL CO. LTD.	*	*	*	*	*	*	*	*	*	*	*	*	*	-	*	*	*	*	*	*	*	*
FUJI KIKO CO. LTD.	*	*	*	*	*	*	*	*	*	*	*	*	*	-	*	*	*	*	*	*	*	*
DAIKIN MFG. CO.	*	*	*	*	*	*	*	*	*	*	*	*	*	-	*	*	*	*	*	*	*	*
FUTABA INDUSTRIAL CO. LTD.	*	*	*	*	*	*	*	*	*	*	*	*	*	-	*	*	*	*	*	*	*	*
KOMATSU FORKLIFT CO. LTD.	*	*	*	*	*	*	*	*	*	*	*	*	*	-	*	*	*	*	*	*	*	*
FUJI TEKLEO CO. LTD.*	*	*	*	*	*	*	*	*	*	*	*	*	*	-	*	*	*	*	*	*	*	*
XENOAH CO.	*	*	*	*	*	*	*	*	*	*	*	*	*	-	*	*	*	*	*	*	*	*
TOYOTA HUTO BLDG. DO. LTD.	*	*	*	*	*	*	*	*	*	*	*	*	*	-	*	*	*	*	*	*	*	*
NISSAN SHATAI CO.LTD*	*	*	*	*	*	*	*	*	*	*	*	*	*	-	*	*	*	*	*	*	*	*
HINO AUTO BODY LTD.*	*	*	*	*	*	*	*	*	*	*	*	*	*	-	*	*	*	*	*	*	*	*
TOKYO TIKA MFG. CO. LTD.	*	*	*	*	*	*	*	*	*	*	*	*	*	-	*	*	*	*	*	*	*	*

TABLE 3.5A INFORMATION APPEARING IN AUTOMOTIVE ASSEMBLERS' AND SUPPLIERS' REPORTS TO THE MINISTRY OF FINANCE. (Continued)

Suppliers	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	R&D investment	R&D current cost	#14	#15	#16	#17	#18	#19	#20	
AICHI MACHINE INDUSTRY CO. LTD.	*	*	*	*	*	*	*	*	*	*	*	*	*	-	-	*	*	*	*	*	*	*	*
NIPPON CARBURETOR CO. LTD.	*	*	*	*	*	*	*	*	*	*	*	*	*	-	-	*	*	*	*	*	*	*	*
TOKICO CO. LTD.	*	*	*	*	*	*	*	*	*	*	*	*	*	-	-	*	*	*	*	*	*	*	*
GOTO DROP FORGING CO. LTD.	*	*	*	*	*	*	*	*	*	*	*	*	*	-	-	*	*	*	*	*	*	*	*
TOKYO RADIATOR MFG. CO. LTD.	*	*	*	*	*	*	*	*	*	*	*	*	*	-	-	*	*	*	*	*	*	*	*
SHOWA MFG. CO. LTD.	*	*	*	*	*	*	*	*	*	*	*	*	*	-	*	*	*	*	*	*	*	*	*
TOYO KOGYO CO. LTD.	*	*	*	*	*	*	*	*	*	*	*	*	*	-	*	*	*	*	*	*	*	*	*
AUTOMOBILE PARTS MFG. CO. LTD.	*	*	*	*	*	*	*	*	*	*	*	*	*	-	-	*	*	*	*	*	*	*	*
JIDOSHA KIKI CO. LTD.	*	*	*	*	*	*	*	*	*	*	*	*	*	-	-	*	*	*	*	*	*	*	*
TOKYO BUHIN KOGYO CO. LTD.	*	*	*	*	*	*	*	*	*	*	*	*	*	-	*	*	*	*	*	*	*	*	*
NIPPON CABLE SYSTEM INC.	*	*	*	*	*	*	*	*	*	*	*	*	*	-	-	*	*	*	*	*	*	*	*
HONDA MOTOR CO. LTD.	*	*	*	*	*	*	*	*	*	*	*	*	*	-	*	*	*	*	*	*	*	*	*
AUTOMOBILE FOUNDRY CO. LTD.	*	*	*	*	*	*	*	*	*	*	*	*	*	-	-	*	*	*	*	*	*	*	*
ISUZU MOTORS LTD.	*	*	*	*	*	*	*	*	*	*	*	*	*	-	-	*	*	*	*	*	*	*	*
KEIKIU SEIKI MFG. CO. LTD.	*	*	*	*	*	*	*	*	*	*	*	*	*	-	-	*	*	*	*	*	*	*	*
YUNSHIU CO. LTD.	*	*	*	*	*	*	*	*	*	*	*	*	*	-	-	*	*	*	*	*	*	*	*
KASAI KOGYO CO. LTD.	*	*	*	*	*	*	*	*	*	*	*	*	*	-	-	*	*	*	*	*	*	*	*



Unfortunately, there are no comparable reports for Japanese automobile companies available in English. Of course, there are annual reports available in English for Toyota Motor Company, Missan Motor Company, Toyo Kogyo Company, Honda Motor Company, Daihatsu Motor Company, Hino Motors and Suzuki Motor Company. (Such annual report apparently are not available for Isuzu, Fuji Heavy Industries, Nissan Diesel, and Mitsubishi Motors). With one exception, these reports contain considerably less information than is available in the Yūka shōken hōkokushō, simply reproducing in slightly more aggregated form the unconsolidated balance sheet and the income and expenditure tables from YSH. Because Honda Motor Company has listed its shares on the New York Stock Exchange, it is required to issue a consolidated balance sheet. This consolidated balance sheet is published in its English language report, but is not available in Japanese.

In addition to the unconsolidated balance sheet and the income and expenditure statement, the English-language Japanese automobile company annual reports contain the following quantitative information:

Toyota Motor Company

aggregate production data  
aggregate domestic sales  
aggregate overseas sales  
domestic market shares

Nissan Motor Company

aggregate production data  
aggregate domestic sales  
overseas sales by market  
foreign suppliers of auto parts

Toyo Kogyo Company

employees, age and work experience  
aggregate production data  
domestic sales  
overseas sales by market

Honda Motor Company

aggregate production data  
domestic sales  
overseas sales

Daihatsu Motor Company

aggregate production data  
production disaggregated by model  
domestic sales  
overseas sales by market

### Hino Motor Company

- aggregate production data
- domestic sales
- overseas sales by market and model
- list of major shareholders
- distribution of shareholders by type
- distribution of shareownership by number of shares held

### Suzuki Motor Company

- aggregate production data
- domestic sales
- overseas sales by market

In 1976 new legislation designed to encourage the submission of consolidated balance sheets to the Ministry of Finance was passed in the Japanese Diet. The loopholes in this legislation are such that it is unlikely that there will be any significant changes in the balance sheets which are submitted by automobile companies. Honda will continue to publish consolidated balance sheets and the others will continue to publish unconsolidated balance sheets. Table 3.5B describes in greater detail the current status of consolidated financial statements.

### 3.6 UNYUSHŌ (MINISTRY OF TRANSPORTATION)

(1) Jōhō kanribu (Minister's Secretariat, Research and Data Processing Department.) As Designated Statistics No. 99, the Research and Data Processing Department of the Minister's Secretariat conducts monthly surveys each year on passenger car, truck and bus use. Two of these surveys are considered large-scale and follow a sample of 36,000 trucks and passenger cars and all buses and line-haul trucks for seven days each year in October and in one other month. A smaller survey following 9000 trucks and passenger cars and again all buses and line-haul trucks for three days is conducted during one other month of each year.

Items in these surveys include:

- (a) type maximum loading or seating capacity and main use of car;
- (b) freight tonnage or number of passengers carried;
- (c) transport distance, running distances, freight-ton kilometers or passenger kilometers;
- (d) place of dispatch and destination;
- (e) number of freight, kind of commodity, type of packing and kind of fuel, amount of fuel consumed; and
- (f) legal form of organization to which user belonged, distinction whether main or branch office, number of workers, kind of activity of the organization where the car user worked, and kind of work the car user is engaged in.

TABLE 3.5B - THE PROGRESS OF CONSOLIDATED FINANCIAL STATEMENTS IN JAPAN

In June 1971, Minister of Finance Takeo Fukuda asked the Kigyō kaikei shingikai (Business Accounting Council) to study systems of consolidated financial statements as used abroad. Four years later the Council submitted its report. Based on this report the Ministry of Finance prepared an outline of a Japanese system of consolidated financial statement which was approved at the July, 1976 meeting of the Kigyō kaikei shingikai. Following this approval, the Ministry of Finance promulgated Ministerial Ordinance No. 28 on October 30th, 1976. The Ministerial Ordinance which became effective April 1st, 1977 details the regulations, formats and instructions for the submission of consolidated financial statements to the Ministry of Finance.

About 2700 companies in Japan are required to submit financial statements to the Ministry of Finance. Of this number, about 600 had by mid-1978 submitted consolidated statements. This is almost a ten-fold increase in the number of Japanese companies preparing such statements. Prior to 1977 the only Japanese companies preparing consolidated statements were companies such as Sony and Honda (which had issued American Depository Receipts and were therefore required to make such statements by American law) and the fifty-one companies who were listed on the Tokyo Stock Exchange since the early 1960's. Since the 1960's the Tokyo Stock Exchange had required as a condition of listing the preparation of a consolidated financial statement.

Definitions and Regulations in Ordinance on Consolidated Financial Statements

1. A subsidiary company (Ko-gaisha) is defined as a company more than fifty percent of whose voting stock is held by the parent company (Oya-gaisha). A subsidiary company must be included in the consolidated financial statement of the parent company.
2. An affiliated company (kanren-gaisha) is defined as a company more than twenty percent but less than fifty percent of whose voting stock is held by the parent company. An affiliated company need not be included in the parent company's consolidated financial statement.
3. A related company (kanren-gaisha) is defined as a parent company, or a subsidiary company or an affiliated company of a company which must submit its financial statement to the Minister of Finance.
4. A subsidiary company which is in reorganization, or bankrupt, or whose stock are only temporarily held by the parent company need not be included in the consolidated financial statement of the parent company.
5. The date for the consolidated settlement is the final day of the business year of the parent company. The parent company must submit its consolidated financial statement to the Minister of Finance within four months after the end of the company's business year.

Table 3.5B (continued)

6. A subsidiary company whose significance for the management of the parent company is low may be excluded from the consolidated financial statement of the parent company. Lack of significance is defined as a subsidiary company whose total assets or sales are less than ten percent of the total assets or the total sales of the parent company and all subsidiary companies combined. Subsidiary companies whose inclusion in the consolidated financial statement might also mislead the public regarding the financial condition of the parent company should also be excluded.
7. Companies which have published consolidated financial statements in order to issue depository receipts abroad are allowed to maintain the format they are presently using.
8. Consolidated financial statements are defined as a consolidated balance sheet, a consolidated income statement and a consolidated surplus account statement.
9. The Yuka shoken hokokusho (Report on Negotiable Securities) must contain the following description of parent and subsidiary companies.
  - a. description of the parent company: the name of the parent company, address, capital, contents of business, (and if the parent company has its own parent company, the relationship between the company and the parent company, and the share of this company's stock held by the parent company.
  - b. description of the subsidiary company: same as the description of the parent company and a statement as to whether subsidiary companies are consolidated or unconsolidated.
10. The consolidated financial statement in the Yuka shoken hokokusho must contain an audit report prepared by a certified public accountant or by an auditor corporation. The audit report must contain the following.
  - a. a summary of the auditing
  - b. an opinion by the auditor as to whether the consolidated financial statement of the company properly represents the business performance and financial condition of the company for the consolidated fiscal year for which the statement has been prepared.
11. If the business performance and financial condition of subsidiary companies excluded from the consolidated financial statement have a significant effect on the business performance and financial condition of its parent company and other subsidiaries included in the consolidated financial statement, the consolidated financial statement should take note of such an effect.
12. A subsidiary company whose final day of the business year differs from the consolidated settlement date must settle its account on the consolidated settlement date for the consolidated financial statement. If the difference between the consolidated settlement date and the final day of a subsidiary company's business year is less than three months, the subsidiary company need not settle its account on the consolidated settlement date.

Table 3.5B (continued)

13. In principle, the format of the consolidated balance sheet should be the same as the format of the old unconsolidated balance sheet with the following exceptions.
  - a. In the event a consolidated company conducts more than two different businesses, assets and debts of each business may be included in the consolidated balance sheet separately from the assets and liabilities of other businesses.
  - b. Assets and liabilities presented in the consolidated balance sheet may be presented in more aggregative form than was possible in the unconsolidated balance sheet.
  - c. Holdings of minority shareholders must be written in at the end of liabilities.
  - d. Equity shares of the company submitting the consolidated financial statement which are owned by the company itself or by its consolidated subsidiaries must be included in the capital portion of the balance sheet.
  - e. If there is a sinking fund or other funds based upon special contracts between creditors and other companies in the consolidated financial statement, the statement must describe the purpose and the amount of such funds.
  - f. Debts and claims a parent company has on unconsolidated subsidiary companies and affiliated companies must be written in separately from other debts and claims of the parent company.
  - g. Assets and liabilities which are usually written in as "others" should be itemized if each item exceeds 5 percent of total assets or liabilities.
14. In principle, the format of the consolidated income statement should be the same as the format of the old unconsolidated income statement with the following exceptions.
  - a. If the consolidated company conducts two or more different lines of business the profit and costs should be written in separately business by business.
  - b. A parent company's non-operating cost or non-operating income which arise from transactions with unconsolidated subsidiaries and which exceed ten percent of total non-operating cost or total non-operating income must be separately itemized.

The results from the small survey are published in Riku-un tōkei geppō (Monthly Statistics on Land Transport) and in Riku-un tōkei nenpo (Annual Statistics on Land Transport). The detailed results from the two large-scale surveys are published in Jidōsha tōkei hōkokushō (Report on Automobile Statistics) and in Rōsen turokku hōkokushō (Report on Line-Haul Truck Survey).

The published reports presents the survey data in the following format. First, automobiles are distinguished from other conveyances. Automobiles are then classified by their geographic location. The following geographic classifications are used:

- Sapporo (includes the following cities: Sapporo, Asahikawa, Hakodate, Muroran, Kushiro)
- Sendai (includes the following prefectures: Aomori, Iwate, Miyagi, Fukushima)
- Niigata (includes the following prefectures: Akita, Yamagata, Niigata, Nakanō)
- Tokyo (includes the following prefectures: Ibaraki, Tochigi, Gumma, Saitama, Chiba, Tokyo, Kanagawa, Yamanashi)
- Nagoya (includes the following prefectures: Toyama, Ishikawa, Fukui, Gifu, Shizuoka, Aichi, Mie)
- Osaka (includes the following prefectures: Saga, Kyoto, Osaka, Hyogo, Nara, Wakayama)
- Hiroshima (includes the following prefectures: Tottori, Shimane, Okayama, Hiroshima, Yamaguchi)
- Takamatsu (includes the following prefectures: Tokushima, Kagawa, Ekime, Kochi)
- Fukuoka (includes the following prefectures: Fukuoka, Saga, Nagasaki, Kumamoto, Oita, Miyazaki, Kagoshima)

Occasionally, more detailed data are also presented for the following six urban prefectures: Tokyo, Kanagawa, Aichi, Osaka, Hyogo, Fukuoka.

Automobiles are also classified by their type. In these reports, distinction is made between trucks, buses, passenger cars and speciality vehicles. These categories are further broken down as to whether the vehicle is used by an enterprise or a household and by size. Distinction is also made as to whether the vehicle carries primarily freight or passengers. Where freight is carried the following disaggregation is published (this is for Riku-un tōkei nenpō; a still more detailed breakdown appears in Jidōsha tōkei hōkokushō):

Grains	Iron and Steel	Dyes, Paint and Other
Vegetables, Fruit	Non-ferrous Metals	Chemical Products
Other Crops	Machinery	Paper and Pulp
Poultry and other	Cement	Textile Industry Products
Animal Products	Other ceramics	Food Processing Industry
Marine Products	Gasoline	Products
Wood	Other Oil and Oil	Daily Necessities
Charcoal	Products	Other Manufactured Products
Coal	Coke and Other Coal	Metal Wastes
Metals	Products	Other Wastes
Gravel, Sand, Stone	Drugs	Animal and Plant Material
Non-Metallic Products	Chemical Fertilizers	Foods; Natural Fertilizer

Mechanical Wrecks  
Container Traffic  
Mixed Cargoes  
Miscellaneous

Under the above disaggregation, data is presented for the six survey items previously listed.

The Research and Data Processing Department of the Minister's Secretariat also conducts Unyushō kanjigyō setsubi toshi keikaku chōsa (The Survey on Investment Programs for Equipment) supervised by the Ministry of Transportation. This survey is conducted every March and includes among other enterprises:

- (a) incorporated enterprises engaged in bus service capitalized at ¥ 50 million or more;
- (b) incorporated enterprises in the hire cars or taxi business capitalized at ¥ 50 million or more, with at least 100 taxis for business use;
- (c) incorporated enterprises engaged in trucking capitalized at ¥ 50 million or more or with 100 or more trucks for business use;
- (d) incorporated enterprises engaged in transportation capitalized at ¥ 30 million or more;
- (e) incorporated enterprises engaged in an expressway service capitalized at ¥ 50 million or more; and
- (f) incorporated enterprises engaged in automobile terminal service capitalized at ¥ 50 million or more.

The following items are included in this survey:

- (a) name of incorporated enterprises;
- (b) address of home office;
- (c) actual investment in equipment for last year and the year before last and investment plan for this year; and
- (d) breakdown of funds raised for new investment.

This survey, which is an important component in forecasting automobile demand, is published each April as Unyōshō kanjigoto setsubi toshi keikaku chōsa hōkoku (Report on the Survey on Investment Program for Equipment Supervised by the Ministry of Transportation).

(2) Administrative Division, Automobile Road Transport Bureau. Data on the number of automobiles in use classified by model (including type of fuel used), model year, prefecture, and commercial or non-commercial use, are compiled from automobile registration data. This is done in conformity with the Road Transport Vehicle Law. Models in the compilation are shown in Table 3.6. (pages 42-45).

Where motor vehicles are used for commercial purposes, their use is cross-classified by model, prefecture and by the following 62 economic sectors:

Agriculture	Forestry
Fishing and Fisheries	Metals Mining
Coal Mining	Oil and Natural Gas
Non-Metals Mining	Construction
Food Processing	Tobacco
Textiles	Textile Products
Wood and Wood Products	Furniture
Paper	Printing and Publishing
Oil Refinery and Coal Products	Chemicals
Glass	Rubber
Ceramics	Iron and Steel
Non-Ferrous Metals	Metal Products
Machinery	Electric Machinery
Transportation Equipment	Precision Instruments
Other Industrial	Wholesalers
General Merchandising Stores	Retail Clothing Stores
Grocery Stores	Food and Drink Establishments
Furniture Stores	Other Shop
Brokerage Business	Finance
Real Estate	Transportation and Communication
Electricity, Water and Gas	Public Offices
Industrial Other Classified	Industrial Unknown
Engineers	Scholars
Artists, Entertainers	Accountants, Statisticians



Free-Lance	Priests
Doctors	Driving
Household Help	Officials
Blue Collar Workers	Others

This data is published in the Ministry of Transportation publications Jidōsha hoyū sharyōsū geppō (Monthly Report on Number of Automobiles in Use), Jidōsha hoyū sharyōsū (Report on Number of Vehicles in Use; an Annual), and Riku-un tōkei yoran (Summary of Land Transport Statistics). Some of the same data is also published in the Japanese Automobile Manufacturers Association's Jidōsha tōkei geppō (Monthly Report on Automobile Statistics).

TABLE 3.6-AUTOMOBILE MODEL CLASSIFICATIONS FOUND IN JAPAN VEHICLE  
REGISTRATION DATA

PASSENGER VEHICLES

Standard Sized Vehicle

Mitsubishi  
Debonair  
Others

Nissan  
President  
Gloria  
Others

Cedric  
Fairlady Z (280Z)  
Lauri

Mazda  
Mazda

Toyota  
Century  
Others

Crown  
Mark II

Foreign Vehicles

Buick  
Pontiac  
Ford  
Plymouth  
Mercedes Benz  
Opel  
Cadillac  
Jaguar  
Porsche  
Others

Oldsmobile  
Chevrolet  
Mercury  
Chrysler (Dodge, Plymouth)  
BMW  
Volvo  
Lincoln  
Audi  
Citroen

Small Scale Vehicles

Daihatsu  
Berlina  
Consort  
Sherman van (remodelled light van)  
Others

Consort  
Sherman

Fuji Heavy Industries

Subaru  
Leone Coupe

Leone  
Others

Hino

Contessa

Others

Honda

Honda  
Honda 145 Coupe  
Honda Civic Van  
Others

Honda 145  
Honda Civic  
Accord

Isuzu

Florian  
117 Coupe  
Femini  
Others

Bellet (Bellelle)  
Florian Van  
Gemini Coupe

Mitsubishi

Debonair  
Gallant  
Gallant Coupe GTO  
Gallant PTO  
Lancer (Celeste)  
Gallant Sigma  
Others

Colt  
Gallant Hardtop  
Colt Van

Lancer Van  
Gallant Lambda

Table 3.6 (Continued)

Nissan	
Cedric	Cedric Hardtop
Gloria	Gloria Hardtop
Laurel	Laurel Hardtop
Fairlady	Bluebird Hardtop (Coupe)
Bluebird U	Bluebird Hardtop
Violet	Violet Hardtop
Skyline	Skyline Hardtop
Sunny	Sunny Coupe
Cherry	Cherry Coupe
Cedric Van	Gloria Van
Bluebird Van	Bluebird U Van
Datsun Van	Skyline Van
Sunny Van	Cherry Van
Violet Van	Silvia
Others	
Suzuki	
Fronti 800	Others
Mazda	
Capella	Capella Coupe
Capella Rotary	Capella Rotary Coupe
Luce	Luce Hardtop
Luce Rotary Hardtop	Savannah
Savannah Coupe	Cosino
Grand Familia	Grand Familia Coupe
Familia	Familia Coupe
Familia Rotary	Familia Rotary Coupe
Luce Van	Familia Van
Grand Familia Van	
Others	
Toyota	
Crown	Crown Hardtop
Corona	Corona Hardtop
Mark II	Mark II Hardtop
Carina	Carina Hardtop
Celica	Celica LB
Corolla	Corolla Coupe
Sprinter	Sprinter Coupe
Publica	Starlet
Toyota Sports 800	Toyota Sports 2000
Crown Van	Corona Van
Mark II Van	Corolla Van
Public Van	Carina Hardtop
Carina Van	Corolla 2B
Others	
<u>Foreign Vehicles</u>	
Vauxhall	Volkswagen
Opel	BMW
Ford Europa	Alfa Romeo
Fiat	Volvo
Audi	Citroen
VW & Porsche	Triumph
Others	

TABLE 3.6 (continued)

SMALL-SIZE THREE WHEEL VEHICLES

Trucks

Standard Size (five tons or less)

Daihatsu	Hino
Isuzu	Toyota
Mitsubishi	Mazda
Nissan	
Others	

Five tons and over

Hino	Isuzu
Mitsubishi	Nissan Diesel
Nissan	Toyota
Others	

Small Size

Daihatsu

Delta 1500-2000	Delta 750
Hi-lini	Compaino
Taft	Sherman Van
Delta-wide	
Others	

Fuji Heavy Industries

Subaru Van	Leone Van
Others	

Hino  
Hino

Honda

Civic Van	Honda
-----------	-------

Isuzu

Elf	Florian Van
Bellet Van	Uni-cab
Faster	
Others	

Mitsubishi

Canter	Colt
Delica	Gallant Van
Corona	Corona Mark II
Corolla Van	Publica
Carina Van	Town-Ace
Others	

Small-size Three Wheeled Trucks

Daihatsu	Mazda
Others	

BUSES

Standard-Size (30 passengers or more)

Hino	Isuzu
Mitsubishi	Nissan
Nissan Diesel	Toyota
Others	

Small-Size (29 passengers or less)

Daihatsu	Hino
Isuzu	Mitsubishi
Nissan	Mazda
Toyota	
Others	

TABLE 3.6 (continued) =

Speciality-Use Vehicles

Daihatsu	Fuji Heavy Industries
Hino	Honda
Isuzu	Mitsubishi
Nissan	Nissan Diesel
Mazda	Toyota
Foreign Vehicles	
Others	

LARGE SPECIAL VEHICLES

TRAILERS

3.7 KENSETSU-SHO (MINISTRY OF CONSTRUCTION),  
DŌRŌ KYOKU (HIGHWAY BUREAU)

The Highway Bureau of the Ministry of Construction each year publishes the Dōrō tōkei nenpō (Highway Statistical Yearbook) which contains a variety of motor vehicle related data. In particular, some of the appendices of this yearbook duplicates the Ministry of Transportation's motor vehicle registration and motor vehicle use data found in Riku-un tōkei nenpō. In addition this yearbook published the results of the Ministry of Construction's own survey Zenkoku dōrō kōtsu jōsei chōsa (Survey on the Condition of National Road Transport). This survey charts the changing intensity of use of super-highways, metropolitan highways, prefectural and local roads. Average traffic volume on these different roads is presented for 150 different Japanese geographical areas (prefecture, urban center and other sub-prefectural).

3.8 NIHON TOKKYOCHŌ (NATIONAL PATENT AGENCY)

In connection with its function of registering patents, the National Patent Agency compiles very extensive statistics. Some of these statistics are reported each year in Tokkyochō nenpō (Patent Agency Yearbook). Automobile, motor-vehicle related patent requests made and prototype models submitted are reported each year in this yearbook disaggregated by the following nine categories:

- Maintenance related
- Body or Chassis
- Engine and related
- Drive Train, Transmission and related
- Gears and related
- Steering
- Wheels
- Brakes
- Other

The data are further broken down as to whether Japanese or foreigners applied for the patent or license. Finally the number of automobile related patent application investigated and the number of registrations actually granted is also presented.

3.9 KEISATSUCHŌ (NATIONAL POLICE AGENCY)  
KŌTSU KYOKU (TRAFFIC BUREAU)

Each police station throughout Japan prepares regular reports on traffic accidents occurring within their jurisdiction for the National Police Agency. The Traffic Bureau of the National Police Agency tabulates these reports and publishes the results each year in Kōtsu tōkei (Traffic Statistics). The results of these tabulations are also published in Unyushō (The Ministry of Transportation)'s Riku-un tōkei yoran.

Traffic accidents statistics are disaggregated according to whether automobiles, motorcycles, bicycles, trains, street cars, trolley buses, pedestrians, and other vehicles are involved. Within these categories, data are presented on the number of the dead and injured and material damages resulting from traffic accidents. The Traffic Bureau counts as traffic deaths only those deaths that occurred within twenty-four hours after the accident.

Automobile accidents are also cross-classified by the cause of the accident. Recognized causes include:

#### Driver Caused Accident

- Disregarding traffic signal
- Violation of No-trucks in this Area Restriction
- Driving Lane Law Violation
  - Driving on the Right Hand Side of the Street
  - Other Violations
- Crossings
  - Improper Reverse Driving
  - Improper Crossing or Turns
- Improper Distance between Vehicles
- Passing
  - Violation of Passing Methods Laws
  - Violation of No-Passing Laws
  - Violation of "Do Not Change Lane" Laws
- Violation of Right turn Laws
- Violation of Left turn Laws
- Violation of Right of Way
- Violation of Pedestrian Protection Laws
  - Ignoring Pedestrian Crossing
  - Other
- Violation of Yielding Laws
  - Violation of Law of Yielding at Crossings
  - Other
- Violation of Stop Sign Laws
- Violation of No Parking and No Stop Laws
- Violation of Lighting Laws
- Violation of Signaling Laws
- Driving by Persons Unfit for Driving
- Improper Loading
- Improper Maintenance of Vehicles
  - Improper Steering System
  - Improper Braking System
  - Other
- Drunken Driving
- Driving with Excess Fatigue
- Violation of Speeding Limit
- Driving without a Permit

## Pedestrian Caused Accident

- Rushing into Street Carelessly
- Children Walking Alone without Parents Permission
- Crossing the Street Immediately Before or During  
the Passing of an Automobile
- Drunken Pedestrian
- Other

Traffic accidents involving automobiles are also disaggregated by prefecture, by the month of the year of the accident, the time of day, the age of victims, and the age and experience of the driver. Of particular interest are the disaggregations by type and size of vehicle and whether the vehicle's primary use is commercial or personal. Specifically, the following classifications are employed:

## Total Automobile Accidents

- Bus related
- Passenger Car related
  - Total
  - Passenger Cars for Business Use
    - Standard-Size
    - Small
  - Passenger Cars for Household Use
    - Standard-Size
    - Small
- Truck related
  - Total
  - Trucks for Business Use
    - Standard-Size
    - Small
  - Trucks for Household Use
    - Standard-Size
    - Small
- Light Automobile
- Other

The Jidōsha kyoku (Automobile Bureau) of the Unyūshō (Ministry of Transportation) in connection with its role as the regulator of industries' using automobiles each year does a further analysis of the data collected by Keisatsuchō (National Police Agency). The results of these analyses are published in Riku-un tōkei yoran. Most interesting from a safety perspective is the quantitative attribution of commercially-used vehicle accidents to various automobile defects. This is done separately for buses, taxis, and trucks and includes the following defects:

Brake System	Exhaust Pipes
Steering System	Engine
Electric System	Heater
Wheels (excluding tires)	Bodies
Fuel System	Other
Shafts	
Suspension System	



#### 4. PRIVATE SOURCES OF AUTOMOBILE INDUSTRY RELATED STATISTICS

##### 4.1 NIHON JIDŌSHA KŌGYŌ KAI JIKŌKAI (JAPAN AUTOMOBILE MANUFACTURERS ASSOCIATION)

The Japan Automobile Manufacturers Association (JAMA) is the largest, best financed and most important of all automobile-related trade associations in Japan. Not surprisingly, JAMA is the major private source for quantitative information on the industry. JAMA publishes a monthly statistical report, Jidōsha tokei geppō (Monthly Reports on Automobile Statistics), an annual, Jidōsha tokei nenpō (Automobile Statistical Annual), which aggregates the monthly survey statistics, and a sales quarterly, Jidōsha hanbai jisseki (Results on Auto Sales). The JAMA reports contain both its own survey statistics and material it receives from government agencies and from other trade associations.

JAMA publishes two statistical pamphlets annually in English. Motor Vehicle Statistics of Japan reproduces information on production and registration data by manufacturer by year as well as data on exports by the industry. Appendix to Motor Vehicle Statistics of Japan contains data on vehicle use in Japan such as vehicle miles travelled, fuel prices, road expenditures.

(1) Production Statistics. JAMA publishes the production data which comes from MITI's Current Production Survey. JAMA also makes its own monthly automobile production survey. The aggregate figures from the two monthly surveys are identical but the two surveys have different levels of disaggregation. Unlike MITI's Kikai tokei geppō, JAMA's Jidōsha tokei geppō disaggregates passenger car, truck and bus assembly data by eleven different assemblers, including:

Toyota	Honda	Nissan Diesel
Nissan	Hino	
Mitsubishi	Suzuki	
Toyo Kogyo	Daihatsu	
Isuzu	Fuji Heavy Industries	

Also unlike MITI, JAMA does not gather data on trailer production, but it does report MITI survey data. It also reports from MITI, but does not collect on its own statistics on auto body production.

(2) Shipment Statistics. JAMA does its own survey of automobile shipments of passenger car, trucks and buses to overseas and domestic markets. JAMA statistics are consistent with MITI survey data.

(3) Inventory. JAMA does not collect assembler inventory data, but again it does publish the results of MITI's Current Production Survey.

(4) New Car Registrations and Used Car Sales. JAMA publishes the surveys of new car registrations and used car sales conducted by the Nihon jidōsha hanbai kyoku rengōkai (Japan Automobile Sales Association) and by Kenkoku keijidōsha kyokai rengōkai (National Light-Vehicle Association). These surveys, in their original tabulation, include new registration and used cars separately by manufacturer's model classifications cross-classified by prefecture. When they are published in the Jidōsha tōkei geppō, Jidōsha tōkei nenpō and Jidōsha hanbai jisseki, they include new registration and used car sales by make cross-classified only by the categories used in the production surveys by MITI and by JAMA. Similarly, JASA's original tabulation of new car registration and used car sales by economic status of owner cross-classified by MITI product categories uses the sixty-two economic sector classification taken from the Ministry of Transportation user surveys. When these survey results are published by JAMA in Jidōsha tōkei geppō and Jidōsha tōkei nenpō, the MITI categories are retained but the sixty-two sectors are aggregated up to twelve sectors, including agriculture, construction, manufacturing, passenger and freight transport service, blue collar and other. The new car registration and used car sales survey results are published in greatest detail in Jidōsha hanbai jisseki and in the Jidōsha nenkan (Automobile Yearbook), the latter of which is jointly compiled by the Nihon jidōsha kaigisho (Japan Automobile Chamber of Commerce) and the Nikkan jidōsha shimbunsha (Daily Automobile News Company).

(5) Exports. JAMA conducts its own survey on automobile exports. Using the product category taken from its production surveys, it cross-classifies exports by assemblers. Exports are also classified by overseas market. Finally, an aggregate export figure on value of auto parts is also given. These latter figures come from the Nihon jidōsha buhin kyokai (Japan Auto Parts Industry Association). JAMA statistics on exports of vehicles and parts are consistent with Ministry of Finance trade data (also published in Jikōkai monthly and annual statistical reports).

(6) Dealer Inventories. Complementarily with the MITI survey of producer inventories, JAMA conducts a survey of domestic dealers' inventories. This data is tabulated using MITI and JAMA automobile classifications.

(7) Vehicle Use. JAMA conducts no surveys of its own on automobile use. Jidōsha tōkei geppō and Jidōsha tōkei nenpō publish, however, in somewhat aggregated form, the results of the various Unyūsho (Ministry of Transportation) surveys.

#### 4.2 NIHON JIDŌSHA BUHIN KYOKAI (JAPAN AUTO PARTS INDUSTRY ASSOCIATION)

Most auto parts manufacturers in Japan are relatively small. As such, they almost inevitably rely on their trade association for information and guidance. In keeping with this role, JAPIA is an energetic collector of industry production and financial data. All JAPIA members are surveyed semi-annually on their performance. Tables 4.1, 4.2, and 4.3 are English translations of the survey forms used. In addition to the production and management analysis surveys carried out with the use of the survey forms just presented, JAPIA also conducts telephone surveys on investment expenditures and research and development expenditures.

TABLE 4.1 - SURVEY FORMS USED BY JAPAN AUTO PARTS INDUSTRY ASSOCIATION TO COLLECT PRODUCTION DATA


  
**AUTOMOBILE PARTS PRODUCTION**  
**TRENDS REPORT**  
**FORM 1**

<b>1</b>	NAME ADDRESS PLANT ADDRESS AND NAME PAID IN CAPITAL OR TOTAL INVESTED (3/31/70)	<b>4</b>	NUMBER OF EMPLOYEES (3/31/78) THE DISTINCTION BETWEEN DIRECT AND INDIRECT LABOR IS BASED ON ACTUAL DUTIES PERFORMED RATHER THAN ON RANK OR TITLE. TEMPORARY OR DAILY LABOR EMPLOYED OFF AND ON FOR MORE THAN 30 DAYS ARE INCLUDED BELOW.			REGISTERED TRADEMARK																		
			<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">CLASS</td> <td style="width: 25%;">MALE</td> <td style="width: 25%;">FEMALE</td> <td style="width: 25%;">TOTAL</td> </tr> <tr> <td>DIRECT</td> <td></td> <td></td> <td></td> </tr> <tr> <td>INDIRECT</td> <td></td> <td></td> <td></td> </tr> <tr> <td>TOTAL</td> <td></td> <td></td> <td></td> </tr> </table>	CLASS	MALE	FEMALE	TOTAL	DIRECT				INDIRECT				TOTAL				1/78	2/78	3/78	FY 1977 2nd Half	000V FY1977 2nd Half Product. Vol
CLASS	MALE	FEMALE	TOTAL																					
DIRECT																								
INDIRECT																								
TOTAL																								
<b>5</b>	CLASSIFICATION # (a) (b) (c) (d) (e) (f) (g) (h) (i) (j) SUBTOTAL SHIPMENTS OF OTHER PRODUCTS TOTAL SHIPMENTS	10/77	11/77	12/77	1/78	2/78	3/78	FY 1977 2nd Half	000V FY1977 2nd Half Product. Vol															
	AUTO PARTS																							
	SHIPMENTS																							

NOTES: 1. The second half of the fiscal year covered in the reports refers to 10/1/77-3/31/78.  
 2. Goods shipments are separated into auto parts and other products. Auto parts should be recorded individually in separate tables. Thus, individual parts are to be listed here by their classification tables rather than by name.  
 3. In the space for registered trademarks affix or record that which is indicated in the company's product.  
 4. Units for production volumes may be individual units sets or weights according to product.

TABLE 4.2-SURVEY FORMS USED BY JAPAN AUTO PARTS INDUSTRY ASSOCIATION TO COLLECT FINANCIAL DATA

AUTO PARTS PRODUCTION TRENDS REPORT FORM 2

PLEASE RECORD THE NAMES (OF OTHER RELEVANT PARTS)

3 CLASSIFICATION NUMBER (AS PER PARTS CLASSIFICATION TABLE)

1 FIRM	DOMESTIC USE				2 PART		THREE-WHEEL VEHICLES (INCLUDES LIGHT 3-WHEELS)		TWO-WHEEL VEHICLES (INCLUDES MOTORCYCLES)		TOTAL
	SHIPMENT DESTINATION	ASSEMBLING UNITS VALUE (1000'S)	MAINTENANCE UNITS VALUE (1000'S)	TOTAL UNITS VALUE (1000'S)	MAKE VALUE (1000'S)	MAKE VALUE (1000'S)	MAKE VALUE (1000'S)	MAKE VALUE (1000'S)	MAKE VALUE (1000'S)		
(a)	TOYOTA				FUJI HEAVYIND						
	NISSAN				TOYO KOCUO						
	ISUZU				MITSUBISHI						
	HINO				AIWA						
	NISSAN DIESEL				DAIHATSU						
	MITSUBISHI				SUZUKI						
	TOYO KOCUO				HONDA						
	DAIHATSU				OTHERS						
	HONDA				TOTAL						
	OTHERS										
(b)	(1) TOTAL										
(c)	(2) CHASSIS MAKE										
(d)	(3) FOREIGN CARS USE										
(e)	(4) GENERAL WHOLESALE, RETAILERS, MAINTENANCE PLANTS, LARGER PUBLIC USERS, EXPORT INDUSTRY (INCLUDES EXPORT WITH PROFIT), ETC. (DOMESTIC CARS ONLY)										
(f)	(5) EXPORT DIRECTED SALES: PORTION OF DELIVERY TO WHOLESALE AND EXPORTERS THAT IS KNOWN TO BE FOR EXPORT										
(g)	(6) TOTAL	(1)	(2)	(3)	(4)	(5)					

NOTES: VALUE OF SHIPMENTS FOR SECOND HALF OF FISCAL YEAR 1977.

- RECORD SHIPMENT VALUES FOR THE HALF-PERIOD 10/1/77-3/31/78. THE GRAND TOTAL IN THE LOWER RIGHT-CORNER CORRESPONDS TO TOTAL GOODS SHIPMENTS IN TABLE 1 FOR THE SECOND HALF OF FY 1977.
- WHEN ONE CANNOT DISTINGUISH DELIVERIES FOR MAINTENANCE USE, AND GENERAL PUBLIC USES, WHEN ONE CANNOT DISTINGUISH BETWEEN SALES FOR 4-WHEEL AND 3-WHEEL VEHICLES, ENTER UNDER 4-WHEEL VEHICLES WHEN ONE CAN IDENTIFY VALUES FOR THREE AND TWO WHEEL VEHICLE COMBINED BUT CANNOT DISTINGUISH FURTHER UNDER "THREE WHEEL VEHICLES". FINALLY, WHEN ONE CANNOT DISTINGUISH BETWEEN 4 AND 3 WHEEL VEHICLE USE, ENTER THE COMBINED VALUE UNDER 4-WHEEL VEHICLES.
- WHEN ONE CANNOT DISTINGUISH BETWEEN PARTS FOR DOMESTIC AND FOREIGN CAR MAINTENANCE, BUT CAN IDENTIFY SEPARATELY 4-WHEEL, 3-WHEEL AND 2-WHEEL VEHICLE USE, ENTER ALL VALUES UNDER DOMESTIC VEHICLE USE.
- 4-WHEEL VEHICLES APPLIES TO VEHICLES WITH 551 C.C. PLUS ENGINE DISPLACEMENT AND LIGHT 4-WHEEL VEHICLE APPLIES TO THOSE UNDER 551 C.C.

TABLE 4.3-SURVEY FORM USED BY JAPAN AUTO PARTS INDUSTRY ASSOCIATION TO PERFORM MANAGEMENT ANALYSES

FIRM: \_\_\_\_\_  
 END OF MARCH LABOR FORCE: \_\_\_\_\_  
 ACCOUNTING PERIOD: \_\_\_\_\_  
 DEPARTMENT IN CHARGE: \_\_\_\_\_  
 EMPLOYEE IN CHARGE: \_\_\_\_\_  
 MANAGEMENT ANALYSIS SURVEY  
 PHONE: \_\_\_\_\_

ACCOUNTING PERIOD	FY 1975	FY 1976	FY 1977	ACCOUNTING PERIOD	FY 1975	FY 1976	FY 1977
ACCOUNTING ITEM	4/75-3/76	4/76-3/77	4/77-3/78	ACCOUNTING ITEM	4/75-3/76	4/76-3/77	4/77-3/78
LIQUID ASSETS (STOCK) FIXED ASSETS (TANGIBLE ASSETS) DEFERRED ASSETS TOTAL ASSETS				LIQUID LIABILITIES FIXED LIABILITIES SPECIAL RESERVE FUND TOTAL CAPITAL REQUIRED RESERVE FUND SURPLUS FUND (RETAINED EARNINGS) TOTAL CAPITAL AND LIABILITIES			
(UNITS: MILLION YEN)	PERCENTAGE OWNED CAPITAL = $\frac{\text{OWNED CAPITAL}}{\text{TOTAL CAPITAL}} \times 100$						
ACCOUNTING PERIOD	FY 1975	PERCENT OF TOTAL SALES	FY 1976	PERCENT OF TOTAL SALES	FY 1977	PERCENT OF TOTAL SALES	
ACCOUNTING ITEM	4/75-4/76		4/76-3/77		4/77-3/78		
1. TOTAL SALES (TOTAL AUTO PART SALES)		100.00		100.00		100.00	
2. COST OF GOODS SOLD (1) COST OF GOODS PURCHASED DURING PERIOD (2) PERIOD PRODUCTIONS COSTS (1) RAW MATER. (2) PUNCH/PARTS (3) SUBCONTRACT PROCESSING (4) LABOR (5) OVERHEAD (6) DEPRECIAT. (7) UNFINISHED GOODS (8) OTHERS (SUCH AS TRANSFERS FROM OTHER ACCOUNTS) (3) GOODS STOCK ADJ (4) OTHERS (COMMODITY TAX)							
3. SALES & GENERAL ADMIN. EXPENSES							
4. OPERATING PROFIT [1]-[2+3]							
5. NON-OPERATING INC. (RECEIVED PROFIT & DIVIDENDS)							
6. NON-OPERATING EXPEN							
7. ORDINARY PROFITS							
8. SPECIAL PROFITS							
9. SPECIAL LOSSES							
10. PRE-TAX PERIOD PROFITS							
11. CORPORATE TAXES AND OTHER APPROPRIATION							
12. LIQUID PROFITS							
4. OPER. PROFIT x 100 TOT. CAPITAL	FY 1975	FY 1976	FY 1977	12. PERIOD PROFITS x 100 TOTAL CAPITAL	FY 1975	FY 1976	FY 1977
TOTAL LABOR COSTS							

- NOTES:  
 (1) PLEASE RECORD THE FIGURES FROM THE FIRM'S CORPORATE REPORT OF FY 1975-FY 1977 (MARCH, 1978)  
 (2) FOR FIRMS WHOSE ACCOUNTING PERIODS DO NOT END IN MARCH PLEASE RECORD FIGURES FOR PERIODS AS CLOSE AS POSSIBLE TO THE ABOVE  
 (3) UNITS - MILLION OF YEN. PLEASE ROUND THE REMAINDER TO THE NEAREST MILLION  
 (4) IF CERTAIN LABOR COSTS ARE INCLUDED IN SPECIAL COSTS, NON-OPERATING EXPENSES, ETC., INCLUDE THEM IN CALCULATING TOTAL LABOR COSTS.

While the investment and R & D surveys are not published, some of the aggregate results of the production and management surveys are published twice each year in Jidōsha buhin seisan dōkō chōsa (Survey on the Trend in Auto Parts Production). The Survey does not provide individual firm data, but it does provide highly detailed monthly statistics on auto parts production. These statistics are much more detailed than what is available in MITI's Kikai tōkei geppō.

The following are JAPIA parts classifications.

#### Engine Parts

101 Pistons	118 Valve Springs
102 Piston Pin	119 Radiator
103 Piston Rings	120 Thermostats
104 Cylinder Lines	121 Bearings Bronze
105 Gaskets	122 Bearings White Metal
106 Valves (Int. & Ext.)	124 Timing Chains
107 Fuel Pumps	125 Timing Gears
108 Diaphragm	126 Crank Shafts
109 Carburetors	127 Cam Shafts
110 Fuel Injection Equipment	128 Connecting Rods
111 Plungers	129 Valve Guide
112 Nozzles	130 Tappets
113 Fuel Filters	131 Valve Rocker Arms
114 Air Cleaner	132 Fly Wheels
115 Oil Cleaner	133 Cylinder Head Bolts
116 Water Pumps	134 Fans
117 Oil Pumps	199 Other Engine Parts

#### Electrical Equipment

201 Starting Motor	207 Ignition Coils
202 Generators	208 Spark Plugs
203 Voltage Regulators	209 Heater Plugs for Diesel Engines
204 Distributors	210 Condensers
206 Distributor Points and Arms	211 Magnets
	299 Other Electrical Equipment

#### Steering Drive and Transmission Parts

301 Steering Wheels	314 Propeller Shafts
302 Power Steering Drivers	315 Transmission Gears & Shafts
303 Clutch Assemblies	316 Differential Gears
304 Clutch Parts	317 Steering Arm Sectors & Shafts
305 Clutch Facings	318 Oil Seals
306 Clutch Springs	319 Wheels
307 Front Axles	320 Hub Bolts and Nuts

308 Knuckles	321 King Pins
309 Tie Rods	322 Bushings
310 Tie Rod Ends	323 Transmission Housings
311 Rear Shafts	324 Differential Housing and Axle Tabs
312 Universal Joints	325 Needle Roller Bearings
313 U-Joint Spiders	399 Other Steering, Drive and Transmission

#### Chassis Stamping Parts

601 Frame	606 Dashboards and Panels
602 Fuel Tanks	607 Bonnet Covers & Panels
603 Mufflers and Silencers	608 Rubber Dampers
604 Bumpers	609 Brackets
605 Side Steps	699 Other Chassis Stamping Parts

#### Chassis Parts and Accessories

701 Window Frames	711 Panels for Truck Chassis
702 Window Regulators	721 Panels for Bus Chassis
703 Door Handles and Locks	731 Panels for Passenger Car Bodies
704 Door Hinges	741 Panels for Motorcycle Bodies
705 Seat and Seat Springs	799 Other Chassis Parts and Accessories
706 Moldings	

#### Service Tools

801 Greasing Pumps	804 Pliers
802 Tacks	899 Other Service Tools
803 Spanners	

In addition to its production data, JAPIA also presents some data on the destination of auto parts shipment—whether original equipment, replacement, body manufacturers, wholesalers, retailers, service garages, fleets and exporters. Finally, size distributions of auto parts firms by employees and capitalization are also regularly published.

Detailed annual JAPIA auto parts production data also appears in Jidōsha nenkan.

#### 4.3 NIHON JIDŌSHA KAIGISHŌ (JAPAN AUTOMOBILE CHAMBER OF COMMERCE, JACC)

The JACC is a relatively small trade group which brings together assemblers and parts manufacturers, dealers and vehicle users associations primarily for lobbying purposes. The JACC does little research



and conducts no surveys, but it does sponsor, together with Nikkan jidōsha shimbunsha (Daily Automotive News Co.), the compilation of Jidōsha nenkan (Automobile Yearbook). This yearbook publishes a large amount of survey material received from JACC member organizations and from the government.

(1) Production and Shipments. Jidōsha nenkan publishes both the MITI and the Jikōkai statistics on production and shipment of automobiles.

(2) Exports. Jidōsha nenkan publishes both the Jikōkai and the Ministry of Finance compiled automobile export statistics.

(3) Automobile Emissions. Reports regular Kankyōchō (Environmental Production Agency) surveys on auto emissions are published in Jidōsha nenkan. The survey form is shown in Table 4.4.

(4) Sales and Use. Jidōsha nenkan reports finely detailed Japanese Automobile Sales Association data on new car registrations and equally finely detailed Ministry of Transportation data on the age profile of automobiles in use. Jidōsha nenkan also publishes detailed statistical analyses of the financial condition of automobile dealers cross-classified by size of dealership, geographic location and type of vehicle sold. Statistics on many individual dealerships are also provided. Finally, data is also given on the inter-prefectural movement of used cars.

(5) Market Shares. Prefectural and city market shares for Japanese and foreign automobile manufacturers and individual models are also published in Jidōsha nenkan.

(6) Automobile Imports. Both the Ministry of Finance and Nihon jidōsha yūnyū kumiai (Japan Automobile Importers Association) provide Jidōsha nenkan with detailed monthly information on automobile imports. Along side this information, Jidōsha nenkan also contains imported vehicle use data by prefecture which is taken from the Ministry of Transportation use surveys.

(7) Automobile Parts. JAPIA production and management survey data is published in Jidōsha nenkan. Jidōsha nenkan also contains a complete listing of technical tie-ups of any kind between Japanese parts manufacturers and assemblers and foreign firms.

(8) Road Use. The Ministry of Transportation conducts detailed surveys on the use to which passenger cars, trucks, buses, rent-a-cars, and taxis are put. Parts of these elaborate surveys are also published in Jidōsha nenkan. The National Police Agency statistics on the accidents and deaths which results from automobile use are also found in this section.

TABLE 4.4-ENVIRONMENTAL PROTECTION AGENCY SURVEY FORM

AUTO EMISSIONS SURVEY

VEHICLE TYPE (MODEL NAME)	ENGINE TYPE	(EQUIVALENT INERTIAL) WEIGHT (KG)	TOTAL DIS- PLACEMENT (CC)	PRIMARY MEASURES FOR REDUCTION OF EXHAUST GAS	AUTOMOBILE EXHAUST DISCHARGE LEVELS						10-MODE RATE OF FUEL CONSUMPTION (TEST RESULTS) KM/L	MANUFACTURER'S REPORTED RATE OF FUEL CONSUMPTION KM/L			
					10 MODE g/km			11 MODE g/test							
					NO <sub>x</sub>	HC	CO	NO <sub>x</sub>	HC	CO					
													COMPLETION TEST TARGET VALUES		10 MODE "TRAVEL"
													ACTUAL TEST RESULTS		GM/KM "TRAVEL"
TOYOTA				ENGINE IMPROVEMENT & TERNARY CATALYTIC AGENT & EXHAUST FUME RECYCLING (ELECTRONI- CALLY) CONTROLLED FUEL PROPUL. DEVICE)											
E-M5105(CROWN)															
E-MX40(CORONA MARK II) (CHASER)				AS ABOVE											
E-MX41(CORONA MARK II (CHASER)				AS ABOVE											
E-TX40(CORONA MARK II) (CHASER)				ENGINE IMPROVEMENT & OXIDIZED CATALYTIC AGENT & SECONDARY AIR INTRODUCTION & EXHAUST RECYCLING											
E-TT126(CORONA)				AS ABOVE											
E-TT125(CORONA)				AS ABOVE											
E-TA46(CARINA (CELICA)				AS ABOVE											
E-TA41(CARINA) (CELICA)				AS ABOVE											
E-TE56(COROLLA)				AS ABOVE											
E-TE6E (SPRINTER)				AS ABOVE											
E-KE55(COROLLA)				AS ABOVE											

4-10

Table 4.4 (Continued)

VEHICLE TYPE (MODEL NAME)	ENGINE TYPE	(EQUIVALENT INERTIAL WEIGHT (KG)  TOTAL DIS- PLACEMENT (CC)	PRIMARY MEASURES FOR REDUCTION OF EXHAUST GAS	COMPLETION TEST TARGET VALUES	AUTOMOBILE EXHAUST DISCHARGE LEVELS						10-MODE RATE OF FUEL CONSUMPTION (TEST RESULTS) KM/	MANUFACTURER'S REPORTED RATE OF FUEL CONSUMPTION KM/	
					10 MODE g/km			11 MODE g/test					
					NO <sub>x</sub>	HC	CO	NO <sub>x</sub>	HC	CO			
				ACTUAL TEST RESULTS								10 MODE "TRAVEL"	60 KM/HR "TRAVEL"
NISSAN													
E-11252 (PRESIDENT)			ENGINE IMPROVEMENT & TERNARY CATALYTIC AGENT & EXHAUST RECY- CLING (ELECTRONIC FUEL PROPUL. DEVICE)										
E-PJ811 (BLUEBIRD)			RAPID COMBUSTION ENGINE & OXIDIZED CATALYTIC AGENT & SECONDARY AIR INTRO. & EXHAUST RECYCLING										
E-P811 (BLUEBIRD)			AS ABOVE										
E-B310(SUNNY)			ENGINE IMPROVEMENT & OXIDIZED CATALYTIC AGENT & SECONDARY AIR INTRODUCTION & EXHAUST RECYCLING										
TOYO KOGYO													
E-CD3MC(COSMO)			ENGINE IMPROVEMENT & TERNARY CATALYTIC AGNT & SECONDARY AIR INTRO. & EXHAUST RECYCLING										
E-CD3MC(COSMO)			AS ABOVE										
E-CD2VC(COSMO)			AS ABOVE										
E-LAYMS(LUCE)			AS ABOVE										
E-FAYTS (FAMILIA)			AS ABOVE										

Table 4.4 (Continued)

VEHICLE TYPE (MODEL NAME)	ENGINE TYPE	(EQUIVALENT INERTIAL) WEIGHT (KG)	TOTAL DIS- PLACEMENT (CC)	PRIMARY MEASURES FOR REDUCTION OF EXHAUST GAS	COMPLETION TEST TARGET VALUES	ACTUAL TEST RESULTS	AUTOMOBILE EXHAUST DISCHARGE LEVELS						10-MODE RATE OF FUEL CONSUMPTION (TEST RESULTS) KM/L	MANUFACTURER'S REPORTED RATE OF FUEL CONSUMPTION KM/L
							10 MODE g/km			11 MODE g/test				
							NO <sub>x</sub>	HC	CO	NO <sub>x</sub>	HC	CO		
							TO MODE "TRAVEL"							
ISUZU AUTO	E-PF50 (GEMINI)			ENGINE IMPROVEMENT & OXIDIZED CATALYTIC AGENT & SECONDARY AIR INTRO. & EXHAUST RECYCLING										
FUJI H.I.	E-A32(LEONE)			ENGINE IMPROVEMENT & EXHAUST RECYCLING & SECONDARY AIR INTRO.										
	E-A33(LEONE)			AS ABOVE										
	E-A34(LEONE) (4-WHEEL DRIVE SEDAN)			AS ABOVE										
	E-K24 (REX 550)			AS ABOVE										
SUZUKI	E-5512 (FRONTE)			ENGINE IMPROVEMENT & OXIDIZED CATALYTIC AGENT & SECONDARY AIR INTRODUCTION										
	E-5520 (FRONTE)			AS ABOVE										
	CERBO			AS ABOVE										

Table 4.4 (Continued)

VEHICLE TYPE (MODEL NAME)	ENGINE TYPE	(EQUIVALENT INERTIAL WEIGHT (KG))	PRIMARY MEASURES FOR REDUCTION OF EXHAUST GAS	AUTOMOBILE EXHAUST DISCHARGE LEVELS						10-MODE RATE OF FUEL CONSUMPTION (TEST RESULTS) KM/	MANUFACTURER'S REPORTED RATE OF FUEL CONSUMPTION KM/
		TOTAL DIS- PLACEMENT (CC)		10 MODE g/km			11 MODE g/test				
				NO <sub>x</sub>	HC	CO	NO <sub>x</sub>	HC	CO		
				COMPLETION TEST TARGET VALUES							10 MODE "TRAVEL"
				ACTUAL TEST RESULTS							60 KM/HR "TRAVEL"
<b>HONDA MOTOR</b>											
E-SG			STRATIFIED VENTILATED COMBUSTION SYSTEM W/ SECONDARY CHAMBER								
E-SH (CIVIC)			AS ABOVE								
<b>DAIHATSU</b>											
E-610(CIARADE)			"WEAK" OR "DILUTED" COMBUSTION SYSTEM & OXIDIZED CATALYTIC AGENT & SECONDARY AIR INTRO. & EXHAUST RECYCLING								
<b>MITSUBISHI</b>											
E-A131A (GALLANT SIGMA (GAL. LAMBDA))			WEAK COMBUSTION SYSTM & OXIDIZED CATALYTIC AGENT & EXHAUST RECYCLING								
E-A132A (GALLANT SIGMA)			AS ABOVE								
E-A133A (GALLANT SIGMA (GAL. LAMBDA))			AS ABOVE								
E-A144A (LANCER) (LANCER CELEST)			AS ABOVE								
E-A141A (LANCER)			AS ABOVE								

(9) Labor Force, Jidōsha nenkan contains individual automobile assembler and parts manufacturers data on number of employees, average age, years of service, sex, fixed and overtime compensation.

In addition to Jidōsha nenkan, the JACC publishes a monthly report Chōsa geppo (Monthly Survey). The first six section of this report are a fascimile of the Ministry of Transportation's monthly report on vehicle use Riku-un tōkei gyppō. The last three sections of this report includes automobile production data disaggregated by assembler and tire production and shipment data disaggregated by the type of vehicle for which the tires were purchased.

#### 4.4 NIHON KAIHATSU GINKŌ (JAPAN DEVELOPMENT BANK)

The Japan Development Bank (JDB) is a major Japanese lending institution. Semiannually the JDB conducts a survey on realized investment and new investment plans. In importance this survey ranks along side the MITI and EPA investment surveys and like them contains considerable information on the automobile industry. It is distinguished from their government surveys by its high quality and by its considerable detail. The results of the JDB survey are published in the bank's research report Chōsa (Survey). The survey collects individual firm data on realized investment and planned investment, on motivation for new investment, on demand and supply of funds for new investment, on the present financial condition of the firm and on the character its present production performance (including the firm's present operating rate). For multi-plant firms the investment data are disaggregated on a perfectual basis. Detailed information on investment for pollution abatement are also collected. A sample of the forms used in the JDB surveys is presented in Table 4.5 and Table 4.6. The JDB does not publish individual firm responses, but it does publish a firmer breakdown of investment by product line that is characteristic of the other two major surveys.

#### 4.5 TOYOTA HANBAI KABUSHIKI KAISHA (TOYOTA MOTOR SALES, INC.)

Each year Toyota Motor Sales publishes Nihon no jidōsha sangyō (The Japanese Automobile Industry), an annual review of the automobile industry's problems and prospects for the future. Nihon no jidōsha sangyō contains considerable statistical material each year including,

Industry and firm export data from Okurashō and Jikokai

Vehicle use data from Unyūshō

Production data from Jikōkai

Sales data from the Ministry of Finance and from data independently collected by Toyota Motor Sales.

New and used car vehicle registration data independently collected by Toyota Motor Sales.

Imported Car registration data independently collected by Toyota Motor Sales. Toyota Motor Sales also publishes an English language version of this report titled The Motor Industry of Japan, which is available in the U.S. as a pamphlet.

TABLE 4.5

JAPAN DEVELOPMENT SURVEY FORM  
 1977, 1978, 1979  
 INQUIRY OF PLANNED FIX CAPITAL INV.

SURVEY CONDUCTED BY  
 JAPAN DEVELOPMENT BANK

PLEASE RETURN SURVEY  
 AUGUST 1, 1978 (TUES.)

CODE OF FIRM					0	0
CARD NO.	1	0	1	0	0	
CODE OF PRIMARY LINE OF PRODUCTION						
CAPITAL STOCK USED						

PRIMARY LINE OF PRODUCTION

NO. OF SIDE BUSINESS

PREFECTURE OF HEAD OFFICE

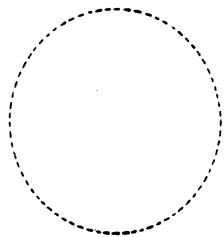
MR.  
 MRS.  
 MISS

Phonetic Syllabary					CAPITAL STOCK ISSUED	FULL TIME EMPLOYEES (HEAD COUNT)
NAME OF FIRM						
ADDRESS OF HEAD OFFICE						
CORRESPONDENCE	ADDRESS -----					
	DIVISION	DEPARTMENT	NAME OF PERSON IN CHARGE		TEL.	
MEMO.						

Please indicate any changes within firm such as mergers or divestures in memo

RETURN TO

JAPAN DEVELOPMENT BANK DIVISION OF INQUIRY 1-9-1 (UAKIGIN BLDG.) ŌTEMACHI CHIYODA-KU TOKYO-to .100  DIVISION OF INQUIRY TEL.(270) 3211 (represent) INOEUE, NAKAMURA TEL.(270) 2486 (Direct ext)
---



						P
--	--	--	--	--	--	---

(1) PLEASE INFORM US OF YOUR TOTAL FIXED CAPITAL EXPENDITURE

(IN MILLIONS OF YEN)

CORD No.		1977 REAL CAPITAL EXPENDITURE	ANTICIPATED 1978	ANTICIPATED 1979
9				
10:2:0:1	TOTAL FIXED CAPITAL EXPENDITURE	CONSTRUCTION BASIS		
10:2:0:2		PAYMENT BASIS		

- NOTE: 1. As a general rule, construction basis is defined as the booked value amount of tangible fixed assets, including construction in progress without deducting sales, destruction, or depreciation. Also payment basis is defined as cash outlay (cash payments, settlement of notes payable).
2. Please match the total figures of fixed capital expenditure for both the construction basis and the payment basis with the aggregation of those in the individual files.

(2) PLEASE ITEMIZE THE DEMAND AND SUPPLY OF THE PLANT AND EQUIPMENT FUNDS

(IN MILLIONS OF YEN)

CORD No.		1977 ACTUAL	PLANNED 1978	PLANNED 1979
9				
10:3:0:1	INVESTMENT IN PLANT AND EQUIPMENT (A)			
10:3:0:2	REDEMPTION OF PLANT & EQUIPMENT FUND (B)			
10:3:0:3	DEMAND	PRIVATE FINANCIAL INSTITUTIONS		
10:3:0:4		BONDS		
10:3:0:5		GOVERNMENT FINANCIAL INSTITUTIONS		
10:3:0:6		FOREIGN CAPITAL		
10:3:0:7		OTHER SOURCES OF LOANS		
10:3:1:2		INCREASE OR DECREASE IN INVESTMENT OR LOANS (C)		
10:3:1:3		(A) + (B) + (C) = Total = (D) + (E)		
10:3:1:4		SUPPLY OF PLANT AND EQUIP. FUND	STOCKS	
10:3:1:5	BONDS			
10:3:1:6	PRIVATE FINANCIAL INSTITUTIONS			
10:3:1:7	GOVERNMENT FINANCIAL INSTITUTIONS			
10:3:1:8	FOREIGN CAPITAL			
10:3:1:9	OTHER SOURCES OF LOANS			
10:3:2:3	EXTERNAL SUPPLY OF FUNDS (D)			
10:3:2:4	INTERNAL SUPPLY OF FUNDS (E) + TOTAL - (D)			

- NOTE: 1. Please employ payment basis for Investment in plant and equipment (A) and match it with the payment basis in chart (1) of the summary file.
2. Please list the supply of investment funds allotted to plant and equipment only and exclude that allotted to operating funds. Further, any amount that is left over from the year in which it was supplied to be used in the following year should be incorporated in the year in which it was actually employed. Please note thereby that Internal supply of funds (E) is not a negative figure.
3. (a) Private financial institutions include all Japanese commercial banks, trusts, life insurance, liability insurance, mutual financing banks, credit unions, Central bank for Commercial and Industrial Cooperatives, the Central Cooperative Bank for Agriculture and Forestry, etc.
- (b) Government financial institutions include development corporation, the Financial Corporation for Hokkaido and Tohoku, Small Business Finance Corporation, the People's Finance Corporation, and any other finance corporation, public corporation or public enterprise with a special status that extends credits.
- (c) For Foreign Capital please indicate foreign debts and loans as well as credit extended by Foreign banks and manufacturers for plant and equipment funds.
- (d) Other sources of loan includes loans extended by financial institutions not listed above (i.e., affiliated firms, local public bodies, etc.).
4. Please list the adjustment of long term loans and investment only to the affiliated firms and subsidiaries in increase or decrease in investment and loans.



(3) PLEASE INFORM US OF YOUR VOLUME OF SALES, RECURRING PROFIT AND LOSS, NET INCOME AFTER TAX, & DEPRECIATION

(IN MILLIONS OF YEN)

CARD No		1977 ACTUAL	ANTICIPATED 1978
9 1:0:4:0:1	SALES	26	32 33
1:0:4:0:4	RECURRING PROFIT AND LOSS		
1:0:4:0:2	NET INCOME AFTER TAX DEPRECIATION		
1:0:4:0:3	DEPRECIATION		

(4) PLEASE INFORM US OF THE AMOUNT OF RENT ON LAND AS IS INCORPORATED IN THE TOTAL FIXED CAPITAL INVESTMENT FUND IN TERMS OF CONSTRUCTION BASIS

(IN MILLIONS OF YEN)

CARD No		ACTUAL 1977	PLANNED 1978	Planned 1979
9 1:0:8:0:1	RENT ON LAND	26	32 33	39 40

(5) IN CALCULATING THE TOTAL FIXED CAPITAL, INVESTMENT EXPENDITURE AMOUNT FOR 1978 AND 1979, HOW MUCH HAVE YOU ACCOUNTED FOR THE INFLUENCE OF THE PRICE CHANGE ON CONSTRUCTION EXPENSES? (IN COMPARISON TO THE PRIOR YEAR) PLEASE EXPRESS IN PERCENTAGE AMOUNTS.

INFLUENCE ON CONSTRUCTION IN 1978	%
INFLUENCE ON CONSTRUCTION IN 1977	%

TABLE 4.6

JAPAN DEVELOPMENT BANK SURVEY FORM

INDIVIDUAL FILE

CODE OF FIRM	2					8
CARD No.	9	1	1	1	0	13
INDUSTRIAL CLASS CODE	28					32

DEVELOPMENT BANK SURVEY

INDUSTRIAL CLASSIFICATION \_\_\_\_\_

NAME OF FIRM \_\_\_\_\_

WE HAVE ENCLOSED AS MANY INDIVIDUAL FILE FORMS AS CORRESPONDS TO THE NUMBER OF YOUR PRODUCTION LINES

SHOULD YOU HAVE ANY PLANT AND EQUIPMENT INVESTMENTS ON OTHER PRODUCTION LINES AS INDICATED IN THE ATTACHED SHEET OF INDUSTRIAL CLASSIFICATIONS, PLEASE NOTIFY US. WE WILL SEND YOU ADDITIONAL FORMS.

IN FILLING OUT THIS FORM, PLEASE NOTE THE FOLLOWING POINTS.

- I. The total of 6(a) in the Individual File = The total fixed capital expenditure in terms of the construction basis in (1) of Summary File
- II. The total of 6(b) in the Individual File = the total fixed capital expenditure in terms of the payment basis in (1) of Summary File
- III. 6(a) of Individual File = 7(a) of Individual File
- IV. 6(a) of Individual File = 9(a) of Individual File

(6) PLEASE INFORM US OF THE AMOUNT OF FIXED CAPITAL INVESTMENT IN THE PRODUCT LINE CONCERNED

(IN MILLIONS OF YEN)

CARD No.		REAL 1977	PLANNED 1978	PLANNED 1979
9 11 2 0 1	CAPITAL EXPENDITURE (a)			
1 1 2 0 2	1st HALF OF YEAR			
1 1 2 0 3	2nd HALF OF YEAR			
9 11 2 0 4	PAYMENT BASIS FIXED CAPITAL EXPENDITURE (b)			
1 1 2 0 5	1st HALF OF YEAR			
1 1 2 0 6	2nd HALF OF YEAR			

- NOTE: 1. Please incorporate indivisible fixed investment (i.e., construction expenditure of the head quarters bldg) into that of the principle product line as specified in the individual file.  
 2. Please match the aggregation of fixed capital investment expenditure both in terms of construction basis and payment basis in the Individual File with that in (1) of the Summary File

- (7) IN REFERENCE TO CONSTRUCTION BASIS FIXED CAPITAL EXPENDITURES OF 6(a), PLEASE GIVE THE DETAILS CLASSIFYING IT ACCORDING TO DIFFERENT ENGINEERING WORKS ON EQUIPMENT (PLEASE DESCRIBE ITS CAPACITY ETC. AS CONCRETELY AS POSSIBLE).

	DETAILED ACCOUNT OF ENGINEERING WORK ON PLANT AND EQUIPMENT	TOTAL CONSTRUCTION EXPENSES					
Sapporo							
Nagoya							
Kanazawa							
Osaka							
Hiroshima							
Takamatsu							
Fukuoka							
	TOTAL (a)						

COPY

- NOTE: 1. Please match Total (a) with the fixed capital investment expenditure in terms of the construction basis in 6(a).  
 2. In filling out the above table, please refer to the example of "how to fill out the table of engineering work" in the attached form.

- (8) PLEASE INDICATE HOW MUCH OF THE FIXED CAPITAL INVESTMENT IN TERMS OF THE CONSTRUCTION BASIS IN 1978 IN (b) WAS ATTRIBUTED TO THE FOLLOWING MOTIVES? PLEASE GIVE IN PERCENTAGE TERMS

CARD No.	MOTIVES FOR INVESTMENT	PERCENT
9 11 3 0 1	A. INV. TO INCREASE CAPACITY	30 32
1 1 3 0 2	B. RATIONALIZE, LABOR SAVING INV.	
1 1 3 0 3	C. INV. FOR RESEARCH/DEVELOPMENT	
1 1 3 0 4	D. INV. FOR MAINTENANCE/REPAIR	
1 1 3 0 5	E. INV. FOR POLLUTION/ SAFETY CONTROL	
1 1 3 0 6	F. INV. TO CONSERVE ENERGY	
1 1 3 0 7	G. OTHER	
1 1 3 1 0	TOTAL	1 0 0

(9) PLEASE ITEMIZE YOUR CONSTRUCTION BASED FIXED CAPITAL INVESTMENT AS SHOWN IN 6(a)  
 ACCORDING TO THE LOCATION (IN MILLIONS OF YEN)

CARD No.	AREA	PREFECTURE	CGOE	1977 REAL	PLANNED 1978	PLANNED 1979
1:1:4:0:1			0:1			
1:1:4:0:2			0:2			
1:1:4:0:3			0:3			
1:1:4:0:4			0:4			
1:1:4:0:5			0:5			
1:1:4:0:6			0:6			
1:1:4:0:7			0:7			
1:1:4:0:8			1:5			
1:1:4:0:9			0:8			
1:1:4:1:0			0:9			
1:1:4:1:1			1:0			
1:1:4:1:2			1:9			
1:1:4:1:3			2:0			
1:1:4:1:4			1:1			
1:1:4:1:5			1:2			
1:1:4:1:6			1:3			
1:1:4:1:7			1:4			
1:1:4:1:8			2:2			
1:1:4:1:9			2:3			
1:1:4:2:0			2:4			
1:1:4:2:1			2:1			
1:1:4:2:2			1:6			
1:1:4:2:3			1:7			
1:1:4:2:4			1:8			
1:1:4:2:5			2:5			
1:1:4:2:6			2:6			
1:1:4:2:7			2:9			
1:1:4:2:8			2:7			
1:1:4:2:9			2:8			
1:1:4:3:0			3:0			
1:1:4:3:1			3:1			
1:1:4:3:2			3:2			
1:1:4:3:3			3:3			
1:1:4:3:4			3:4			
1:1:4:3:5			3:5			
1:1:4:3:6			3:6			
1:1:4:3:7			3:7			
1:1:4:3:8			3:8			
1:1:4:3:9			3:9			
1:1:4:4:0			4:0			
1:1:4:4:1			4:1			
1:1:4:4:2			4:2			
1:1:4:4:3			4:4			
1:1:4:4:4			4:3			
1:1:4:4:5			4:5			
1:1:4:4:6			4:6			
1:1:4:4:7			4:7			
TOTAL (a)						

NOTE: 1. Please match Total (a) with fixed capital investment in terms of the construction basis in 6(a).  
 2. Please incorporate all indivisible investment expenditure under the prefecture of the head office.  
 3. Please incorporate all investment in ships where the port of registry is located.  
 4. Please separate investment incurred to electric wires and railroad tracks etc. according to its location as much as possible.

(10) HOW DO YOU PERCEIVE THE PRESENT RATE OF YOUR OPERATION (OUTPUT RATE?) IN COMPARISON TO THAT OF WHEN IN NORMAL OPERATION? PLEASE GIVE APPROXIMATE FIGURES.

RATE OF OPERATION	%
-------------------	---

NOTE: Non-manufacturers excluding the electric industry, storage industry, and hotels and inns need not fill this column.

(11) IF ANTIPOLLUTION INVESTMENT IS INCORPORATED IN THE FIXED CAPITAL INVESTMENT EXPENDITURE OF (6), PLEASE GIVE THE MONETARY AMOUNTS IN TERMS OF THE CONSTRUCTION BASIS.

1 In terms of types of antipollution measures

CARD No.	TYPE OF ANTIPOLLUTION INVESTMENT	1977 REAL	1978 PLANNED	1979 PLANNED
11501	A. NOX ANTIPOLLUTION FACILITIES			
11502	B. OTHER AIR POLLUTION CONTROL FACILITIES			
11503	C. WATER POLLUTION PREVENTION FACILITIES			
11504	D. NOISE, VIBRATION PREVENTION FACILITIES			
11505	E. INDUSTRIAL WASTE DISPOSAL FACILITIES			
11506	F. OTHER			
11510	TOTAL			

2 Investment according to location

CARD No.	PREFECTURE	* CODE	1977 REAL	1978 PLANNED	1979 PLANNED
21401					
21402					
21403					
21404					
21405					
21406					
21407					
21408					
21409					
21410					
21421	TOTAL				

NOTE: 1. In the case of no antipollution investment please enter zero to facilitate data organization.  
 2. The types of anti pollution measures are to be in accordance with the definitions employed by the Statutes concerning pollution.  
 (A) Air pollution control facility is defined as a measure to prevent the discharge of poisonous chemicals such as sulphur oxide and includes  
 (B) Water pollution prevention measures are facilities such as waste water disposal plants and include equipment to change the production method of sodium hydroxide.  
 (C) Noise & vibration prevention facilities are equipment to prevent noise and vibration and includes sound arresters.  
 (D) Industrial waste disposal facilities are equipment intended to collect, convey, and dispose of cinders, sludge, oil waste, acid waste, plastic waste, etc.  
 (E) Other pollution preventive equipment are items that have not been included in A-D such as equipment to prevent malodor or land subsidence, or fixed capital investment for the upkeep of plant surroundings such as planting of shrubs, etc.  
 Further, please separate research and development funds for nonpolluting production methods due to the current problems of heavy pollution into categories A thru E depending on the condition of the pollution at the time of its occurrence, i.e., Production Facilities which eliminate exhaust of automobiles - Air pollution prevention facilities  
 3. Please match the total for the itemization by location with that by type.  
 4. Please leave space with \* blank.



## 5. INVESTMENT AND CAPITAL STOCK SERIES FOR THE JAPANESE AUTOMOBILE INDUSTRY

The four investment series presented in Tables 5.1 and 5.2 have been constructed from the separate semi-annual surveys undertaken by MITI and by the Japan Development Bank and described elsewhere in this study.<sup>1</sup> Both the MITI and the Japan Development Bank survey investment on a cost and on a disbursement basis. For total investment the four series are consistent with one another when allowances are made for differences in timing, concept and sample. Happily, the four series also have complementary disaggregations. The Ministry of International Trade and Industry disaggregates its investment data by assembler, body and parts manufacturer and by production versus research and testing facilities. On the other hand, the Japan Development Bank, in addition to providing survey data on total investment also provides detailed regional investment breakdowns and also detailed data on investment in pollution control equipment. The pollution control investment data is further broken down by type of nuisances being abated.

It will be observed from Table 5.1 that while Japanese automobile body and parts manufacturers have been responsible for one-quarter to one-third of their investment in production facilities since 1966, their share of investment in research facilities is considerably less. Overall the share of new investment in research and testing facilities in total investment has risen considerably since 1966. Similarly, the share of pollution control investment in total investment has also risen since 1966. In this case, however, as seen from Table 5.2 a peak was reached in 1974 when over one-quarter of all automobile industry investment was in pollution control equipment, or in the facilities for the production of pollution control equipment.

The data in Tables 5.1 and 5.2 are given in current yen terms. In order to better appreciate the growth in automobile production capacity, Table 5.3 presents a vehicle production capacity constructed from components obtained from MITI's Current Productions Survey. This survey has also been previously described in this report.<sup>2</sup> Table 5.3 also presents a price index for industrial land and for building materials.

As Table 5.1 suggests, the Japanese automobile industry is considerably less integrated than the automobile industry in the United States. Japanese automobile assemblers rely on subcontractors far more heavily than do their counterparts in this country. In part, this is the result of differing requirements for financial reporting in the two countries. In Japan until 1976 consolidated balance sheets and consolidated financial statements were not required. Even today the new Japanese legislation has been so loosely drawn that only Honda (among Japanese automobile

---

1. Cf ante, pgs. 3-8 and 4-14  
2. Cf ante, pg.3-8

assemblers) submits a consolidated balance sheet. In this situation, Japanese automobile assemblers have a considerable incentive to maintain suppliers and subcontractors as independent entities if only to retain maneuver when reporting financial results. These unusual accounting practices partially explain the prevalence of both small firms and large industrial groupings in Japan.

Table 5.4 presents the suppliers for the eleven Japanese automobile assemblers for each of one hundred sixty-eight auto parts. Table 5.4 makes explicit what is implicit in Table 5.1. A relatively small proportion of all auto parts are supplied by the assemblers themselves. Table 5.4 also provides an interesting commentary on the nature of enterprise groups in the automobile industry. First, while rival automotive groups tend to use different suppliers, this is far from universally true even for significant components. Moreover, while Daihatsu and Hino are, for most purposes, considered part of the Toyota Group, they don't necessarily use the same suppliers as Toyota. Similarly, Fuji Heavy Industries is, for most purposes, considered part of the Nissan Group; but it does not necessarily use the same suppliers as Nissan. It follows from this discussion that many of the suppliers of both major and minor assemblers are not members of the assemblers' enterprise group. This can be seen readily from the Tables 5.5 series.

Table 5.6 presents capital stock series for each of ten Japanese automobile assemblers. Since Mitsubishi Motors is a subsidiary of Mitsubishi Heavy Industries, it is not required to submit a separate financial report to the Ministry of Finance. Hence, no capital stock information is available on this firm.



Table 5.1

MITI SURVEY ON AUTOMOBILE INDUSTRY  
INVESTMENT IN PRODUCTIVE AND IN RESEARCH  
AND TESTING FACILITIES

(COST BASIS, 1975-1977, EXPENDITURE BASIS IN PARENTHESES, 1975-1977)

(¥ 100 Million)

FISCAL YEAR	ASSEMBLERS			PARTS MANUFACTURERS			BODY MANUFACTURERS		
	TOTAL INVESTMENT	INVESTMENT IN PRODUCTIVE FACILITIES	INVESTMENT IN RESEARCH & TESTING FACILITIES	TOTAL INVESTMENT	INVESTMENT IN PRODUCTIVE FACILITIES	INVESTMENT IN RESEARCH & TESTING FACILITIES	TOTAL INVESTMENT	INVESTMENT IN PRODUCTIVE FACILITIES	INVESTMENT IN RESEARCH AND TESTING FACILITIES
1977	4841 (4521)	3721	546	1120 (992)	960	43	371 (315)	336	17
1976	3561 (2998)	2778	332	777 (825)	641	35	232 (202)	205	8
1975	2602 (2705)	2022	229	578 (583)	495	30	186 (179)	164	3
1974	3757	2914	343	894	772	34	216	194	4
1973	2989	2299	282	974	806	40	310	279	7
1972	2498	1781	231	612	498	30	177	132	13
1971	2266	1724	209	511	403	24	165	130	6
1970	2825	2257	152	626	530	25	205	179	5
1969	2457	1918	186	427	346	17	103	88	2
1968	2417	1952	104	434	352	15	162	145	3
1967	1947	1334	88	419	313	9	133	104	1
1966	1188	847	54	180	134	9	54	39	1

SOURCE: Tsūshōsangyōshō (MITI), Shiyō sangyō no setsubi toshi keikaku (EQUIPMENT INVESTMENT PLANS OF PRINCIPAL MANUFACTURING INDUSTRIES)

TABLE 5.2

JAPAN DEVELOPMENT BANK AND MITI SURVEY DATA  
ON AUTOMOBILE INDUSTRY INVESTMENT  
(¥ 100 Million)

FISCAL YEAR	JDB SURVEY TOTAL INVESTMENT (EXPENDITURE BASIS)	MITI SURVEY TOTAL INVESTMENT (EXPENDITURE BASIS)	JDB SURVEY TOTAL INVESTMENT (COST BASIS)	MITI SURVEY TOTAL INVESTMENT (COST BASIS)	JDB SURVEY TOTAL INVESTMENT IN POLLUTION CONTROL	JDB SURVEY AIR RELATED POLLUTION INVESTMENT	JDB SURVEY WATER RELATED POLLUTION INVESTMENT	JDB SURVEY INVESTMENT IN PRODUCTION FACILITIES FOR ANTI-POLLUTION DEVICES	JDB SURVEY INVESTMENT IN NOISE AND VIBRATION ABATEMENT	JDB SURVEY INVESTMENT IN REMOVAL OF VISUAL POLLUTION
1977	5408	5828	5813	6330	766	650	80	Included in other categories	8	15
1976	3642	3917	4111	4570	740	585	118	Included in other categories	17	12
1975	3306	3367	3161	3366	871	768	57	Included in other categories	15	13
1974	4769	4867	4711	4762	1350	35	81	1153	Not available	Not available
1973	4231	4273	4415	4431	671	45	81	465	Not available	Not available
1972	3096	3287	3255	3425	309	27	67	183	Not available	Not available
1971	3160	2941	3126	2978						
1970	3680	3655	3843	3723						
1969	2997	2986	3011	3028						
1968	3490									
1967	2841									
1966	1599									

SOURCE: Nihon Kaihatsu Ginko (Japan Development Bank), Chōsa (Survey); Tsūshōsangyōshō (MITI), Shuyō Sangyō no setsubi toshi keikaku (EQUIPMENT INVESTMENT PLANS OF PRINCIPAL MANUFACTURING INDUSTRIES).

TABLE 5.3

SEVERAL MAJOR JAPANESE INDUSTRIAL INDEXES  
1967-1977

Fiscal Year	Index of Productive Capacity in the Motor Vehicle Industry (1970 = 100)	Index of Prices for Investment Goods in Transportation Industry (1970 = 100)	Index of Price for Industrial Land (1970 = 100)	Index of Price for Building Materials (1970 = 100)
1977	166.5	154.7	192.8	166.9
1976	150.8	149.3	191.3	163.3
1975	146.4	145.5	190.8	151.3
1974	135.6	142.1	201.6	159.2
1973	129.0	116.9	163.8	142.5
1972	121.8	102.0	131.4	102.4
1971		100.7	115.0	95.9
1970	100.0	100.0	100.0	100.0
1969		94.5	85.6	97.4
1968		91.4	74.7	91.7
1967		92.7	67.8	91.3

---

SOURCES: Column (1), Tsushōsangyōsho (MITI), Kikai tōkei nempō  
(YEARBOOK OF MACHINERY STATISTICS)  
Column (2), Nihon Ginkō (Bank of Japan), Bukka shisū nempō  
(PRICE INDEX YEARBOOK)

Table 5.4  
ASSEMBLERS AND THEIR PARTS SUPPLIERS

	Service Tools	Jack	Grease Pump	Spanners (wrenches)	Fire Extinguisher	Emergency Flasher
Isuzu	Manpei Kōgyō Ebara Kōgyō	Masada Seisakusho Manpei Sangyō	Yamada Yuki	Ebara Kōgyō Manpei Sangyō	-	-
Suzuki	Riken Kaki	Kawasaki Kōgyō Riken Kaki	-	Riken Kaki	-	-
Daihatsu	Nittan Maeda Kiko	Kawasaki Kōgyō Kayaba	-	Nittan Maeda Kiko	Puresuto Kōgyō	Nippon Kāritto
Toyota	-	Aishin Seiki	-	-	Nisshin Kōgyō Automatic Kōgyō	Nippon Kāritto
Toyo Kōgyō	Maeda Kiko Nittan Koki	Ondo Kōsakucho Taiheiyo Koki Kayaba Nabeya Chuzōsho Masada Seisakusho Tokyo Press Kōgyō	-	Maeda Kiko Nittan Koki	-	Mitsubishi Denki Hitachi Makusera
Nissan	Nissan Jihan	Wako Kōgyō Kubota Kōgyō	Yamada Yuki	Maeda Kinzoku Shōwa Kōgyō Imaeda Seisakusho Kyoto Kikai Shōwa Spanner	Nippon Dry Chemical Yamato Shokaki	Hitachi Matsushita
Nissan Diesel	Nissan Jihan	Kayaba Nissan Jihan	Nissan Jihan	Nissan Jihan	-	-
Hino	Chiyoda Shokai	Kayaba Masada Seisakusho	Yamada Yuki	Narita Kōki	-	-
Fuji	Kyo	Taihei Kōki	-	Kyowa Sangyō	-	-
Honda	Riken Kaki Kōwa Seiki	Riken Koki	-	Riken Kaki Kōwa Seiki	-	-
Mitsubishi	Takahashi Kōsan Washino Kikai Mito Kōgyō Banzai Jidōsah Sarai Shoten	Masada Seisakusho Washino Kikai Taihei Kōki Banzai Jidōsha Kayaba	Yamada Yuki Takahashi Kōsan	Banzai Jidōsha Washino Kikai Takahashi Kōsan Mito Kōgyō Sarai Shoten	Mitohama Kōgyō	Mitsubishi Penki

Table 5.4 (Cont.)

	Oil Seal	Formed Rubber	Nonmetallic Pipes	Rubber Hose	Vinyl Hose
<b>Isuzu</b>	Nippon Oil Seal Tokushu Kōsaku Kōyō	Tokyo Gomu Hokusui Gomu	-	Tokyo Gomu Toyoda Gōsei	Toyoda Gōsei Esaki Kōgyō
<b>Suzuki</b>	Nippon Oil Seal Arai Seisakusho Keeper Nippo Kōgyō	Kōkoku Gomu Tōkai Kōgyō Furusawa Kōgyō	-	Kōkoku Gomu Meiki Gomu	Sansei Sangyō Fuji Kasei
<b>Daihatsu</b>	Nippon Oil Seal Arai Seisakusho	Nishikawa Gomu Tōkai Kōgyō Toyoda Gōsei	Toyoda Gōsei Usui Kokusai	Hōyū Gomu Toyoda Gōsei	Toyoda Gōsei Usui Kokusai Hōyū Gomu
<b>Toyota</b>	Nippon Oil Seal Nippon Baruka Kōgō Seiko	Toyoda Gōsei Tōkai Gomu	Toyoda Gōsei	Toyoda Gōsei Tōkai Gomu	Yasaki Sōgyō Toyoda Gōsei
<b>Tōyō Kōgyō</b>	Nippon Oil Seal Keeper	Kurashiki Kasei Morutan Gomu Marugo Gomu Fukuyama Gomu	Inoue Gomu	Kurashiki Kakō Morutan Gomu Marugo Gomu	Watanabe Vinyl Kagaku
<b>Nissan</b>	Keeper Nippon Oil Seal Arai Seisakusho	Kinugawa Gomu Tokyo Gomu Sanei Gomu	Usui Kokusai	Sumitomo Dankō Teito Gomu Meiji Gomu	Teito Gomu
<b>Nissan Diesel</b>	Nippon Oil Seal	Fukoku Gomu Tokyo Gomu Sanei Gomu	-	Tōkai Gomu Teito Gomu Meiji Gomu Nichi-rin Gomu	Sankō Gomu Teito Gomu
<b>Nino</b>	Nippon Oil Seal Kōyō Seikō	Kōkoku Gomu Kōkō Gomu Tōkai Gomu	Ishikawajima- Harima Jukōgyō	Kōkoku Gomu Tōkai Gomu	Hayashi Teranpu
<b>Fuji</b>	Nippon Oil Seal Arai Seisakusho	Tokyo Gomu Kinugawa Gomu Tōkai Gomu Yokohama Gomu	-	Teito Gomu	Sansui Gomu
<b>Honda</b>	Nippon Oil Seal Arai Seisakusho Hamano Oil Seal	Ōtsuka Gomu Yamashita Gomu Hakusui Gomu Kōkoku Gomu Hokushin Kagaku	-	Hakusui Gomu	Shimizu Shōkai Hisami Shōkai
<b>Mitsubishi</b>	Nippon Oil Seal Keeper	Marugo Gomu Ikuyo Kagaku Hasshū Gomu Sanpō Gomu Meiji Gomu Kinshō Gomu Uchiyama Kōgyō	-	Naruyo Gomu Toyoda Gōsei Meiji Gomu Tōkai Gomu Sanpō Gomu Tokyo Gomu	Toyoda Gōsei Chubu Kagaku Watanabe Vinyl Daishin Plastic

Table 5.4 (Cont.)

	Frame	Fuel Tank	Mufflers & Silencers	Bumper	Brackets
Isuzu	Press Kogyo	Tokyo Radiator	Kozitsu Sangyo Nisshin Kogyo	Tokyo Press Nitto Sha	Nippon Chuku-ko Dai-ichi Press Jidōsha Imono Shimizu Seisakusho
Suzuki	Nikko Sangyo	Okamoto Press	Futaba Sangyo	Futaba Sangyo Maruchi Koken	Sanko Seisakusho
Daihatsu	Kasamatsu Kinzoku Supplied Internally Aoi Kikai	Aoi Kikai	Futaba Sangyo Kasamatsu Kinzoku	Futaba Sangyo Taiheiyō Kōgyō	Enoki Seisakusho Kasamatsu Kinzoku Asada Katan Chutetsu
Toyota	-	Supplied Internally Horie Kinzoku	San Go Futaba Sangyo	-	Futaba Sangyo Chūō Katan
Toyō Kōgyō	Press Kogyo Sai Sei Sanyō Kōgyō	Kawada Tekkoshō Chūgoku Kōgyō	Tokyo Roki Ninpo Seisakusho	Tokyo Press	Kuroishi Tekkō Miura Tekkō
Nissan	Supplied Internally	Supplied Internally Sanwa Kōgyō Sanei Kōgyō	Nippon Radiator	Tokyo Press Sanwa Kōgyō Tokyo Shearing	Sanwa Kōgyō San-ai Kōgyō Kai-ai-sha
Nissan Diesel	Press Kōgyō Press Kogyo	Sueyoshi Kōgyō Daiwa Kōgyō	Nippon Radiator Aoki Seisakusho	Hiro-oka Tekkō Kōno Jidōsha Press Kōgyō	Dai-ichi Press Yorozu Jidōsha Hitachi Kinzoku
Hino	Takebe Tekkō	Dengensha Supplied Internally	Chiyoda Jidōsha Kokusen Kiki	Takebe Tekkō Tokyo Shearing	Takebe Tekkō Fukushima Seiko Kakawa Seiki
Fuji	Sakamoto Kōgyō	Sakamoto Kōgyō	Nippon Radiator Sakamoto Kōgyō	Need	-
Honda	Supplied Internally	Nokamura Seisakusho Masuda Seigocho	Sankei Giken	Sankei Giken	Kikuchi Press
Mitsubishi	Press Kōgyō Takebe Tekkō Kyoei Kōgyō	Yajima Kinzoku Hōei Kōgyō Sankei Kōgyō	Hōei Kōgyō Futaba Sangyo Sankei Kogyo	Hōei Kōgyō Orayama Mekki Yashima Kogyo	-

Table 5.4 (Cont.)

	Panel	Reflector	Gauges	Speedometer	Cable & Casing	Power Window	Steer'g Wheel
Isuzu	Shatai Kōgyō Daiva Press Press Kōgyō Nisshin Kōgyō	Ichimitsu Kōgyō	Yasaki Sōgyō Nippon Denso	Yasaki Sōgyō Nippon Denso	Yasaki Sōgyō Onishi Seisakusho	Jonan Seisakusho Amao Seisakusho	Mitsui Kōgyō Aishin Seiki
Suzuki	-	Tokai Denso Koito Stanley Denki	Nippon Denso Nippon Seiki	-	Cable Kōgyō Onishi Seisakusho	Shiraki Kinzoku	Shiraki Kinzoku Bekimi Kōgyō
Daihatsu	Supplied Internally	Ichimitsu Kōgyō Koito	Nippon Denso Nippon Seiki	Nippon Denso	Nippon Cable System Cable Kōgyō	Shiraki Kinzoku	Shiraki Kinzoku Kanbishi Denki
Toyota	-	Koito Ichimitsu Kōgyō	Nippon Denso Yasaki Sōgyō	Nippon Denso Yasaki Sōgyō	Nippon Denso Yasaki Sōgyō	Shiraki Kinzoku Aishin Seiki	Aishin Seiki Marui Kōgyō
Toyō Kōgyō	Supplied Internally	Stanley Denki Koito Ichimitsu Kōgyō	Yūshin Seiki Nippon Denso	Yasaki Sōgyō	Nippon Cable System Yushin Seiki	Delta Kōgyō	Delta Kōgyō Hisshibi Seisakusho Yushin Seiki Dai Kyō
Nissan	Supplied Internally Sama Kōgyō Sanei Kōgyō Tokyo Press	Ichimitsu Kōgyō Koito	Kanto Seiki	Kanto Seiki	Kanto Seiki Hayashi Spring	Jonan Seisakusho	Kokusan Kinzoku
Nissan Diesel	Takada Kōgyō Daiva Press Narita Tekkō Suwayoshi Kōgyō Press Kōgyō	Ichimitsu Kōgyō	Yasaki Sōgyō Kanto Seiki	Kanto Seiki Yasaki Sōgyō	Yasaki Sōgyō Hayashi Spring	Jonan Seisakusho	Kokusan Kinzoku Hitachi Kasei
Nino	Supplied Internally	Ichimitsu Kōgyō Koito	Yasaki Sōgyō Nippon Denso Yushin Seiki	Yasaki Sōgyō Nippon Denso	Kokoku Control Cable Nippon System	Imasen Denki Aishin Seiki	Yushin Seiki Mitsui Kinzoku Aishin Seiki
Fuji	Supplied Internally	Koito Oshima Denki	Nippon Denso Nippon Seiki	-	Kokoku Control Cable Cable Kōgyō	Jonan Seisakusho	Nairusu Buhin Kokusan Kinzoku
Honda	Supplied Internally	Stanley Denki	Nippon Seiki Honda Lock	-	Nippon Cable System Hayashi Spring Kokoku Control Cable	Imasen Denki	Mitsui Kinzoku Ōi Seisakusho
Mitsubishi	-	Koito Stanley Denki Ichimitsu Kōgyō	Yasaki Sōgyō Nippon Denso	Yasaki Sōgyō Nippon Denso	Yasaki Kōgyō Nippon Cable System Kokoku Control Cable	Shiraki Kinzoku Jonan Seisakusho Imasen Denki	Tokai Rika Shimami Gokin Jonan Seisakusho

Table 5.4 (Cont.)

	Steering Ball Joint	Steering Ball Joint ASSY	Power Steering System	Transmission Shifter Fork	Transmission Shifter Fork Rail
Isuzu	-	-	Jidōsha Kiki	-	-
Suzuki	-	-	-	-	Riken Piston Suzuki Tekkō Supplied internally
Daihatsu	Akaashi Kikai	Akaashi Kikai	Jidōsha Kiki	Shin Nippon Kikai	Shin Nippon Kikai
Toyota	Ishikawa Tekkō	Ishikawa Tekkō	Kayaba Toyoda Kōki	Asahi Tekkō Toyoda Kōki	Asahi Tekkō Toyoda Kōki
Toyo Kogyō	Hamada Tekkōsho	Supplied internally	-	Hiroshima Seimitsu Kōgyō	Kubota Tekkōsho
Nissan	Atsugi Buhin Risumu Jidōsha Buhin	Atsugi Buhin Risumu Jidōsha Buhin	Kayaba Jidōsha Kiki	Supplied internally Fuji Tekkō Aichi Kikai	Supplied internally Fuji Tekkō Aichi Kikai
Nissan Diesel	-	-	Jidōsha Kiki	-	-
Hino	Toyo Bearing	Toyo Bearing	Kayaba Jidōsha Kiki	Chiyoda Jidōsha	Chiyoda Jidōsha Showa Hikōki
Fuji	-	-	-	Dai-ichi Tanzo	Riken Piston
Honda	Musashi Seimitsu	Musashi Seimitsu	-	Tenryū Sangyō	Yanagisawa Seiki (materials) Sawada Malleable
Mitsubishi	Daiel Seitan Ihara Seiki	Kōyō Seiko Tōyō Bearing Ihara Seiki	Jidōsha Kiki Kayaba	Mishiura Seisakusho Mizushima Kikō	Nai Sei Ihara Seiki
	-	-	-	-	-



Table 5.4 (Cont.)

	Clutch System	Clutch Plate	Clutch Facings	Clutch Pressure Plate	Clutch Cover	Clutch Spring	Clutch Lever
Ieuzu	Dai Kin	Dai Kin	Akebono Brake	Dai Kin	Dai Kin	Dai Kin	Dai Kin
Suzuki	Dai Kin Aishin Seiki	Dai Kin Aishin Seiki	Dai Kin Aishin Seiki	Dai Kin Aishin Seiki	Dai Kin Aishin Seiki	Dai Kin Aishin Seiki	-
Daihatsu	Dai Kin	Dai Kin	Dai Kin Akebono Brake Nisshinbō	Dai Kin	Dai Kin	Dai Kin	Dai Kin
Toyota	Aishin Seiki	Aishin Seiki	Akebono Brake Nisshinbō	Aishin Seiki	Aishin Seiki	Aishin Seiki	Aishin Seiki
Toyo Kōgyō	Dai Kin	Dai Kin	Dai Kin	Dai Kin	Dai Kin	Dai Kin	Hiruta Kōgyo
Nissan	Atsugi Buhin Dai Kin	Atsugi Buhin Dai Kin	Hitachi Kasei Akebono Brake	Atsugi Buhin Dai Kin	Atsugi Buhin Dai Kin	Atsugi Buhin Dai Kin	Fuji Tekkō
Nissan Diesel	Hitachi Seiki Dai Kin	Dai Kin Atsugi Buhin	Dai Kin Atsugi Buhin	Nikkō Seiki Dai Kin	Nikkō Seiki	Murata Hatsujo	Tokyo Seitan Katakura Kōgyō
Hino	-	Dai Kin Aishin Seiki	Akebono Brake Nisshinbō	Atsugi Buhin Chiyoda Jidōsha	Atsugi Buhin Dai Kin	Dai Kin Murata Hatsujo	Dai Kin Chiyoda Jidōsha
Fuji	Atsugi Buhin Dai Kin	Atsugi Buhin Dai Kin	Atsugi Buhin Dai Kin	Atsugi Buhin	Nikkō Seiki Dai Kin	Atsugi Buhin Dai Kin	Atsugi Buhin Dai Kin
Honda	Fuji Kagaku	Fuji Kagaku	Fuji Kagaku	Riken Plaston	Fuji Kagaku Supplied Internally	Nippon Hatsujo Chō Hatsujo	Atsumi Saisakusho
Mitsubishi	Dai Kin Aishin Seiki	Dai Kin Aishin Seiki	Nisshinbō Akebono Brake	Dai Kin Aishin Seiki	Aishin Seiki Dai Kin	Dai Kin Aishin Seiki	Dai Kin Aishi Seiki

Table 5.4 (Cont.)

	Automatic Transmission	Propeller Shaft	Universal Joint	Rear Shaft	Axle Housing	Needle Roller Bearing
Isuzu	Aishin Wana (Warner) Nippon Jie Rison	Jidōsha Buhin Koyo Seiko	Jidōsha Buhin Koyo Seiko	Supplied Internally Jidōsha Buhin Nippel Sangyo	Press Kogyō	Nippon Seiko Koyo Seiko Tōyō Bearing
Suzuki	-	Suzuki Tekko Konan Kinzoku	Koyo Seiko Tōyō Bearing	Okada Kogyō Supplied Internally Setwa Tankō	Osaka Sharin Putaba Sangyo	Koyo Seiko Tōyō Bearing Utsunomiya Kiki
Daihatsu	Aishin Wana	Aoi Kikai	Aoi Kikai	Asano Haguruma Supplied Internally	Asano Haguruma Yumo Kogyō Aoi Kikai	Hikari Seiko Tōyō Bearing
Toyota	Aishin Wana	Toyoda Koki	Toyoda Koki	-	-	Tōyō Bearing Hikari Seiko Koyo Seiko Nippon Seiko
Kōgyō	Nippon Jidō Hensokuki	Supplied Internally Kawada Tekko	Hikari Seiko Kawada Tekko	Supplied Internally	Osaka Sharin	Nippon Seiko Hikari Seiko Tōyō Bearing
Nissan	Nippon Jidō Hensokuki	Atsugi Buhin Tochigi Fuji	Atsugi Buhin	Supplied Internally Yanagigawa Seiki	Daidō Seiko Supplied Internally Press Kogyō	Tōyō Bearing Koyo Seiko Nippon Thomson Nippon Seiko
Nissan Diesel	-	Supplied Internally Atsugi Buhin Koyo Seiko	Koyo Seiko Matsui Seisakusho	Daidō Seiko Supplied Internally	Press Kogyō Date Seiko Supplied Internally Katakura Kogyō Hikko Seiki	Nippon Seiko Koyo Seiko Tōyō Bearing Nippon Thomson
Hino	Supplied Internally	Mitsui Seiki Supplied Internally	Tōyō Seitan Katayama Tokushu Tankō Riken Tenzō Supplied Internally Kakuma Seiki Koyo Seiko	Daidō Seiko Nae Sei	Fukushima Seiko Daidō Seiko Supplied Internally	Tōyō Bearing Nippon Seiko Kōyō Seiko
Fuji	Supplied Internally	-	Tōyō Bearing Koyo Seiko	Fuji Kikai	-	Tōyō Bearing Nippon Thomson
Honda	Supplied Internally	-	Kōyō Seiko	Yanagigawa Seiki	Yanagigawa Seiki	Tōyō Bearing Koyo Seiko Nippon Thomson
Mitsubishi	Aishin Wana Borugu Wana (Borg- Warner)	Shiko Seisakusho Supplied Internally	Kōgyō Seiko Hikari Seiko Supplied Internally	Supplied Internally Mitsubishi Seiko Shin Kitten	Press Kogyō Yonan Kogyō Supplied Internally	Koyo Seiko Tōyō Bearing Hikari Seiko Nippon Thomson
	-	-	-	-	-	-

Table 5.4 (Cont.)

	Inb Bolts & Nuts	Wheels	Chassis Spring	Rubber Parts for Air Springs	Levelling Bulbs for Air Springs	Shock Absorber
Isuzu	Asagawa Seisakusho Jidōsha Neji	Topi Press Kogyō	Nippon Hatsujo Mitsubishi Seiko Sumikin Hatsujo	Bridgestone	Jidōsha Kiki	Kayaba Tokiko Shōwa Seisaku
Suzuki	Tōpura Satō Neji	Topi Osaka Sharin	Nippon Hatsujo Mitsubishi Seiko Chuo Hatsujo	-	-	Kayaba Tokiko
Daihatsu	Urano Seisakusho Yamamoto Seisakusho	Yuno Kōgyō Osaka Sharin	Chuo Hatsujo Nippon Hatsujo Sumikin Hatsujo	-	-	Kayaba Tokiko
Toyota	Tsuda Kōgyō Sugiura Seisakusho	Topi Chuo Seiki	Mitsubishi Seiko Nippon Hatsujo Chuo Hatsujo	-	-	Kayaba Tokiko
Kōgyō	Ono Kōsakusho Kawada Tekko	Osaka Sharin Yuno Kōgyō Kanai Sharin	Chuo Hatsujo Sumikin Hatsujo Nippon Hatsujo	-	-	Kayaba Kawada Tekko Konan Denki Tokiko
Nissan	Atsuji Buki Fuse Neji	Supplied Internally Topi	Nippon Hatsujo Chuo Hatsujo Sumikin Hatsujo Mitsubishi Seiko	-	-	Kayaba Tokiko
Nissan Diesel	Katō Neji Ohashi Neji Fuse Neji	Topi Yusōki Kōgyō	Horikiri Bane Mitsubishi Seiko	Bridgestone	Nippon Air Brake	Kayaba Tokiko
Hino	Kokusan Kiki Ishiwatari Neji	Yusōki Kōgyō Topi Yuno Kōgyō	Horikiri Bane Sumikin Hatsujo	Bridgestone Tōyō Gomu	Miwa Seiki	Kayaba Saitama Kiki
Fuji	Tōyō Atsuzō	Kanai Sharin	Nippon Hatsujo	Bridgestone	-	Tokiko Kayaba
Ikeda	Saga Tekko	Kanai Sharin Daido Kōgyō	Nippon Hatsujo Mitsubishi Seiko Chuo Hatsujo	-	-	Shōwa Tokiko
Mitsubishi	Nagoya Neji Isshi Rashi Mizushima Kiko Mitsuba Kōgyō Kawasaka Seisakusho Asagawa Seisakusho	Topi Kanai Sharin Yusōki Kōgyō	Mitsubishi Seiko Nippon Hatsujo	Tōyō Gomu	Jidōsha Kiki Nippon Air Brake	Kayaba Tokiko

Table 5.4 (Cont.)

	Hydraulic Brake (Disc)	Pads for Disc- Brake	Hydraulic Brake (Drum)	Drum	Brake Lining	Brake Cylinder
Izuzu	Sumitomo Denko Akebono Brake	-	Akebono Brake Tokyo Buhin	Jidōsha Buhin Supplied Internally	Akebono Brake Nisshin Brake	Saitama Kiki Tokyo Buhin Akebono Brake
Suzuki	Sumitomo Denko	-	Aishin Seiki Nippon Air Brake Nisshin Kōgyō	Supplied Internally Takaoka Kōgyō Suzuki-shiki Orimono Fusō Kaigokin Yoshimoto Tekko Tōkai Seikō	Aishin Seiki Nippon Air Brake	Aishin Seiki Nippon Air Brake Nisshin Kōgyō
Daihatsu	Sumitomo Denko	Sumitomo Denko	Chikuma Seisakusho Tokiko Nippon Air Brake Akebono Brake	Supplied Internally Imada Kōgyō	Akebono Brake Nisshinbō	Chikuma Seisakusho Tokiko
Toyota	Sumitomo Denko Akebono Brake	Akebono Brake Sumitomo Denko	Hōsei Brake Akebono Brake	Takaoka Kōgyō	Akebono Brake Nisshinbō	Aishin Seiki
Toyo Kōgyō	Sumitomo Denko Akebono Brake	Sumitomo Denko Akebono Brake	Supplied Internally Akebono Brake Nisshinbō	Supplied Internally Kawada Tekko	Akebono Brake Nisshinbō	Tatsuei Kōgyō Chikuma Seisakusho
Nissan	Tokiko Akebono Brake Sumitomo Denko	Akebono Brake Sumitomo Denko Nisshinbō	Supplied Internally Akebono Brake Tokiko	Supplied Internally Kiryu Kikat	Akebono Brake Nisshinbō	Tokiko Nippon Air Brake
Nissan Diesel	-	-	Akebono Brake	Supplied Internally Samwa Chuzō	Akebono Brake Nisshinbō	Tokiko
Hino	Akebono Brake	-	Akebono Brake Nisshinbō	Hino Chuzō Takaoka Kōgyō Chiyoda Jidōsha Matsuda Kōgyō Nai Sei	Nisshinbō Hisayo Sekimen	Saitama Kiki
Fuji	Akebono Brake	-	Nippon Air Brake Akebono Brake Tokiko	Furukawa Denko	Akebono Brake Tokiko Nippon Air Brake	Tokiko Nippon Air Brake Akebono Brake
Honda	Tokiko Sumitomo Denko	Sumitomo Denko Hitachi Gōsei	Nisshin Kōgyō	Supplied Internally	Nippon Air Brake Asahi Sekimen	Nisshin Kōgyō
Mitsubishi	Sumitomo Denko	Sumitomo Denko	Supplied Internally Akebono Brake Sanyō Brake Nippon Air Brake	Supplied Internally Ihara Seiki Yamate Kiki	Akebono Brake Nisshinbō Hisayo Sekimen	Akebono Brake Tokyo Buhin Nippon Air Brake Saitama Kiki Chikuma Seisakusho Asagoe Kikai

Table 5.4 (Cont.)

	Back-Plate	Brake Shoes	Brake-Return Spring	Brake Pipe	Brake Hose	Power Brake
Iasuzu	Tokyo Buhin Akebono Brake	Akebono Brake Tokyo Buhin	Murata Hatsujo Nippon Hatsujo	Usui Kokusai	Toyoda Gosei	Jidōsha Kiki
Suzuki	Aishin Seiki Nippon Air Brake	Fuji Shōkai Kokusai Kogyo	Aishin Seiki Nippon Air Brake	Usui Kokusai	Talei San (Toyoda Gōsei)	-
Daihatsu	Supplied internally Chikuma Seisakusho Tokiko	Akebono Brake Nisshinbo	-	Usui Kokusai San-o Kōgyō Maruyasu	Toyoda Gōsei	Jidōsha Kiki
Toyota	Hōsei Brake Akebono Brake	Hōsei Brake Akebono Brake	Tōgō Seisakusho	Maruyasu Usui Kokusai	Toyoda Gōsei	Jidōsha Kiki Aishin Seiki
Toyo Kōgyō	Kawada Tekkō	Akebono Brake Nisshinbo Nippon Brake-lining	Chūō Hatsujo Chūō Hatsujo Kōgyō Nippon Hatsujo	Usui Kokusai	Toyoda Gōsei Seiken Kagaku Meiji Gomu	Jidōsha Kiki
Nissan	Supplied internally Samwa Kogyo Tokyo Press Kogyo	Akebono Brake Nisshinbo	Katō Hatsujo Murata Hatsujo Chuo Hatsujo	Usui Kokusai San-o Kōgyō	Nichirin Gomu Meiji Gomu	Jidōsha Gomu
Nissan Diesel	Hiruoka Tekkō Tatsumi Kinsoku	Akebono Brake Tokyo Buhin	Murata Hatsujo	Usui Kokusai	Nichi-rin Gomu	Jidōsha Kiki
Hino	Akebono Brake Nisshinbo	Akebono Buhin Nisshinbo Kakuwa Seiki	Murata Hatsujo	Usui Kokusai	Toyoda Gōsei	Jidōsha Kiki
Fuji	Tokiko Nippon Air Brake Akebono Brake	Tokiko Nippon Air Brake Akebono Brake	Tokiko Nippon Air Brake Akebono Brake	Usui Kokusai San-o Kōgyō	Toyoda Gōsei	-
Isuda	Hirata Press	Nippon Brake-lining	Chūō Hatsujo Nippon Hatsujo	San-o Kōgyō	Nichi-rin Gomu Hisami Shōkai Meiji Gomu	Jidōsha Kiki Nisshin Kogyō
Mitsubishi	May Seisakusho Joban Seisakusho Akebono Brake Sanyō Brake Nippon Air Brake	Tokyo Buhin Akebono Brake Sanyō Brake Nisshinbo	Murata Hatsujo Nippon Hatsujo Tōgō Seisakusho	Usui Kokusai	Meiji Gomu Toyoda Gōsei	Jidōsha Kiki

Table 5.4 (Cont.)

	Air Brake System	Compressor	Brake Chamber	Slack Adjuster	Air Tank	Pressure Regulator
Isuzu	Jidōsha Kiki Nippon Air Brake	Diesel Kiki	Jidōsha Kiki	Jidōsha Buhin Seikō Isuzu	Dai-ichi Press	Jidōsha Kiki
Suzuki	-	-	-	-	-	-
Daihatsu	-	-	-	-	-	-
Toyota	-	-	-	-	-	-
Tōyō Kōgyō	-	-	-	-	-	-
Nissan	-	-	-	-	-	-
Nissan Diesel	Nippon Air Brake	Miwa Seiki	Nippon Air Brake	Nippon Air Brake	Dai-ichi Press	Dai-an Kōgyōsho
Hino	-	Miwa Seiki	Miwa Seiki	Saitama Kiki	Takebe Tekkō	Saitama Kiki
Fuji	-	-	-	-	-	-
Honda	-	-	-	-	-	-
Mitsubishi	Nai Sei	Amadera Tekkō	Miwa Seiki Nippon Air Brake	Nippon Air Brake	Supplied internally	-
	-	-	-	-	-	-

Table 5.4 (Cont.)

	Air Hose	Brake Bulb	Brake Safety Devices (Safety Cylinders, etc.)	Window Frames	Rubber Parts for Window Glass	Rubber Damper
Isuzu	Toyoda Gōsei Esaki Kōgyō	Jidōsha Kiki Nippon Air Brake	Nippon Tokushu Buhin Saitama Kiki	Hashimoto Forming Aishin Seiki	Ikuyo Kagaku Toyoda Gōsei Tokyō Gomu	Bridgestone Taiyō Gomu
Suzuki	-	-	-	Shiraki Kinzoku Tiger Sash	Tōkai Kōgyō Kōkoku Gomu Inoue Gomu	Hokushi Kagaku Tokai Gomu
Daihatsu	Tōkai Gomu	-	-	Shiraki Kinzoku	Tōkai Kōgyō Miki Gomu Toyoda Gōsei	Bridgestone Tōkai Gomu
Toyota	-	-	-	Shiraki Kinzoku Aishin Seiki	Toyoda Gōsei Nishikawa Gomu	Tōkai Gomu Tōyō Gomu Bridgestone Toyoda Gōsei
Tōyō Kōgyō	-	-	Nippon Air Brake	Katayama Kōgyō Dai Kyo	Morutan Gomu Nishikawa Gomu Marugo Gomu	Kurashiki Kakō Bridgestone Tōkai Gomu
Nissan	Nichi-rin Gomu	-	Nippon Tokushu Buhin	Hashimoto Forming Shiraki Kinzoku	Kinugawa Gomu Kurano Gomu	Bridgestone Sumitomo Denkō Kinugawa Gomu
Nissan Diesel	Nichi-rin Gomu	Miwa Seiki Jidōsha Kiki	Nippon Tokushu Buhin	Aoi Koki Sash	Kinugawa Gomu Sanhō Gomu Shimada Channel	Bridgestone Fukoku Gomu Kinugawa Gomu
Hino	Meiji Gomu	Miwa Seiki Nippon Air Brake	Nippon Tokushu Buhin	Shiraki Kinzoku Aishin Seiki	Tōkai Kōgyō Kōkoku Gomu	Kōkoku Gomu Tōkai Gomu
Fuji	-	-	-	Hashimoto Forming Shigeru Kōgyō	Kinugawa Gomu Tokyo Gomu	Bridgestone Tōkai Gomu Kinusawa Gomu
Honda	-	-	-	Hashimoto Forming	Kasei Kōgyō	Yamashita Gomu Sumitomo Denkō Hokushin Kagaku
Mitsubishi	Meiji Gomu Toyoda Gōsei Marugo Gomu	Miwa Seiki Nippon Air Brake	Nippon Tokushu Buhin	Shiraki Kinzoku Aoi Kuki Sash Okayama Mekki Katayama Kōgyō	Ikuyo Kagaku Toyoda Gōsei Kinugawa Gomu Marugo Gomu	Tōkai Gomu Meiji Gomu Marugo Gomu Bridgestone

Table 5.4 (Cont.)

	Head Light	Other Illumination Equipments	Switches (including fuse)	Flasher Unit	Wiper	Horn
Iauzu	Ichimitsu Kōgyō	Ichimitsu Kōgyō Koito	Ueda Seisaku Ebina Denki Jidosha Denki Metro Denso Tokai Rika	Mitsuba Denki Nippon Denso	Jidosha Denki Mitsuba Denki	Mitsuba Denki Maruko Keihōki Kitahara Seisaku-sho
Suzuki	Koito Stanley	Tokai Denso Koito Stanley	Tokai Rika Yūshin Seiki	Nippon Denso	Nippon Denso Hitachi (Jidosha Denki)	Nippon Denso Nikko Kintzoku
Daihatsu	Koito Ichimitsu Kōgyō	Koito Ichimitsu Kōgyō	Kanbishi Denki Tokai Rika	Nippon Denso Mitsuba Denki	Tanaka Kaiki Mitsuba Denki Nippon Denso	Nippon Denso
Toyota	Koito Toshiba	Koito Ichimitsu Kōgyō	Tokai Rika Matsushita Denki Taiheyō Kōgyō	Nippon Denso	Tanaka Kaiki Nippon Denso Tokai Rika	Maruko Keihōki Nippon Denso
Toyo Kōgyō	Koito Stanley Toshiba	Koito Ichimitsu Kōgyō Imasen Denki Stanley	Yūshin Seiki Tokai Rika	Yūshin Seiki Imasen Denki Nippon Denso	Tanaka Kaiki	Imasen Denki
Nissan	Ichimitsu Kōgyō Koito	Ichimitsu Kōgyō Koito	Nairusu Buhin Jidosha Denki	Nairusu Buhin	Jidosha Denki Mitsuba Denki Ichimitau	Miyamoto Keihōki Mitsuba Denki
Nissan Diesel	Ichimitsu Kōgyō Koito	Ichimitsu Kōgyō Koito	Nairusu Buhin Eiko Denki Matsushita Denki Yūshin Seiki Tokai Rika	Imasen Denki Nairusu Buhin	Tanaka Kaiki Jidosha Denki	Miyamoto Keihōki Kitahara Seisakusho Imasen Denki
Hino	Ichimitsu Kōgyō Koito	Ichimitsu Kōgyō Koito	Yūshin Seiki Eiko Denki Tokai Rika	Nippon Denso	Tanaka Kaiki Nippon Denso	Imasen Denki Kitahara Seisakusho Maruko Keihōki Nippon Denso
Fuji	Koito Toshiba	Koito Ōshima Denki	Tokai Rika Nairusu Buhin	Nairusu Buhin Mitsuba Denki	Mitsuba Denki Tanaka Kaiki	Maruko Keihō Mitsuba Denki
Honda	Stanley	Stanley	Toyo Denso Nairusu Buhin Toyo Fuse Honda Lock	Mitsuba Denki Signalstat	Mitsuba Denki	Mitsuba Denki Imasen Denki
Mitsubishi	Koito Ichimitsu Kōgyō Stanley	Stanley Ichimitsu Kōgyō Imasen Denki Koito	Tokai Rika Nairusu Buhin Yūshin Seiki Asahi Denso	Nippon Denso Nairusu Buhin	Nippon Denso Tanaka Kaiki Mitsuba Denki	Imasen Denki Nippon Denso



Table 5.4 (Cont.)

	Electric Wires	Electric Bulbs for Automobiles	Steering Handle	Steering ASSY	Tie Rod ASSY	Steering Knuckle
Iaizu	Yasaki Sōgyō	Life Denkyū Toshiba	Toyoda Gōsei	Nippon Seikō Jidosha Buhin	Fuji Jidosha Kōgyō Rokurin Kōgyō	Seikō Isuzu Jidosha Buhin Supplied Internally
Suzuki	Bunka Jidosha Stanley Furukawa Denkō	Toshiba Stanley Life Denkyū	Daiei Sangyō Izumi Jidosha	Nippon Seikō Kōyō Seikō	Ishikawa Tekkō	Konai Kinzoku Tokai Seikō Okada Kōgyō Tokyo Tankō
Daihatsu	Furukawa Denkō Sumitomo Denkō	Stanley Toshiba Life Denkyū	Izumi Jidosha	Akashi Kikai Nippon Seikō Kōyō Seikō	Akashi Kikai	Akashi Kikai
Toyota	Yasaki Sōgyō Sumitomo Denkō	-	Toyoda Gōsei	Nippon Seikō Kōyō Seikō	Ishikawa Tekkō	Tokyo Tankō Toyoda Kōki
Toyo Kōgyō	Yasaki Densen Fujikura Densen Furukawa Denkō Kyōsan Densen	Life Denkyū Stanley Toshiba	Kuroishi Tekkō Supplied Internally Dai Kyō Izumi Jidosha	Supplied Internally Nippon Seikō Kōyō Seikō	Supplied Internally	Supplied Internally
Nissan	Yasaki Sōgyō Shinagawa Densen Sumitomo Denkō	Life Denkyū Toshiba	Nippon Burasuto Izumi Jidosha	Supplied Internally Nippon Seikō Kōyō Seikō	Atsugi Buhin Rizumu Jidosha Buhin	Rizumu Jidosha Buhin Atsugi Buhin
Nissan Diesel	Yasaki Sōgyō	Life Denkyū	Hitachi Kasei Izumi Jidosha	Nippon Seikō Kayaba Jidosha Kiki	Katakura Kōgyō Atsugi Buhin Rizumu Jidosha Buhin	Katakura Kōgyō
Hino	Yasaki Sōgyō Sumitomo Denkō	Toshiba Life Denkyū Stanley	Toyoda Gōsei	Supplied Internally Nippon Seikō	Riken Tanzo Supplied Internally Tokyo Neji Aoki Setaikusho	Supplied Internally Riken Tanzo
Fuji	Fujikura Densen Furukawa Denkō	Life Denkyū Toshiba	Hitachi Kasei	Fuji Kikai	Ishikawa Tekkō Kyōwa Sangyō	Supplied Internally
Honda	Sumitomo Denkō Furukawa Denkō	Stanley	Nippon Burasuto Hitachi Kasei	Yamada Seisakuusho	Kyōwa Sangyō Musashi Seimitsu	Supplied Internally
Mitsubishi	Yasaki Sōgyō Shinagawa Densen	Stanley Toshiba	Izumi Jidosha Toyoda Gōsei	Nippon Seikō Kōyō Seikō	Supplied Internally Zurō Seiki Ihara Seiki	Supplied Internally Ogino Tekko Hitachi Kinzoku

Table 5.4 (Cont.)

	Cylinder Head Cover	Cooling Fan	Automobile Emissions Cleaning Device	Alternator	Starting Motor	Voltage Regulators
Iasusu	Nisshin Kōgyō Furukawa Chūzō	Tokyo Radiator Usui Kokusai	Nippon Denso	Nikkō Denki Hitachi Nippon Denso	Nikkō Denki Hitachi Nippon Denso	Nikkō Denki Hitachi Nippon Denso
Suzuki	-	-	-	Nippon Denki Mitsubishi Denki	Nippon Denki Mitsubishi Denki	Nippon Denki Mitsubishi Denki
Daihatsu	Kasamatsu Kinzoku Riko Kogyo	Nikkō seiki Usui Kokusai	Nippon Denso	Hitachi Nippon Denso	Hitachi Nippon Denso	Hitachi Nippon Denso
Toyota	-	Aishin Seiki Toyoda Tekkō	Nippon Denso Aisan Kogyō	Nippon Denso	Nippon Denso	Nippon Denso
Toyo Kōgyō	Kawada Tekkō	Kuroishi Tekkō Usui Kokusai	Tokyo Roki	Mitsubishi Denki Nippon Denso	Mitsubishi Denki Nippon Denso	Mitsubishi Denki Nippon Denso
Nissan	Sanwa Kōgyō Hitachi Kinzoku Fusō Keigōkin	Nippon Radiator Ōi Seisaku	Hitachi Tokyo Sokuhan	Hitachi Mitsubishi Denki	Hitachi Mitsubishi Denki	Hitachi Mitsubishi Denki
Nissan Diesel	Fusō Keigōkin	Tatsumi Kinzoku Fuji Kikō Usui Kokusai	-	Hitachi Sawafuji Denki Mitsubishi Denki	Hitachi Sawafuji Denki Mitsubishi Denki	Hitachi Sawafuji Denki Mitsubishi Denki
Hino	Furukawa Denko	Dengen-kai	-	Sawafuji Denki Nippon Denso	Sawafuji Denki Nippon Denso	Sawafuji Denki Nippon Denso
Fuji	Kikuchi Press	Kurita Aluminium	-	Hitachi Nippon Denso	Hitachi Nippon Denso	Hitachi Nippon Denso
Honda	Supplied internally	Supplied internally Mori Roku Shōji	-	Nippon Denso Hitachi	Nippon Denso Mitsuba Denki Hitachi Seisakusho	Nippon Denso Hitachi
Mitsubishi	Hitachi Kinzoku Furukawa Chūzō Hishibi Seisakusho	Itoei Kōgyō Heian Seisaku-sho Usui Kokusai Seitaiji Sangyo	-	Mitsubishi Denki Nippon Denso	Mitsubishi Denki Nippon Denso	Mitsubishi Denki Nippon Denso

Table 5.4 (Cont.)

	Distributors	Ignition Coil	Ignition Plug	Heater Plugs	Magnetic Generator
Isuzu	Hitachi	Hitachi	Nippon Tokushu Togyo	Jidosha Kiki	-
Suzuki	Nippon Denso Mitsubishi Denki	Kokusan Denki Mitsubishi Denki Nippon Denso	Nippon Tokushu Togyo Nippon Denso	-	Nippon Denso Mitsubishi Denki Kokusan Denki
Daihatsu	Hitachi Nippon Denso	Hanshin Hen-atsu-ki Diamond	Nippon Tokushu Togyo Nippon Denso Hitachi	Nippon Denso	-
Toyota	Nippon Denso	Nippon Denso	Nippon Denso Nippon Tokushu Togyo	Nippon Denso	-
Toyo Kogyo	Mitsubishi Denki	Hanshin Hen-atsu-ki Nippon Denso	Nippon Denso Nippon Tokushu Togyo	Hitachi	-
Nissan	Hitachi Mitsubishi Denki	Hitachi Nippon Denso	Hitachi Nippon Tokushu Togyo	Nippon Tokushu Togyo Eiko Denki	-
Nissan Diesel	Hitachi Sawafuji Denki	-	-	Nippon Tokushu Togyo Jidosha Kiki	-
Hino	Nippon Denso	Nippon Denso	Nippon Denso Nippon Tokushu Togyo	Nippon Denso Eiko Denki	-
Fuji	Hitachi Nippon Denso	Hitachi Nippon Denso	Hitachi Nippon Tokushu Togyo	-	-
Honda	Nippon Denso Hitachi Kokusan Denso	Nippon Denso Togyo Denso Honda Lock Hitachi	Nippon Denso Nippon Tokushu Togyo	Nippon Tokushu Togyo	Nippon Denso Hitachi Kokusan Denki Mitsubishi Denki
Mitsubishi	Mitsubishi Denki Nippon Denso	Diamond Hanshin Henatsuki	Nippon Denso Nippon Tokushu Togyo	Jidosha Kiki Hiyoshi Denso Nippon Tokushu Togyo	-
				-	-

Table 5.4 (Cont.)

	Oil Cooler	Valve Springs	Radiator	Thermostat	Bearing Metal	Fan Belt
Isuzu	Tokyo Roki Tsuchiya Tokyo Radiator	Murata Hatsugo Nippon Hatsugo	Tokyo Radiator	Fuji Seiko	Nagato Metal	Mitsuboshi Belt
Suzuki	-	-	Nippon Denso	Onishi Seiki	-	Mitsuboshi Belt
Daihatsu	-	Sankō Senzai	Nippon Denso Toyo Radiator	Fuji Seiko Onishi Seiki	Taihō Kōgyō Daidō Metal Nippon Daiakurebaito	Bando Chōtai Mitsuboshi Belt
Toyota	Nippon Denso	Togyō Seisaku-sho Sankō Senzai	Toyo Radiator Nippon Denso	Kuzē Fuji Seiko	Taihō Kōgyō Daidō Metal	Mitsuboshi Belt Tōkai Gomu
Toyo Kōgyō	Nippon Denso Showa Arumi Tokyo Roki	Chūo Hatsujō Nippon Hatsujō	Nippon Radiator Nippon Denso Showa Aluminium	Onishi Seiki Fuji Seiko	Daidō Metal	Mitsuboshi Belt Bando Chōtai
Nissan	Nippon Radiator Tsuchiya	Nippon Hatsujō Katō Hatsujō	Nippon Radiator	Fuji Seiko Onishi Seiki	Nippon Daiakurebaito Daidō Metal	Bando Chōtai Mitsuboshi Belt
Nissan Diesel	Tsuchiya Tokyo Roki	Murata Hatsujō	Nippon Radiator	Fuji Seiko	Daidō Metal Nippon Daiakurebaito	Mitsuboshi Belt
Hino	Tokyo Roki	Murata Hatsujō	Sankyō Radiator Nippon Denso	Fuji Seiko	Daidō Kōgyō Taihō Kōgyō	Mitsuboshi Belt
Fuji	-	Nippon Hatsujō	Nippon Radiator	Fuji Seiko	Daidō Metal Nippon Daiakurebaito	Mitsuboshi Belt
Honda	Nippon Denso	Nippon Hatsujō Chūo Hatsujō	-	-	Daidō	Mitsuboshi Belt
Mitsubishi	Toyo Radiator Tsuchiya	Murata Hatsujō Sankō Senzai	Toyo Radiator Nippon Radiator Nippon Denso	Fuji Seiko Kuzē	Daidō Metal Nippon Daiakurebaito Taihō Kōgyō	Mitsuboshi Belt

Table 5.4 (Cont.)

	Timing Chain	Timing Gear	Timing Gear Case	Cylinder Head	Cylinder Block	Oil Pan
Isozu	Tsubakimoto Chain	Supplied internally Tsubakimoto Chain	Furukawa Chūzō Supplied internally	Supplied internally Kawasaki Jukogyō	Supplied internally Kawasaki Jukogyō	Tokyo Radiator Furukawa Chūzō Kawasaki Jūkōgyō Hitachi Kinzoku
Suzuki	-	-	-	Fusō Kaigōkin Totsuka Tekkosho	Suzuki-shiki Shokki	-
Daihatsu	Tsubakimoto Chain	Supplied internally Shin-Kōbe Denki	Supplied internally Kyoto Die-Cast	Supplied internally	Supplied internally	Supplied internally Aoi Kika
Toyota	Tsubakimoto Chain Daidō Kōgyō	Shin-Kōbe Denki Yutaka Seimitsu Takaoka Kōgyō	Aishin Seiki	Toyoda Shokki	Toyoda Shokki	Taiheiyō Kōgyō Haruhachi Kōgyō
Toyo Kōgyō	Renold Tsubakimoto Chain	Supplied internally Kanda Tekkō	Supplied internally	Supplied internally	Supplied internally	Kawada Tekkō
Nissan	Tsubakimoto Chain	Tsubakimoto Chain Atsugi Buhin Fuji Tekkō	Hitachi Kinzoku Fusō Kaigōkin Sanwa Kōgyō	Supplied internally Tokyo Kaigōkin Hitachi Kinzoku	Kiryū Kikai Nai Sei	Sanwa Kōgyō Hitachi Kinzoku
Nissan Diesel	-	Supplied internally Atsugi Buhin	Supplied internally Fusō Kaigōkin	Supplied internally Kawaguchi Mainenki	Supplied internally Kawaguchi Mainenki	Sōei Sangyō Suwayoshi Kōgyō
Hino	-	Sanwa Seiki Supplied internally	Saitama Chūzō Koyama Chūzō	Saitama Chūzō Hino Chūzō	Hino Chūzō	Supplied internally Kyowa Selsaku
Fuji	-	Supplied internally	-	Tokyo Kaigōkin	Riken Piston Enshū Kaigōkin	Kikuchi Press
Honda	Daidō Kōgyō Takasago Chain	Supplied internally	Supplied internally	Supplied internally	Supplied internally	Mauda Saisakuwo
Mitsubishi	Tsubakimoto Chain	Supplied internally Tsubakimoto Chain Endō Haguruma	Aishin Seiki Hitachi Kinzoku Furukawa Chūzō	Supplied internally	Supplied internally	Hōei Kōgyō Halan Saisaku-sho Putaba Sangyō

Table 5.4 (Cont.)

	Sintering	Coil	Nonferrous Molding	Rubber	Interiors (excluding plastics)
Isuzu	Mitsubishi Kinzoku Sumitomo Denko	Orihashi Seisakusho	Hitachi Kinzoku Furukawa Chuzo Orihashi Seisakusho Mitsubishi Kinzoku Sato Shoji	Taiyo Gomu Bridgestone Hokushin Kagaku	Hashimoto Forming Aichi Kogyosho Marui Kogyo Usui Kokusai Mitsui Kinzoku Showa Aluminum Daido Kogyo
Suzuki	Tokyo Shoketsu Kinzoku Nai Sei	Taiho Kogyo Mitsuya Seiko	Tokai Seiki	Tokai Kogyo Hokushi Kagaku Maiki Gomu Inoue Gomu	Mikami Kogyo Ozawa Kinzoku
Daihatsu	Nippon Punmatsu Gokin Nai Sei	Taiho Kogyo Mitsuya Kogyo	Kasamatsu Kinzoku Kyoto Die-cast Nai Sei	Kinjo Gomu Hogyu Gomu Taikoku Kasei	Shiraki Kinzoku Usui Kokusai Yamamoto Mark Mikami Kogyo
Toyota	Tokyo Shoketsu Kinzoku Sumitomo Denko	Taiho Kogyo	Taiho Kogyo	Toyoda Gosei Tokai Gomu	Marui Kogyo Taiheiyu Kogyo Shiraki Kinzoku
Toyo Kogyo	Mitsubishi Kinzoku Sumitomo Denko Sumitomo Tokushu- Kinzoku Nai Sei	Red Metal Daido Metal	Hiroshima Aluminum Kogyo Nai Sei Hishibi Seisakusho	Marugo Gomu Kurashiki Kako	Sanyo Mark Katayama Kogyo Nippon Keikinzoku Kakoki Delta Kogyo Hishibi Seisakusho Usui Kokusai
Nissan	Mitsubishi Kinzoku Sumitomo Denko Hitachi Kasei	Nippon Daiyakure- baito	Nai Sei Hitachi Kinzoku Tokyo Keigokin	Kinugawa Gomu	Marui Kogyo Hashimoto Forming Kokusan Kinzoku
Nissan Diesel	Daido Metal Mitsuya Seiko Nippon Daiyakure- baito	Mitsuya Seiko Daido Metal	-	Bridgestone Gomu Fukoku Gomu	Marui Kogyo Mitsui Kinzoku
Hino	Orihashi Seisakusho Daido Metal Sennu Kinzoku	Mitsuya Seiko Senju Kinzoku	Goto Gokin	Hikko Gomu Kokuku Gomu Nippon Oil Seal Tokai Gomu	Mitsui Kinzoku Marui Kogyo
Fuji	Tokyo Shoketsu Kinzoku Hitachi	Taiho Kogyo Sato Kinzoku Senju Kinzoku	-	Tokai Gomu Bridgestone Kokoku Gomu Kinugawa Gomu	Hashimoto Forming Tokyo Forming Dai-ichi Mark Kokusan Kinzoku
Honda	Tokyo Shoketsu Kinzoku Hitachi Kasei	Daido Metal Taiho Kogyo	-	-	Mikami Kogyo Uehara Name Hata
Mitsubishi	Mitsubishi	Taiho Kogyo Orihashi Seisakusho Mitsuya Seiko	Hishibi Seisakusho Mitsui Kinzoku Tokai Die-cast	Tokai Gomu Meiji Gomu Marugo Gomu	Daido Kogyosho Shiraki Kinzoku Katayama Kogyo Yashima Kogyo

Table 5.4 (Cont.)

	Wheel Cap	Radiid-shield	Small Spiral Springs	Packings	Bolts & Nuts
Iauzu	Ichimitsu Kogyo Ikuyo Kagaku	-	Murata Hatsujo Yamato Kogyo Suzuki Spring	Otsuka Packing Daiba Buhin	Jidosha Buhin
Suzuki	Putaba Sangyo Sekisui Kagaku	San Kai	Suzuki Spring Tokai Spring Chuo Hatsujo	Ishino Gasket Tokyo Three Bond	Topura Dai-ichi Kogyo Tokai Seitatsu Okawa Neji
Daihatsu	Putaba Sangyo	-	Togo Seisakusho Uchida Spring Dai-ichi Hatsujo	Sanwa Packing Kokusen Packing	Urano Seisakusho Saga Tekko Yano Tekko Hitachi Yamamoto Seisakusho Ogino Seisakusho
Toyota	Taiheiyō Kogyō	-	Togo Seisakusho Chuyō Spring	Tokai Gasket Nippon Pillar Toyoda Gosei Nippon Asbestos Nippon Gasket Uchiyama Kogyo	Aoyama Seisakusho Myōdō Tekkō Sugino Seisakusho Owari Seiki Tokyo Neji Topura
Toyo Kogyo	Ondo Kosakusho Koito	-	Chuo Hatsujo Kogyo	Nippon Asbestos Tokyo Three Bond Kokusai Packing	Osaka Neji Matsumoto Jukogyo Ondo Kosakusho Tokyo Neji Owari Seiki Ochiai Seisakusho
Nissan	Ichimitsu Kogyo Koito	-	Kato Hatsujo Nippon Hatsujo Murata Hatsujo	Nippon Leints Ishino Gasket	Nut...Fuse Neji Bolt...Okawa Seira Saga Tekko, Tokyo Neji, Sun Bolt
Nissan Diesel	-	-	Murata Hatsujo Kato Hatsujo	Aho Packing Tokyo Gasket Ishino Gasket Yamamoto Hikaku Kogyo	Topura, Fuse Neji Kato Neji, Hamano Tekko Tokyo Neji, Saga Tekko
Hino	Taiheiyō Kogyō Yasaki Kako	-	Murata Hatsujo	Marusan Packing Suzuki Seisakusho	Bolt...Saga Tekko Hamano Tekko, Tokyo Neji Nut...Ishiwatari Neji Onashi Shoji
Fuji	Koito Izumi Kogyo	-	Sanyo Hatsujo Nippon Hatsujo Murata Hatsujo	Fukuda Packing Mikumi Seisakusho	Katsuragawa Seira Sato Neji Okawa Neji Toyō Atsuzō Tōwa Seisakusho Saga Yamashina Seikōsho Owari Seiki
Honda	Sankai Giken	Fuji Kagaku	Chuo Hatsujo Nippon Hatsujo Sanko Sensai	Ishino Gasket Nippon Leakless Marusan Packing	Nagoya Neji Kaneda Kogyo Tokai Seitatsu Saga Tekko
Mitsubishi	Koito Okayama Makki Putaba Sangyo	-	Murata Hatsujo Togo Seisakusho Kasaya Spring Dōwa Hatsujo Sanko Seiko Chuo Hatsujo Marubo Hatsujo	Yamamoto Hikaku Kogyo Nippon Packing Sanwa Packing Kokusen Packing	Kawasaka Seisakusho Tokyo Neji Asagawa Seisakusho Ishii Masen Nagoya Neji Osaka Neji Kyōritsu Seiki Fujita Neji

Table 5.4 (Cont.)

	Piston	Piston Pin	Piston Ring	Cylinder Liner	Gaskets for Cylinder-Heads & In-take & Exhaust Pipes	Air In-take Valves & Exhaust Valves
Isuzu	Piston Seizō	Kawasaki Jidōsha	Nippon Piston Riken Piston	Izumi Jidōsha Nippon Piston	Ōtsuka Packing Ishikawa Gasket	Fuji Valve
Suzuki	Āto Kinzoku Izumi Jidōsha Kōgyō	Āto Kinzoku Tanaka Seimitsu	Riken Piston Nippon Piston Teikoku Piston	Suzuki-shiki Shokki	Ishino Gasket Nippon Asbestos	-
Daihatsu	Sakura Kōgyō Āto Piston Aishin Seiki	Urano Seisakusho Nai Sei	Nippon Piston Riken Piston Teikoku Piston	Teikoku Piston	Sanwa Packing Kokusen Packing	Aisan Kōgyō Mitsubishi Jūko Nittan Valve
Toyota	Āto Piston Aishin Seiki	Āto Piston	Nippon Piston Riken Piston Teikoku Piston	Teikoku Piston	Nippon Asbestos Nippon Gasket Nippon Pillar	Nittan Valve Aisan Kōgyō
Toyō Kōgyō	Nai Sei	Nai Sei	Nippon Piston Riken Piston	Nai Sei	Nippon Gasket Nippon Asbestos Tokyo <del>Gasket</del>	Nittan Valve
Nissan	Atsugi Buhin Āto Kinzoku	Atsugi Buhin Āto Kinzoku	Riken Piston Nippon Piston	Nippon Piston	Nippon <del>Gasket</del> Ishino Gasket	Fuji Valve Nittan Valve
Nissan Diesel	Riken Piston Atsugi Buhin Izumi Jidōsha Kōgyō	Atsugi Buhin Kasuya Tekkōsho	Riken Piston Nippon Piston	Nippon Piston Teikoku Piston Riken Piston	Tokyo Gasket Tatsumi Kinzoku Yamamoto Hiçaku	Fuji Valve Nittan Valve
Hino	Izumi Jidōsha Kōgyō Hirukawa Denkō	Kasuya Tekkōsho	Nippon Piston Riken Piston Teikoku Piston	Nippon Piston Teikoku Piston Riken Piston	Marusan Packing Tokyo Gasket	Fuji Valve Nittan Valve
Fuji	Atsugi Buhin Sakura Kōgyō	Atsugi Buhin Kasura Kōgyō	Riken Piston Nippon Piston	Riken Piston Nippon Piston	Nippon Asbestos Nippon Gasket Ishikawa Gasket Fukuda Packing	Fuji Valve
Honda	Āto Kinzoku Honda Chuzō	Tanaka Seimitsu	Riken Piston Nippon Piston Teikoku Piston	Morikawa Sangyō Riken Piston	Ishino Gasket Nippon	Mitsubishi Jūko Fuji Valve Nittan Valve Nai Sei
Mitsubishi	Āto Piston Sakura Kōgyō Izumi Jidōsha Kōgyō Aishin Seiki Hiratsuka Kinzoku	Āto Piston Atsugi Buhin Tōkyō Seisakusho Sakura Kōgyō	Teikoku Piston Riken Piston Nippon Piston	Teikoku Piston Nai Sei	Sanwa Packing Ishida Packing Nippon Packing Nippon Asbestos Nippon <u>Leintz</u> Kokusen Packing	Nai Sei



Table 5.4 (Cont.)

	Fuel Pump (Electric)	Fuel Pump (Mechanical)	Carburetor	Fuel Pipes	Fuel Jet	Fuel Jet Pump
Iaizu	Jidōsha Kiki	Nippon Kikaki	Nippon Kikaki Hitachi Mikuni Kōgyō	-	Diesel Kiki	Diesel Kiki
Suzuki	-	Aisan Kōgyō Mikuni Kōgyō	Mikuni Kōgyō Hitachi Seisaku	Toyoda Gōsai	-	-
Daihatsu	Nippon Denso	Mikuni Kōgyō Kyōsan Denki	Hitachi Mikuni Kōgyō Nippon Kikaki Aisan Kōgyō	Usui Kokusai Sanō Kōgyō Maruyasu	Nippon Denso Diesel Kiki	Nippon Denso Diesel Kiki
Toyota	Nippon Denso	Kyōsan Denki Aisan Denki	Aisan Kōgyō Nippon Kikaki	Usui Kokusai Maruyasu	-	Nippon Denso
Toyō Kōgyō	Mitsubishi Denki Nippon Denso	Nippon Kikaki Mikuni Kōgyō	Nippon Kikaki Hitachi	Usui Kokusai Nishimura Shokai	Diesel Kiki	Nippon Kikaki
Nissan	Sanyō Denki (?) Jidōsha Kiki	Nippon Kikaki Kyōsan Denki	Hitachi Nippon Kikaki Mikuni Kōgyō	Usui Kokusai Sanō Kōgyō	-	-
Nissan Diesel	-	-	-	-	Diesel Kiki	Diesel Kiki
Hino	Nippon Denso	Kyōsan Kanki	Hitachi Aisan Kōgyō	Usui Kokusai Hayashi Terenpu	Diesel Kiki Nippon Denso	Diesel Kiki Nippon Denso
Fuji	Jidōsha Kiki	Mikuni Kōgyō	Hitachi Mikuni Kōgyō	Tokyo Kōgyō Gomu	-	-
Honda	Mitsubishi Denki	-	Keihin Seiki	Sanō Kōgyō	Diesel Kiki	-
Mitsubishi	Jidōsha Kiki	Aisan Kōgyō Mikuni Kōgyō Kyōsan Denki	Aisan Kōgyō Nippon Kikaki Mikuni Kōgyō	Nagoya Gomu Usui Kokusai	Nippon Denso Diesel Kiki Nai Sei	Diesel Kiki Nippon Denso

Table 5.4 (Cont.)

	Door Lock	Key Lock	Door Hinges	Seat Assembly	Seat Spring	Interior Parts
Isuzu	Amao Seisakusho Yushin Seiki Aishin Seiki	Sanwa Buhin Toyo Rika	Yanagisawa Tekkocho Jidooha Imono	Kunimatsu Kogyo Ikeda Bussan	Nippon Hatsujo	Kawashima Orimono Nippon Leather MTP Kasel Kunimatsu Kogyo Ikeda Bussan Kasai Kogyo Sumie Orimono
Suzuki	Shiraki Kinzoku	Shiraki Kinzoku Toyo Rika	Nagata Buhin Asahi Katantetsu	Koretto Kogyo Howa Kogyo Tokyo Sheet	Nippon Hatsujo	MTP Mitsuboshi Belt Hayashi Terenpu Ikeda Bussan
Daihatsu	Shiraki Kinzoku Kanbishi Denki Aishin Seiki	Kanbishi Denki Tokai Rika	Nakamura Katan Chutetsu	Fuji Sheet	Sanko Sensai Nippon Hatsujo	Taiyo Kogyo Hayashi Terenpu Fuji Sheet
Toyota	Aishin Seiki	Shiraki Kinzoku Tokai Rika	Aishin Seiki Takaoka Kogyo	Arakawa Shatai Takashimaya Nippatsu	Nippon Hatsujo Sanko Sensai	Takashimaya Hatsujo Takehiro Mokuzai Arakawa Shatai Mitsuiya Kogyo Kyowa Leather Kawaguchi Gomu Hayashi Terenpu, MTP Kanamachigomu, Kawashima Sumiko (or Sumie) Mitsuboshi, Meiwa Takamura, Howa Seni
Toyo Kogyo	Yushin Seiki Delta Kogyo	Yushin Seiki	Hiroshima Seimitsu Kogyo Sango Kogyo	Toyo Sheet Delta Kogyo Yagyu Sheet	Nippon Hatsujo Takahara Spring	Nanjō Sōbi, Sanwa Shokai Daikyō Hirotsu Shoten, Nishigawa Kasel, Kawashima Orimono, Nippon Cloth, Sumiko Orimono, Kyowa Leather
Nissan	Ōi Seisakusho Jonan Seisakusho	Kokusen Kinzoku Nairusu Buhin	Katayama Kogyo Yanagisawa Seiki	Supplied Internally Ikeda Bussan Tachikawa Spring	Tachikawa Spring Nippon Hatsujo	Hitachi Kasel MTP Kasel Kawashima Orimono Kasai Kogyo Sumiko Orimono Ikeda Bussan Meiwa Sangyo Kotobukiya Furonta Mitsuboshi Belt
Nissan Diesel	Ōi Seisakusho	Kokusen Kinzoku	Jidooha Shatai Katayama Kogyo	Mikuriya Kazaku Tachikawa Spring Ikeda Bussan	Tachikawa Spring Nippon Hatsujo	Ikeda Bussan Kasai Kogyo Meiwa Sangyo
Hino	Mitsui Kinzoku Yushin Seiki Aishin Seiki	Yushin Seiki Tokai Rika	Nagata Buhin	Tachikawa Spring Izumi Seisakusho	Tachikawa Spring Izumi Seisakusho	Hayashi Terenpu Meiwa Sangyo Takashimaya Nippatsu MTP Kasel
Fuji	Jonan Seisakusho	Nairu Buhin Kokusen Buhin	Kokusen Kinzoku	Nippon Hatsujo France Bed Izumi Seisakusho	Nippon Hatsujo Izumi Seisakusho France Bed	Meiwa Sangyo Shigem Kogyo
Honda	Ōi Seisakusho Mitsui Kinzoku	Toyo Densō Honda Lock	Kotokukiya Frontier	Tokyo Sheet	Tokyo Sheet	Tokyo Sheet Kasai Kogyo Hayashi Terenpu Ikeda Bussan
Mitsubishi	Aishin Seiki Jonan Seisakusho Hikan Kiki	Tokai Rika Jonan Seisakusho Narumi Gokin	Katagawa Kogyoshi	Naniwa Press Fujiko Sangyo Marubishi Kogyo	Sanko Sensai Tachikawa Spring	Yōwa Kogyo Daikō Kogyo Kanto Sheet Ikeda Bussan MTP Kyowa Sangyo Sanjo Kogyo Howa Seni Hayashi Terenpu Sumiko Orimono

Table 5.4 (Cont.)

	Safety Belt	Safety Pillow	Rearview Mirror	Ash Tray	Air Conditioner	Heater
<b>Isuzu</b>	Nippon Seiko Takada Kōjō	-	Ichimitsu Kōgyō	Ichimitsu Kogyo	Diesel Kiki Toshiba	Diesel Kiki Nippon Denso
<b>Suzuki</b>	Iiwa Kōgyō (Takada Kōjō)  Ashimori Kōgyō	Korreto Kōgyō	Tanaka Seisakusho Tōyō Kōgyō	Putaba Sangyō San Kei	-	Suzuyo Sangyō Kyōei Sangyō Kamizu Seisaku
<b>Daihatsu</b>	Takada Kōjō Ashimori Kōgyō Nippon Seiko	Fuji Sheet	Tōyō Kōgyō Ichimitsu Kōgyō	Putaba Sangyō Nisaho Sangyō	Nippon Denso	Nippon Denso Taiheiyō
<b>Toyota</b>	Takada Kōjō Tōkai Rika Nippon Seiko	MTP Mitsuboshi Tōkai Kasec Maiva	Murakami Kaimeidō Ichimitsu Kōgyō	Kojima Press	Nippon Denso	Nippon Denso
<b>Tōyō Kōgyō</b>	Takada Kōjō Ashimori Kōgyō	Tōyō Sheet Delta Kōgyō Kiryū Sheet	Delta Kōgyō Tōyō Kōgyō Ichimitsu Kōgyō	Delta Kōgyō	Nippon Denso Diesel Kiki	Nippon Radiator Nippon Denso Diesel Kiki
<b>Nissan</b>	Takada Kōjō Nippon Seiko	Ikeda Bussan Mitsuboshi Belt	Ichimitsu Kōgyō	Ichimitsu Kōgyō Kantō Seiki	Hitachi Diesel Kiki	Nippon Radiator Diesel Kiki
<b>Nissan Diesel</b>	Takada Kōjō Kayaba Kōgyō	-	Ichimitsu Kōgyō	Maruei Kōgyō Ichimitsu Kōgyō Nippon Parasuto	-	Nippon Radiator Diesel Kiki Hitachi
<b>Hino</b>	Tōkai Rika Takada Kōjō	Yamamoto Shoten	Ichimitsu Kōgyō Murakami Kaimeidō	Ichimitsu Kōgyō	Nippon Denso Toshibata	Nippon Denso Diesel Kiki
<b>Fuji</b>	Ashimori Kōgyō	-	Ichimitsu Kōgyō Oshima Denki	Oshima Denki	Hitachi Nippon Denso	Supplied Internally Hitachi
<b>Honda</b>	Takada Kōjō	Tokyo Sheet	Matsuyama Seisakusho	Fuji Kagaku	Hitachi Seisakusho Nai So	Kokusan Denki
<b>Mitsubishi</b>	Takada Kōjō Ashimori Kōjō	Yōwa Kōgyō Fujiko Kōgyō	Ichimitsu Kōgyō Osaka Case Murakami Kaimeidō	Ichimitsu Kōgyō Shin-Kobe Denki	Nippon Denso Mitsubishi Jūkō	Nippon Denso Nippon Radiator Diesel Kiki Mitsubishi Denki

Table 5.4 (Cont.)

	Jet Pumps	High-Pressure Jet Pipes	Nozzles	Nozzle Supporters	Fuel Filters (for gasoline)	Fuel Filters (for diesel)	Air Cleaners (Air Filters)
Isuzu	Diesel Kiki	Usui Kokusai	Diesel Kiki	Diesel Kiki	Tokyo Roki	Tsuchiya Tokyo Roki	Tsuchiya Tokyo Roki
Suzuki	-	-	-	-	Tsuchiya Tōyō Roki Mikuni Kogyo	-	Tōyō Roki Nippon Filter Nippon Denso
Daihatsu	Nippon Denso Diesel Kiki	Usui Kokusai Sanō Kōgyō	Nippon Denso Diesel Kiki	Nippon Denso Diesel Kiki	Kyōsan Denki Tokyo Roki	Nippon Rokaki	Nippon Rokaki Tokyo Roki
Toyota	Nippon Denso	Usui Kokusai	Nippon Denso	Nippon Denso	Kyōsan Denki Nippon Denso	Kyōsan Denki	Nippon Denso
Toyo Kōgyō	Diesel Kiki	Usui Kokusai	Diesel Kiki	Diesel Kiki	Tokyo Roki	Tokyo Roki	Tokyo Roki
Nissan	-	-	-	-	Tsuchiya Kyosan Denki	-	Tsuchiya
Nissan Diesel	Diesel Kiki	Usui Kokusai	Diesel Kiki	Diesel Kiki	-	Tsuchiya Nippon Rokaki	Tsuchiya Nippon Donaldson
Hino	Diesel Kiki Nippon Denso	Usui Kokusai	Diesel Kiki Nippon Denso	Kokusai Denki Diesel Kiki Nippon Denso	Kyōsan Denki	Tokyo Roki	Tokyo Roki Nippon Donaldson
Fuji	-	-	-	-	Kyosan Denki	-	Tsuchiya Koito
Honda	Diesel Kiki	Diesel Kiki	Diesel Kiki	Diesel Kiki	Tokyo Roki	-	Tokyo Roki Tōyō Roki
Mitsubishi	Diesel Kiki Nippon Denso	Usui Kokusai	Usui Kokusai Nippon Denso	Diesel Kiki Nippon Denso	Tokyo Roki	Nippon Rokaki	Tokyo Roki Nippon Rokaki Sankei Kogyō Nippon Donaldson
		-	-	-	-	-	

Table 5.4 (Cont.)

	Parts for Air Cleaners	Cases for Air Cleaners	Oil Cleaners (Oil Filters)	Water Pumps	Oil Pumps
Isuzu	Tokyo Roki Tsuchiya Nippon Donaldson	Tokyo Roki Tsuchiya Nippon Donaldson	Tokyo Roki Tsuchiya	Tokyo Buhin	Tokyo Buhin
Suzuki	Tōyō Roki Nippon Filter Nippon Denso	Tōyō Roki Suzuya Sangyō Maruhachi Kogyō	-	Aisan Kogyō	Supplied Internally Mikuni Kogyo
Daihatsu	Nippon Rokaki Tokho Roki	Nippon Rokaki Tokyo Roki	Nippon Rokaki Tokyo Roki	Aoi Kikai	Chuō Yuatsu Mikuni Kōgyō
Toyota	Nippon Denso Tokyo Roki	Nippon Denso Kojima Press Maruhachi Kōgyō	Nippon Denso	Aishin Seiki Aisan Kōgyō	Aishin Seiki
Toyo Kōgyō	Tokyo Roki	Tokyo Roki	Tokyo Roki	Supplied Internally	Supplied Internally Mikuni Kogyo
Nissan	Tsuchiya	Tsuchiya	Tsuchiya	Atsugi Buhin	Atsugi Buhin Tochigi Fuji
Nissan Diesel	Tsuchiya	Tsuchiya	Nippon Rokaki Tsuchiya Tokyo Roki	Atsugi Buhin Tokyo Buhin	Atsugi Buhin Tochigi Fuji Fuji Tekko
Hino	Tokyo Roki	Tokyo Roki	Tokyo Roki	Kikusan Kiki	Tochigi Fuji
Fuji	Tsuchiya Koito	Tsuchiya Koito	Tsuchiya	Atsugi Buhin	Atsugi Buhin Mikuni Kōgyō
Honda	Tōyō Roki Tokyo Roki Koito	Matsuhashi Seisaku-sho Poli-ka Nai Sei	Tokyo Roki	-	Yamada Seisaku-sho
Mitsubishi	Nippon Rokaki Tokyo Roki Nippon Filter Nippon Donaldson	Nippon Rokaki Tokyo Roki Sankei Kogyo Nippon Donaldson	Nippon Rokaki Tokyo Roki Mikuni Kōgyō Nippon Denso	Aishin Seiki Tokyo Buhin	Tokyo Buhin Mikuni Kōgyō Nippon Jirōtō Aishin Seiki

Table 5.4 (Cont.)

	Clamps	Cocks	Plastic (bodies)	Plastic (functional parts)	Plastic (interiors)	Automobile Clock
Isuzu	Dōwa Seisakusho Tada Press	Ueda Seisakusho Daian Kogyosho	Toyoda Gōsei Ikuyo Kagaku	Toyoda Gōsei Ikuyo Kagaku	Marui Kōgyō Toyoda Gōsei Ichimitsu Kōgyō	Yasaki Sōgyō Jeko
Suzuki	Sanko Seisakusho Kyoei Kogyo	Mikuni Kōgyō	Inoue Gomu Sekisui Kagaku Takagi Seisakusho San Kai	Seikisui Kagaku Takagi Seisakusho	Hayashi Terenpu	-
Daihatsu	Takagi Seisakusho Takagi Kagaku	Kasamatsu Kinzoku	Toyoda Gōsei Taiyo Kogyō Miyagawa Kasei	Toyoda Gōsei Miyagawa Kasei Mikuni Celluloid	Miyagawa Kasei Sekisui Kagaku Toyoda Gōsei	Jeko
Toyota	Kojima Press Takagi Seisakusho	Itō Kinzoku	Sanko Seisakusho Yasaki Kako Toyoda Gōsei Kojima Press	Toyoda Gōsei	Toyoda Gōsei Kantō Kasei Marui Kōgyō	Jeko Yasaki Sōgyō Citizen
Tōyō Kōgyō	Takara Kinzoku Delta Kōgyō Yagyū Kōgyō	Matsui Kōgyō	Shin Kobe Denki Miyagawa Kasei Kōgyō Star Light Kōgyō Dai Kyō	Shin Kobe Denki Dai Kyō	Shin Kobe Denki Miyagawa Kasei Dai Kyō Star Light Kōgyō Toyoda Gōsei	Jeko
Nissan	Ōi Seisakusho Kato Hatsujō	Tokyo Sokuhan	Nippon Purasuto Hitachi Kasei	Nippon Purasuto Hitachi Kasei	Marui Kōgyō Ichimitsu Kōgyō	Jeko Yasaki Sōgyō
Nissan Diesel	Arai Kōgyō Kinugawa Gomu Teito Gomu Tokyo Gasket	Dai-an Kōgyōsho	Hitachi Kasei Izumi Jidōsha Nippon Purasuto	Marui Plastic Hitachi Kasei Nippon Pura	-	-
Hino	Kokusan Buhin Seisakusho	Hino Seiki	Toyoda Gōsei Toshiba	Toshiba Naigai Kagaku	Marui Kōgyō Toyoda Gōsei Kanto Kasei	Jeko
Fuji	Sanyō Hatsujō Yokohama Gomu	-	Dai Nippon Ink Tōto Seikai Hitachi Kasei	Tokyo Kako	Hitachi Kasei Ichimitsu Kōgyō	Jeko
Honda	-	Keihin Seiki	Fuji Kagaku Nai Sei	Fuji Kagaku Moriroku Shōji	Moriroku Shōji	Jeko
Mitsubishi	Sanpō Gomu Katayama Kogyō Muro Kinzoku	Kanto Valve Hirata Valve Daian Kōgyō Sanwa Kōgyō Teikei Kikaki	Toyoda Gōsei Izumi Jidōsha Ikuyo Kagaku Shin Kobe Denki Ryō Sei Kōgyō Nai Sei	Toyoda Gōsei Shi Kobe Denki Ryōsei Kōgyō Izumi Jidōsha	Izumi Jidōsha Marui Kōgyō Toyoda Gōsei Ikuyo Kagaku Yamamoto Mark Sekisui Adohea Nai Sei	Yasaki Sōgyō Jeko

Table 5.4 (Cont.)

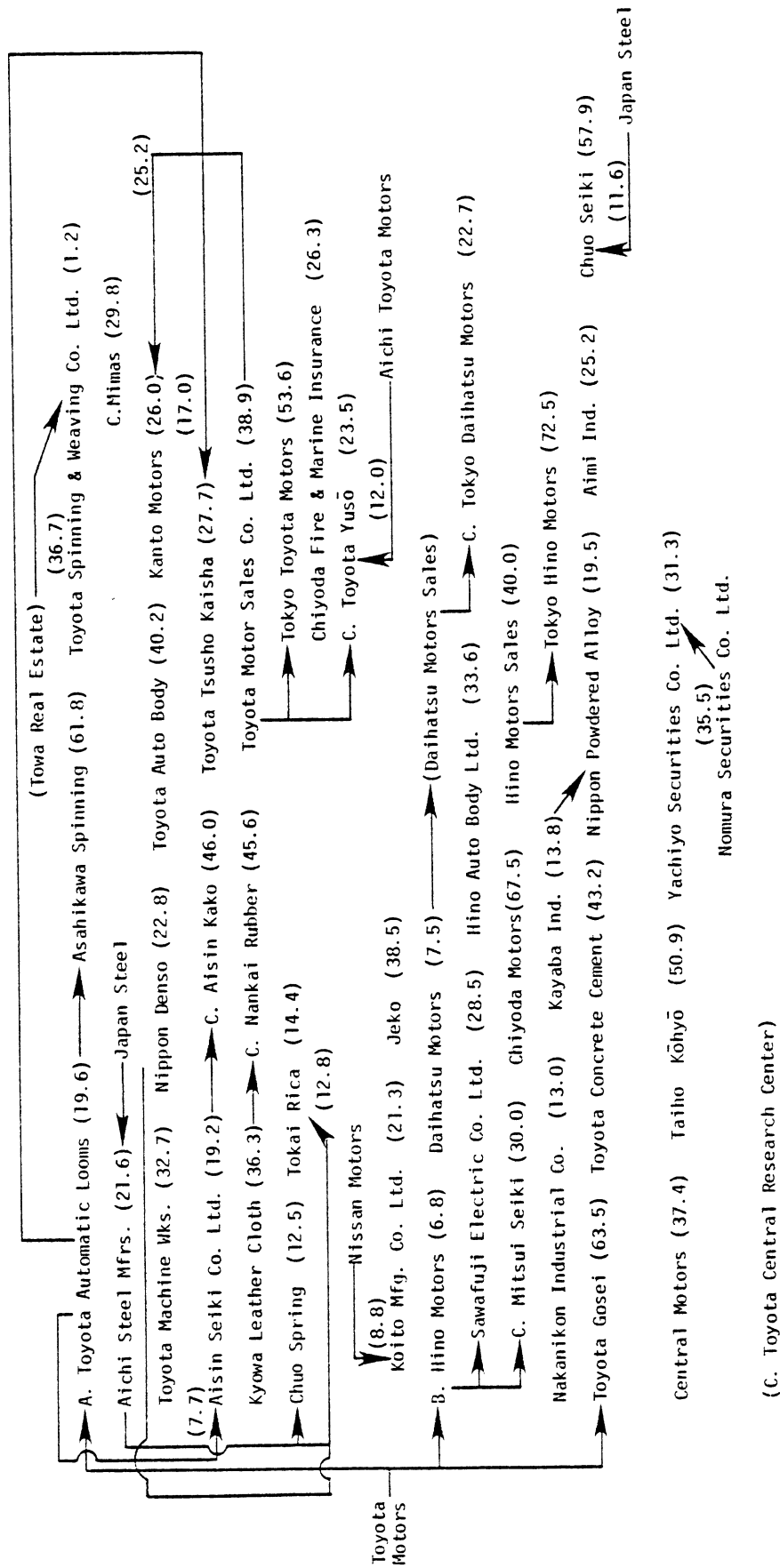
	Automobile Radio	Battery	Glass	Tire Tube	Bearing
Isuzu	Matsushita Denki Sanyo Denki Toshiba	Nippon Denchi Yuasa Denchi Matsushita Denchi Furukawa Denchi Shin Kobe Denki	Asahi Glass Nippon Ita Glass	Yokohama Gomu, Bridgestone Toyo Gomu, Otsu Gomu Nitto Tire Nippon Dunlop	Nippon Seiko Kogyo Seiko Fujikoshi Toyo Bearing
Suzuki	Fujitsu Teikoku Denpa Toshiba Mitsubishi	Yuasa Denchi Furukawa Denchi Nippon Denchi	Asahi Glass Central Glass Nippon Ita Glass	Bridgestone Yokohama Gomu Inoue Gomu Mitsubishi Belt	Nippon Seiko Toyo Bearing Kogyo Seiko Fujikoshi
Daihatsu	Matsushita Denki Teikoku Denpa Fujitsu	Matsushita Denchi Nippon Denchi Yuasa Denchi Shin Kobe Denki	Asahi Glass Nippon Ita Glass Central Glass	Bridgestone Yokohama Gomu Toyo Gomu Otsu Tire Nippon Dunlop	Nippon Seiko Toyo Bearing Kogyo Seiko
Toyota	Fujitsu Matsushita Denki	Nippon Denchi Shin Kobe Denki Yuasa Denchi Furukawa Denchi	Asahi Glass Nippon Ita Glass	Yokohama Gomu Sumitomo Gomu Toyo Gomu Bridgestone Otsu Tire	Nippon Seiko Fujikoshi Koyo Seiko
Toyo Kogyo	Fujitsu Mitsubishi Denki Matsushita Denki Teikoku Denpa Sanyo Denki	Nippon Denchi Yuasa Denchi Matsushita Denchi	Nippon Ita Glass	Bridgestone Sumitomo Gomu Toyo Gomu Toyo Gomu Yokohama Gomu	Toyo Bearing Koyo Seiko Nippon Seiko Hikari Seiko
Nissan	Hitachi Toshiba Teikoku Denpa Sanyo Denki Matsushita Denki	Yuasa Denchi Matsushita Denchi Nippon Denchi Shin Kobe Denki Furukawa Denchi	Asahi Glass Central Glass Nippon Ita Glass	Bridgestone Yokohama Gomu Nippon Dunlop Toyo Gomu	Nippon Seiko Koyo Seiko Toyo Bearing Fujikoshi
Nissan Diesel	Hitachi Teikoku Denpa Matsushita Denki Mitsubishi Denki Sanyo Denki Toshiba	Nippon Denchi Furukawa Denchi Yuasa Denchi Shin Kobe Denki Matsushita Denki	Asahi Glass Central Glass	Bridgestone Yokohama Gomu Toyo Gomu Nippon Dunlop Nitto Tire	Nippon Seiko Kogyo Seiko Toyo Bearing
Hino	Matsushita Denki Toshiba Teikoku Denpa	Nippon Denchi Shin Kobe Denki Furukawa Denchi Yuasa Denchi	Asahi Glass Central Glass	Bridgestone Sumitomo Gomu Toyo Gomu Yokohama Gomu Otsu Tire Nitto Tire	Kogyo Seiko Nippon Seiko Fujikoshi Toyo Bearing
Fuji	Teikoku Denpa Matsushita Denki	Nippon Denchi Yuasa Denchi Matsushita Denki Furukawa Denchi	Asahi Glass Nippon Ita Glass Central Glass	Bridgestone	Toyo Bearing Nippon Seiko Fujikoshi Kogyo Seiko
Honda	Nippon Musen Matsushita Denki Fujitsu	Yuasa Denchi Nippon Denchi Matsushita Denki	Asahi Glass	Bridgestone Yokohama Gomu Nitto Tire Otsu Tire Nippon Dunlop Inoue Gomu	Kogyo Seiko Fujikoshi Toyo Bearing
Mitsubishi	Mitsubishi Denki Teikoku Denpa	Nippon Denchi Yuasa Denchi Furukawa Denchi Shin Kobe Denki	Asahi Glass	Yokohama Gomu Sumitomo Gomu Toyo Gomu Bridgestone Otsu Tire Nitto Tire	Kogyo Seiko Nippon Seiko Toyo Bearing Fujikoshi





TABLE 5.5.1

THE TOYOTA ENTERPRISE GROUP

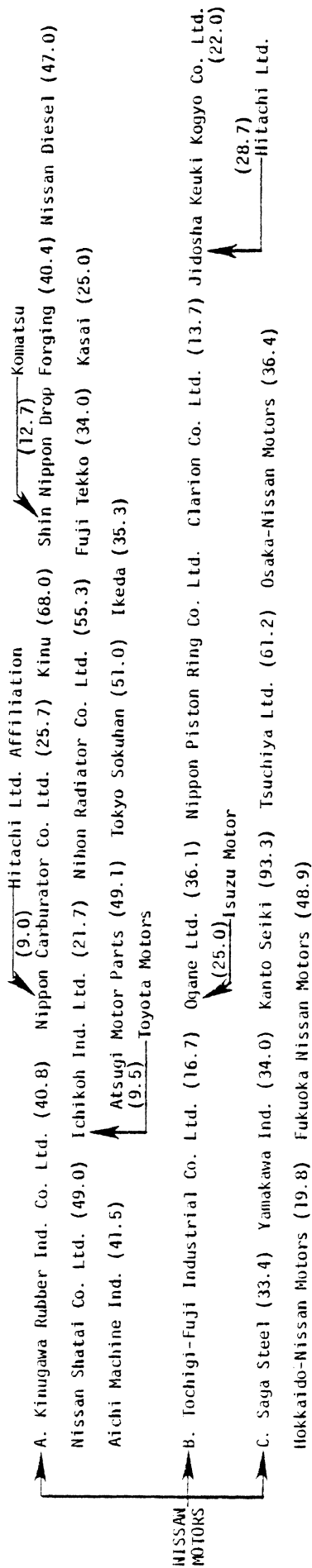


SOURCE: Sangyō dōkō chōsakai (Industrial Change Study Group), Nihon kigyō shūdan bunseki (Analysis of Japanese Enterprise Groups)

(Numbers in parentheses indicate share of equity held by assembler)

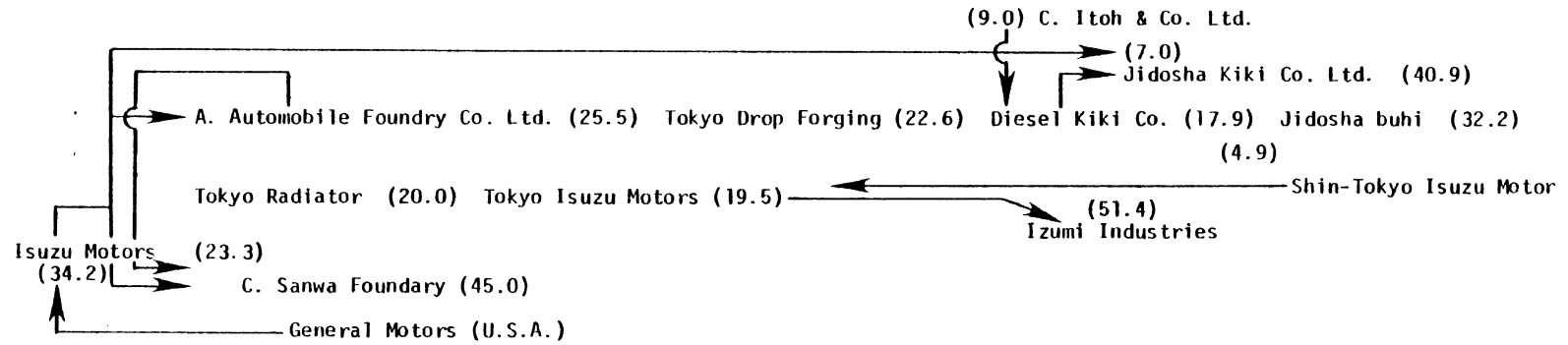
TABLE 5.5.2

THE NISSAN ENTERPRISE GROUP



SOURCE: Same as Table 5.5.1

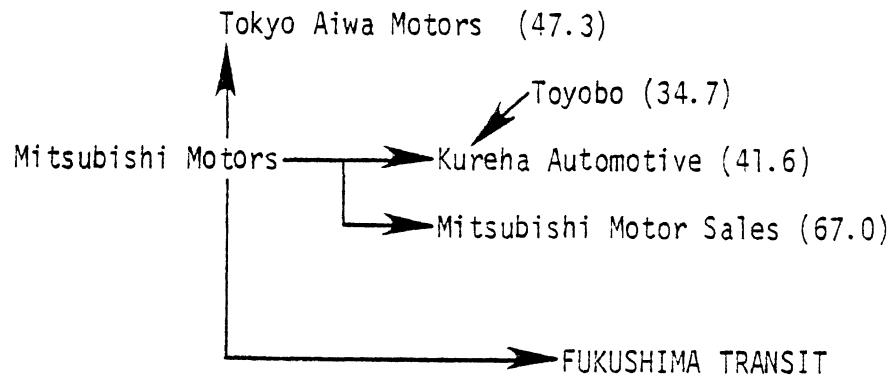
TABLE 5.5.3  
THE ISUZU ENTERPRISE GROUP



SOURCE: Same as Table 5.5.1

TABLE 5.5.4

THE MITSUBISHI MOTORS ENTERPRISE GROUP



---

SOURCE: Same as Table 5.5.1

TABLE 5.6.1.1.

FUJI HEAVY INDUSTRIES - Total Plant & Equipment

Fiscal Year: April 1 - March 31 (¥ Million) Fiscal Year 19xx ends in calendar year 19xx + 1 for FHI and all other auto assemblers

<u>YEAR</u>	<u>LAND</u>	<u>BUILDINGS</u>	<u>MACHINES</u>	<u>OTHERS</u>	<u>TOTAL</u>
1977-2 -1	15053	11428	16639	1413	49102
1976-2 -1	14389	11212	12359	1292	44254
1975-2 -1	13213	11065	11463	1288	40420
1974-2 -1	10686 10552	11736 12078	13072 12781	1311 1291	39800 39921
1973-2 -1	9933 8722	12224 10461	12572 10470	1342 1145	39367
1972-2 -1	7722 7001	10139 9589	10610 9345		32767 29501
1971-2 -1	6353 5884	9674 9527	9845 10055		29007 28771
1970-2 -1	3946	9151	10598		27149 26948
1969-2 -1	3503 3019	8773 8363	10045 9949		26234 25147
1968-2 -1	2749	7431	8725		21337 19591
1967-2 -1	2147	6135	6795		17559

5-39

SOURCE: Okurashō (Ministry of Finance)  
Yūka shoken hokokusho sōran (Overall Report for Negotiable Securities)

TABLE 5.6.1.2

FUJI HEAVY INDUSTRIES  
LAND & BUILDING AREA

<u>YEAR</u>	<u>LAND AREA</u>	<u>BUILDING</u>
1977-2	4,145 (thousand M <sup>2</sup> )	816 (thousand M <sup>2</sup> )
1976-2	4,150	816
1975-2	4,138	804
1974-2	4,105	787
1973-2	4,133	786
-1	4,174	784
1972-2	4,201	723
-1	4,201	708
1971-2	4,180	685
-1	4,157	676
1970-2	4,142	666
-1	4,075	659
1969-2	4,061	649
-1	3,965	614
1968-2	4,192	594
-1	4,071	563
1967-2	4,025	507
-1	3,970	508

TABLE 5.6.1.3

FUJI HEAVY INDUSTRIES  
LIST OF MACHINES (Units)

YEAR	MACHINE TOOL	INDUSTRIAL MACHINE	ELECTRIC MACHINE	TESTING MACHINE	MULTI-PURPOSE USE MACHINE	TOTAL
1977-2	2,348 (unit)	2,879	2,086	1,322	4,919	13,554
1976-2	2,247	2,624	1,782	1,457	4,574	12,684
1975-2	2,246	2,506	1,703	1,391	4,407	12,253
1974-2	2,262	2,423	1,683	1,382	4,293	12,043
1973-2	2,237	2,357	1,678	1,351	4,226	11,849
-1	2,466	2,568	1,956	1,437	4,411	12,838
1972-2	2,448	2,404	1,822	1,391	4,128	12,194
-1	2,518	2,303	1,764	1,378	4,000	11,963
1971-2	2,498	2,258	1,775	1,353	3,886	11,770
-1	2,524	2,256	1,854	1,352	3,935	11,921
1970-2	2,544	2,156	1,835	1,345	3,807	11,686
-1	2,536	2,075	1,812	1,312	3,720	11,455
1969-2	2,537	2,101	1,808	1,245	3,625	11,316
-1	2,529	2,053	1,756	1,196	3,567	11,101
1968-2	2,520	2,007	1,711	1,138	3,486	10,862
-1	2,429	1,893	1,674	1,087	3,195	10,278
1967-2	2,438	1,790	1,711	1,033	3,070	10,042
-1	2,367	1,738	1,661	990	2,943	9,699

TABLE 5.6.2.1

TOYOTA TOTAL PLANT & EQUIPMENT  
FISCAL YEAR: JULY 1 - JUNE 30 (¥ Million)

<u>Year</u>	<u>Buildings</u>	<u>Other Structures</u>	<u>Machines, etc.</u>	<u>Vehicles</u>	<u>Tools</u>	<u>Land</u>	<u>Total</u>
1977-2 -1	87666	18729	143594	2700	26244	74732	377797
1976-2 -1	67110	17151	104457	2274	19634	59871	307705
1975-2 -1	65796	15891	94888	1838	13992	27737	261626
1974-2 -1	70173	16832	118899	1474	16329	27708	287248
1973-2 -1	69915 63003	16421 15579	138964 119948	1647 1670	19004 21724	25899 25168	311835 265726
1972-2 -1	59612 57583	12906 10764	105794 90568	1590 1283	17474 12273	20603 20435	280231 200027
1971-2 -1	54351 55511	10031 9097	92512 107074	1125 1087	10610 9906	17567 17695	195121 204241
1970-2 -1	56817 56822	9354 9476	123927 128665	1177 1288	11813 12512	17495 17561	224228 232712
1969-2 -1	53522 50103	8240 7116	122924 82011	1342 1173	13106 10194	14403 14178	222646 173759
1968-2 -1	38424 36061	5913 5610	73957 68390	1049 951	8885 7827	9884 9721	148733 132829
1967-2 -1	34436 29984	5450 5364	61919 47869	922 884	7994 7473	8056 8090	123908 108049
1967-2 -1	25189 20737	4306 4163	35097 28599	851 686	7711 7892	7343 5321	87885 74570



TABLE 5.6.2.2

TOYOTA LAND & BUILDING AREA

<u>YEAR</u>	<u>LAND AREA</u> 74,732 (thousand m <sup>2</sup> )	<u>BUILDING AREA</u> 87,666 (thousand m <sup>2</sup> )
1977-2	59,671	67,110
1976-2	27,737	65,796
1975-2	27,708	70,178
1974-2	25,899	69,915
-1		
1973-2	25,168	63,003
-1	20,603	59,612
1972-2	20,435	57,583
-1	17,567	54,351
1971-2	17,695	55,511
-1	17,495	56,817
1970-2	10,947	2,909
-1	10,488	2,815
1969-2	10,317	2,730
-1	9,411	2,211
1968-2	9,139	2,065
-1	8,259	1,990
1967-2	8,314	1,770

TABLE 5.6.2.3

TOYOTA LIST OF MACHINERY (Units)

YEAR	METAL MACHINE TOOL	METAL PROCESSING	MACHINE WELDING	INDUSTRIAL MACHINE	PLANT'S SUPPLEMENTARY INSTALLATION	TOTAL
1977-2	14,881 (unit)	6,945	6,961	28,306	12,735	69,828
1976-2	14,770	6,774	6,276	27,550	11,939	67,309
1975-2	14,327	5,832	5,895	27,933	11,352	65,339
1974-2	14,047	5,450	6,485	26,429	10,418	62,829
-1	13,409	5,311	7,049	25,853	9,427	61,049
1973-2	13,411	5,231	7,016	24,914	7,945	58,517
-1	12,785	4,635	6,531	23,805	5,969	53,220
1972-2	12,453	4,355	5,996	21,547	4,906	49,257
-1	12,379	4,291	5,698	19,952	4,121	46,441
1971-2	12,464	4,138	5,619	19,228	3,175	44,624
-1	12,750	4,192	5,826	19,833	2,503	45,104
1970-2	12,500	4,066	5,848	21,780	1,819	46,013
-1	11,987	4,228	5,280	20,335	1,838	43,668
1969-2	10,678	3,403	4,911	18,236	1,703	38,931
-1	10,240	3,149	4,740	17,285	1,661	37,075
1968-2	9,789	2,806	4,490	16,519	1,805	35,409
-1	9,427	2,586	4,409	15,163	1,928	33,513
1967-2	8,890	2,278	4,153	14,404	1,963	31,688

TABLE 5.6.3.1

TOYO KOGYO  
FISCAL YEAR: May 1 - April 30 (¥ Million)

YEAR	LAND	BUILDING	MACHINE & EQUIPMENT	OTHERS	TOTAL	TOTAL INCLUDING CONSTRUCTION IN PROGRESS ACCOUNT
1977-2 -1	25300	41966	47783	24079	139068	Not available
1976-2 -1	29873	45545	49619	18153	143190	158944
1975-2 -1	29993	47310	55525	19501		166012
1974-2 -1	35039	51493	60848	18758	166138	183264
1973-2 -1	35530 31098	49193 44486	55448 46833	17964 17814	158135 140231	156408
1972-2 -1	30601 28166	43095 28645	39218 28012	16411 13428	129325 98251	129961
1971-2 -1	28401	34628	32684	13862	109575	101331
1970-2 -1	29162 29693	25517 26454	25119 26355	12949 13440	92748 95943	101179
1969-2 -1	29632 28983	27087 27053	27083 28009	13151 12930	96952 96974	102837
1968-2 -1	28292 26526	27014 22347	27548 23045	13863 11416	96717 89539	
1967-2 -1	24107 19554	22347 20228	23045 18488	11416 10436	80915 68707	

TABLE 5.6.3.2

TOYO KOGYO  
LAND & BUILDING AREAS

<u>YEAR</u>	<u>LAND AREA</u> 5,668 (thousand m <sup>2</sup> )	<u>BUILDING AREA</u> 2,232 (thousand m <sup>2</sup> )
1977-2	5,886	2,294
1976-2	5,904	2,280
1975-2	5,851	2,392
1974-2	5,865	2,356
-1	4,959	2,189
1973-2	4,919	2,151
-1	4,458	1,508
1972-2	4,440	1,776
-1		

TABLE 5.6.3.3

TOYO KOGYO  
LIST OF MACHINERY (Units)

YEAR	LATHE	DRILLING	BORING	MILLING	PLANING	GRINDING	GEAR-CUTTING AND GEAR FINISHING	UNIT STYLE SPECIAL PURPOSE	OTHERS	TOTAL
1977-2	1,040 (unit)	592	230	522	5	1,237	527	827	352	5,332 (unit)
1976-2	1,059	593	231	529	5	1,244	530	850	352	5,393
1975-2	1,091	601	232	544	6	1,256	535	858	368	5,491
1974-2	1,101	602	233	546	6	1,257	539	857	372	5,513
1974-1	1,109	604	234	548	6	1,242	536	840	371	5,490
1973-2	1,105	608	233	552	7	1,183	531	802	374	5,395
1973-1	1,111	607	230	533	7	1,124	523	728	364	5,227
1972-2	1,103	568	227	531	7	1,077	498	732	399	5,142
1972-1	1,124	568	227	534	7	1,119	511	736	407	5,233

TABLE 5.6.3.4

TOYO KOGYO  
LIST OF SECONDARY PROCESSING MACHINERY (Units)

YEAR	PRESS MACHINES	SHEARING MACHINES	FORGING MACHINES	WELDING MACHINES	OTHERS	TOTAL
1977-2	385 (unit)	39	21	3,090	222	3,757
1976-2	387	40	21	2,455	222	3,125
1975-2	390	41	22	2,467	222	3,142
1974-2	399	41	22	2,426	217	3,105
1974-1	400	43	22	2,302	208	2,975
1973-2	390	44	23	2,246	180	2,883
1973-1	381	44	31	2,162	177	2,795
1972-2	373	44	24	1,916	158	2,515
1972-1	380	44	24	2,071	186	2,705

TABLE 5.6.3.5  
 TOYO KOGYO  
 LIST OF OTHER MACHINES (Units)

YEAR	WOOD WORKING MACHINES	TEST MACHINES	WORK TRANSPORTATION MACHINERY	CASTING & HEAT TREATMENT FACILITIES	POWER SUPPLY FACILITIES	TOTAL
1977-2	38 (unit)	4,834	8,390	2,204	5,551	21,037
1976-2	58	4,230	6,077	1,927	5,566	17,858
1975-2	58	4,268	5,993	1,921	5,579	17,819
1974-2	58	4,170	5,502	1,559	5,520	16,809
1974-1	58	4,158	3,474	1,509	5,341	14,540
1973-2	58	4,066	3,260	1,454	5,043	13,881
1973-1	55	3,824	3,103	1,421	4,830	13,233
1972-2	56	3,543	2,733	959	4,834	12,125
1972-1	56	3,619	2,951	1,340	4,777	12,740

Table 5.6.4.1. Total Plant and Equipment  
Nissan Diesel  
Fiscal Year: April 1 - March 31 (¥ Million)

<u>Year</u>	<u>Land</u>	<u>Buildings</u>	<u>Machines</u>	<u>Others</u>	<u>Total</u>
1977-2 -1	4510	13258	16552	3001	37321
1976-2 -1	4313	12809	16439	3029	36590
1975-2 -1	4286	12237	16755	3104	36382
1974-2 -1	4292 3777	11838 10100	14991 13737	2849 2362	33970 29976
1973-2 -1	3306 2910	9133 7019	12416 11043	2107 1676	26962 22648
1972-2 -1	2436 1999	6761 6945	11867 12648	1750 1837	22815 23428
1971-2 -1	1851 1660	6609 5958	12431 1776	1938 1961	22829 19355
1970-2 -1	1391 1054	5794 4546	9006 8094	1764 1605	17955 15299
1969-2 -1	1025 933	4140 3937	7623 7078	1549 1530	14337 13477
1968-2 -1	699 536	3492 3169	5937 5201	1260 1173	11387 10079
1967-2 -1	434 448	2483 2554	3927 3065	1129 1071	7973 7139



Table 5.6.4.2. Land Areas and Building Area  
Nissan Diesel

Year	Land Areas (Thousand m <sup>2</sup> )	Building Area (Thousand m <sup>2</sup> )
1977-2	925	373
1976-2	915	358
1975-2	880	349
1974-2	875	339
1973-2	851	317
-1	789	364
1972-2	764	331
-1	752	330
1971-2	717	331
-1	715	257
1970-2	708	230
-1	709	232
1969-2	626	209
-1	616	198
1968-2	622	200
-1	603	190
1967-2	559	184
-1	559	181

Table 5.6.4.3. List of Machinery (Units)

Nissan Diesel

Year	Lathes	Drilling Machines and Threading Machines	Boring Machines	Milling Machines	Grinding Machines and Lapping Machines	Gear- Cutting Machines	Other Machine Tools
1977-2	373	561	171	292	377	169	259
1976-2	374	563	169	284	367	170	249
1975-2	363	567	174	286	365	169	237
1974-2	361	558	174	288	358	165	235
-1	394	560	194	294	355	163	181
1973-2	349	538	174	286	341	157	227
-1	346	537	174	286	339	151	233
1972-2	361	536	173	283	345	154	202
-1	369	542	175	283	348	157	200
1971-2	371	526	165	283	364	169	147
-1	355	517	160	230	324	141	221
1970-2	347	501	154	268	318	132	160
-1	373	529	149	273	310	134	158
1969-2	367	508	146	264	294	119	155
-1	352	482	141	256	283	106	146
1968-2	340	455	126	242	279	94	139
-1	319	445	111	237	260	91	120
1967-2	301	397	101	214	236	81	106
-1	275	355	87	198	236	72	91

Table 5.6.4.3. (Cont.)

## Nissan Diesel

Year	Press and Shearing Machinery	Woodworking Machinery	Welding Machinery	Test Machinery	Other Industrial Machinery
1977-2	202		486	129	306
1976-2	195		445	124	290
1975-2	194		452	115	277
1974-2	188		432	110	272
-1	170		387	106	271
1973-2	159		377	102	268
-1	149		315	97	271
1972-2	149		262	97	339
-1	148		270	93	351
1971-2	148		268	93	354
-1	141		257	90	323
1970-2	131		259	89	319
-1	131		196	78	303
1969-2	130		190	83	280
-1	123		187	65	301
1968-2	113		179	78	260
-1	101		165	61	208
1967-2	93		158	51	218
-1	76		153	59	208

Table 5.6.4.3. (Cont.)  
Nissan Diesel

Year	Crane Installations	Furnace-Related Installations	Supply Installations	Other Installations
1977-2	1,433		259	2,777
1976-2	1,387		254	2,674
1975-2	1,356		254	2,602
1974-2	1,311		245	2,498
-1	1,247		249	2,490
1973-2	1,168		243	2,319
-1	1,098		219	2,246
1972-2	1,042		228	2,223
-1	1,100		231	2,092
1971-2	1,067		228	2,092
-1	987		210	1,812
1970-2	955		174	1,724
-1	869		155	1,577
1969-2	788		144	1,418
-1	813		136	1,379
1968-2	700		134	1,011
-1	645		125	561
1967-2	563		84	738
-1	462		85	662

Table 5.6.5.1. Total Plant and Equipment  
Isuzu Automobile  
Fiscal Year: May 1 - April 30 (¥ Million)

Year	Land	Buildings	Machines	Others	Total
1977-2	21229	19971	27926	6778	75904
1976-2	19490	20259	31248	8381	79378
1975-2	18837	21280	32353	10818	83288
1974-2	18302	19486	29732	11301	78821
1973-2	18393	16508	23839	6991	65731
-1	15449	15959	23260	7148	61816
1972-2	15084	15031	20817	6630	57562
-1	15016	14854	20840	5894	56604
1971-2	15089	14060	18947	5931	54027
-1	13795	13707	19072	6253	52827
1970-2	13189	13873	18253	6802	52117
-1	13537	13809	18863	7186	53396
1969-2	11531	13084	17172	6718	48504
-1	9284	12663	15423	6707	44077
1968-2	8579	12106	14462	7067	42215
-1	7520	11284	13009	6781	38594
1967-2	6818	10735	11825	5955	35333
-1	6268	8923	11041	5684	31915

Table 5.6.5.2. Land and Building Area  
Isuzu Automobile

Year	Land Area (Thousand m <sup>2</sup> )	Building Area (Thousand m <sup>2</sup> )
1977-2	7,229	1,145
1976-2	7,216	1,130
1975-2	6,794	1,112
1974-2	6,795	1,085
-1	6,801	1,028
1973-2	3,436	1,013
-1	3,343	970
1972-2	3,315	961
-1	3,284	893
1971-2	3,254	855
-1	3,244	831
1970-2	3,269	837
-1	3,238	803
1969-2	2,205	778
-1	2,187	749
1968-2	2,175	682
-1	2,107	653
1967-2	2,068	617
-1	2,000	573

Table 5.6.5.3. List of Machinery (Units)

## Isuzu Automobile

Year	Boring Machines	Broaching Machines	Drilling Machines	Hobbing Machines	Polishing Machines	Lathes	Milling Machines	Other Machines
1977-2	451	46	946	583	944	852	590	454
1976-2	461	46	1,000	590	969	898	602	466
1975-2	403	45	1,007	581	982	905	605	474
1974-2	444	43	981	563	935	884	751	446
-1	433	40	958	550	914	847	579	413
1973-2	419	39	957	529	896	833	578	401
-1	420	38	945	529	883	826	569	387
1972-2	421	37	988	530	901	830	589	395
-1	402	35	969	511	868	796	551	367
1971-2	395	34	960	511	870	788	575	363
-1	393	34	962	512	866	784	579	360
1970-2	384	34	944	499	852	749	567	352
-1	354	34	885	476	820	741	535	329
1969-2	315	29	843	453	796	711	493	300
-1	295	27	807	447	770	695	491	287
1968-2	299	26	791	431	744	669	464	272
-1	294	24	777	396	723	646	464	271
1967-2	290	24	765	375	695	648	457	260
-1	269	25	725	347	666	654	441	241

Table 5.6.6.1. Total Plant and Equipment  
Honda  
Fiscal Year: March 1 - End of February (¥ Million)

Year	Land	Buildings	Machines	Tools	Others	Total
1977-2	29167	102209				150741
1976-2	26255	34695	41475	4727	18724	125876
1975-2	24108	33669	35416	4426	11757	109376
1974-2	22223	24955	31179	5268	11444	95069
-1	21193	24422	25716	4390	10841	86562
1973-2	20773	23133	23917	4904	9273	82000
-1	19208	21071	18880	4336	7954	71449
1972-2	17441	21023	20722	5039	4336	68561
-1	16064	21153	21128	6511	5162	69118
1971-2	14782	21060	22217	5103	6159	69321
-1	14356	21181	23434	5687	6386	71043
1970-2	13967	20325	21675	4959	8261	69187
-1	13641	19185	20262	4278	7725	64991
1969-2	12504	18648	20038	3914	7194	62298
-1	12298	17647	17208	3826	8785	59764
1968-2	10349	15171	16354	3032	8210	53116
-1	8977	14974	16400	2246	5191	
1967-2	8210	13704	13252	2967	9709	47841
-1	7230	10430				33721

The Construction in Progress Account is included in the accounts of Buildings, Machines, Tools and Others. The Total includes the Construction in Progress Account.



Table 5.6.6.2. Land Area and Building Area  
Honda

Year	Land Area (Thousand m <sup>2</sup> )	Building Area (Thousand m <sup>2</sup> )
1977-2		
1976-2	5,707	1,084
1975-2	5,615	1,055
1974-2	4,487	904
-1	4,420	868
1973-2	3,015	873
-1	2,931	848
1972-2	2,876	753
-1	2,846	744
1971-2	3,953	828
-1	3,911	805
1970-2	3,885	776
-1	3,861	750
1969-2	3,746	703
-1	3,727	689
1968-2	3,553	657
-1	3,544	640
1967-2	3,297	605
-1	3,062	473

Table 5.6.6.3. List of Machinery [Production Installation](Units)

Year	Honda						
	Foundry and Forging Shell Equipment	Heat Treatment Installation	Coating Installation	Metal Surface Treatment Installation	Assembly Installation	Conveyance and Lifting Machines	Others
1977							
1976-2	310	234	450	75	497	1097	970
1975-2	267	231	383	111	472	985	794
1974-2	213	342	375	198	438	906	579
-1	276	340	345	199	385	835	533
1973-2	291	283	207	194	399	849	501
-1	290	313	143	151	392	786	490
1972-2	290	304	317	135	415	951	690
-1	292	231	311	127	455	961	690
1971-2	324	234	343	124	463	977	712
-1	329	239	357	121	466	946	718
1970-2	318	208	346	120	395	912	717
-1	284	219	331	122	372	889	718
1969-2	273	217	338	125	398	863	754
-1	263	196	333	119	413	814	743
1968-2	272	254	307	115	350	685	594
-1	241	259	Not Available	109	356	625	Not Available
1967-2	144	310	356	173	316	600	801
-1	115	276	360	156	270	403	509

Table 5.6.6.3 List of Machinery [Machine Tools] (Units)  
Honda

Year	Special Use Machines	Lathes	Drilling and Boring Machines	Milling Machines	Gear-Cutting Machines	Grinding Machines	Misc. Machines	Press, Foundry, Forging Machines	Plastic Processing Machines	Welding Machines	Others
1977											
1976-2	1,127	306	640	271	427	592	194	415	32	1,810	710
1975-2	1,052	333	651	275	426	590	190	402	64	1,682	663
1974-2	1,057	333	668	248	440	568	171	371	70	1,443	642
-1	1,027	322	724	250	428	561	184	358	67	1,583	632
1973-2	998	345	794	259	437	526	162	380	33	1,613	467
-1	953	323	760	268	437	535	185	372	21	1,574	445
1972-2	923	324	757	269	439	539	185	371	21	1,589	423
-1	899	327	766	272	433	537	178	373	24	1,484	401
1971-2	950	344	767	269	437	546	307	378	24	1,495	412
-1	1,029	351	835	276	440	578	309	394	11	1,489	382
1970-2	978	354	832	279	435	548	278	360	22	1,441	370
-1	974	354	831	280	422	538	282	370	22	1,349	322
1969-2	913	366	815	281	402	537	270	366	21	1,258	313
-1	772	325	757	261	355	502	259	332	24	1,168	208
1968-2	725	308	667	242	330	489	317	311	20	1,038	221
-1	738	311	583	242	324	486	351	322	20	1,184	345
1967-2	678	254	540	222	332	459	119	301	27	1,178	353
-1	584	235	634	231	322	451	149	272	21	921	323

Table 5.6.7.1. Total Plant and Equipment  
Nissan Automobile  
Fiscal Year: April 1 - March 31 (¥ Million)

Year	Land	Building	Machines & Equipment	Tools	Total
1977-2	62567	99257	117928	21426	347376
1976-2	60453	96687	89806	22484	309952
1975-2	56049	85746	77732	18282	271040
1974-2	53002	86018	89561	16176	280480
-1	45057	80899	91538	18621	280914
1973-2	44544	78249	89383	18084	267878
-1	36974	76383	83266	16694	245351
1972-2	35057	72604	79000	17317	227599
-1	33737	68596	74174	16587	213747
1971-2	31597	65227	76801	15290	208954
-1	26792	65764	77548	15271	204929
1970-2	23981	62553	74091	12207	197717
-1	21546	53936	60611	10204	170167
1969-2	16172	50582	58200	9321	155255
-1	16132	43625	50770	7141	135457
1968-2	15627	42588	47513	7294	128358
-1	13380	40941	41219	8146	119672
1967-2	12749	35305	31381	6639	100542
-1	11163	26780	27486	6200	83577

Note: The Construction in Progress Account is included implicitly in the accounts of Building, Machines, Tools and Others.

Table 5.6.7.2. Land and Building Area  
Nissan Automobile

Year	Land Area (Thousand m <sup>2</sup> )	Building Area (Thousand m <sup>2</sup> )
1977-2	11,533	5,017
1976-2	11,520	4,878
1975-2	11,240	4,473
1974-2	11,144	4,656
-1	9,671	4,487
1973-2	9,678	4,157
-1	9,535	4,112
1972-2	9,438	3,918
-1	9,389	3,692
1971-2	9,294	3,517
-1	8,966	3,497
1970-2	8,759	3,280
-1	8,519	2,957
1969-2	8,012	2,735
-1	8,065	2,534
1968-2	7,925	2,504
-1	7,684	2,415
1967-2	7,604	2,389
-1	7,402	1,929

Table 5.6.7.3 List of Machines (Units)  
Nissan Automobile

Year	Metal Cutting Machines	Metal Machine Tools	General Processing Machines	Testing Machines	Power Machines	Supply Equipment	Engineering Equipment	Conveyance Equipment	Supplementary Machines	Total
1977-2	8,979	6,829	1,144	2,690	2,450	4,916	4,746	13,043	39	47,692
1976-2	8,850	6,418	1,072	2,499	4,937	5,212	4,578	12,166	444	46,176
1975-2	8,875	6,046	1,033	2,329	4,850	4,931	4,193	11,654	349	44,260
1974-2	8,949	5,997	939	2,225	4,752	4,816	4,046	11,238	339	43,301
-1	8,924	6,018	945	2,190	4,769	4,753	4,015	11,045	288	42,947
1973-2	8,875	5,794	937	2,088	4,697	4,710	3,966	10,733	292	42,002
-1	8,520	5,819	911	2,013	4,588	4,513	3,805	10,308	290	40,767
1972-2	8,417	5,700	880	1,904	4,572	4,441	3,657	10,292	302	40,165
-1	8,378	5,545	817	1,852	4,463	4,310	3,489	9,870	305	39,029
1971-2	8,894	5,404	797	1,757	4,349	4,362	3,424	9,439	368	38,794
-1	9,339	5,508	790	1,714	4,351	4,189	3,467	9,070	297	38,725
1970-2	10,243	5,954	937	2,220	4,927	5,476	3,616	10,337	576	44,286
-1	10,000	5,538	806	2,068	4,648	5,334	3,318	9,536	741	41,989
1969-2	9,858	5,628	740	1,986	4,535	5,181	3,122	9,238	552	40,840
-1	9,555	5,381	695	1,903	4,330	4,938	2,973	8,982	523	39,280
1968-2	9,286	5,202	649	1,830	4,241	4,805	2,892	8,849	506	38,260
-1	9,017	5,013	637	1,750	4,094	4,634	2,704	8,457	466	36,772
1967-2	8,525	4,615	574	1,642	3,712	4,265	2,496	7,736	443	34,008
-1	8,322	4,335	533	1,556	3,452	3,985	2,468	7,439	425	32,515

Table 5.6.8.1. Total Plant and Equipment  
 Daihatsu Kogyo  
 Fiscal Year: Jan. 1 - Dec. 31 (¥ Million)

Year	Land	Buildings	Machines	Other Equipment	Total
1978-2	8199	11083	18794	7218	45294
1977-2	8153	9852	17475	5188	40668
1976-2	8257	11658	13752	3627	37294
1975-2	8132	11249	14926	3831	38138
1974-2	7856	10229	14731	4685	37501
1973-2	7734	9669	11641	3975	33019
-1	7438	9201	11578	4622	32839
1972-2	6982	9298	12292	4120	32692
-1	7142	8468	10808	1866	28284
1971-2	6843	8382	11057	1852	28134
-1	7133	8192	10407	1781	27513
1970-2	7234	7677	9711	1733	26355
-1	6140	6631	6074	1450	20294
1969-2	5621	6612	5876	1375	19484
-1	5638	6246	4375	1264	17523
1968-2	5593	6290	4295	1270	17448
-1	5527	6142	4352	1183	17204
1967-2	4549	5524	3249	1133	14455
-1	3619	4805	2068	1037	11529

Table 5.6.8.2. Land Area and Building Area  
Daihatsu Kogyo

Year	Land Area (Thousand m <sup>2</sup> )	Building Area (Thousand m <sup>2</sup> )
1978-2	2,866	669
1977-2	2,892	632
1976-2	2,958	662
1975-2	2,932	661
1974-2	2,906	641
-1	2,905	636
1973-2	2,902	607
-1	2,851	608
1972-2	2,871	580
-1	2,858	571
1971-2	2,993	569
-1	3,115	561
1970-2	3,224	475
-1	2,626	465
1969-2	2,641	458
-1	2,641	651
1968-2	2,647	483
-1	2,544	401
1967-2	2,483	373
-1	2,421	366



Table 5.6.8.3 List of Machinery (Units)  
Daihatsu Kogyo

Year	Lathes	Milling Machines	Drilling Machines	Grinding Machines	Others	Sub-Total	2000-Ton Press and Other Metal Processing Installations
1978-2						3,239	538
1977-2						3,065	507
1976-2						2,828	500
1975-2	762	295	557	476	887	2,977	511
1974-2	759	272	500	468	726	2,725	464
-1	712	268	479	460	822	2,741	439
1973-2	714	264	449	454	803	2,684	434
-1	718	257	459	457	805	2,696	465
1972-2	717	256	456	455	754	2,638	395
-1	725	258	430	444	752	2,609	341
1971-2	721	247	421	432	740	2,561	324
-1	709	241	425	432	733	2,540	347
1970-2	342	185	310	298	426	1,561	256
-1	335	185	303	284	424	1,531	231
1969-2	321	185	313	278	377	1,474	210
-1	313	182	311	275	373	1,454	202
1968-2	311	169	291	269	367	1,407	209
-1	295	183	287	258	345	1,368	193
1967-2	287	177	282	256	345	1,347	
-1	281	179	286	255	340	1,341	

Table 5.6.8.3 (Cont.)

Year	Casting Machines and Other Foundry Installations	Conveyor & Other Transportation Installations	Continuous Carbonization Furnace & Other Heat Treatment Installations	Electric Coating & Other Industrial Machines	Sub-Total of Industrial Machines
1978-2					5,792
1977-2					5,603
1976-2					5,797
1975-2	306	2,356	158	2,270	
1974-2	316	2,380	170	2,349	
-1	309	2,350	177	2,277	
1973-2	311	2,312	172	2,223	
-1	308	2,230	134	2,164	
1972-2	311	1,826	137	1,873	
-1	302	1,669	128	1,668	
1971-2	270	1,590	125	1,600	
-1	277	1,574	142	1,645	
1970-2	275	1,239	111	1,418	
-1	275	1,241	112	1,270	
1969-2	238	1,107	98	1,257	
-1	240	1,056	91	1,236	
1968-2	281	974	88	1,175	
-1	269	957	94	1,144	
1967-2					2,474
-1					2,538

Table 5.6.8.3. (Cont.)

Year	Welding Machines	Plant Supplementary Installations
1978-2	4,226	1,748
1977-2	4,167	1,701
1976-2	3,939	1,726
Electrical Machines: Welding, Transformer and Others		
1975-2	5,441	
1974-2	5,463	
-1	4,719	
1973-2	4,578	
-1	4,456	No Category of This from 4/68 to 6/75
1972-2	3,780	
-1	3,485	
1971-2	3,448	
-1	3,613	
1970-2	2,775	
-1	2,542	
1969-2	2,416	
-1	2,408	
1968-2	2,458	
-1	2,274	
1967-2	2,367	
-1	2,324	

Table 5.6.9.1 Total Plant and Equipment  
Suzuki Automobile Company  
Fiscal Year: April 1 - March 31 (¥ Million)

Year	Land	Buildings	Other Structures	Machinery & Equipment	Vehicles	Tools	Total	Construction In Progress	Total Incl. C.I.P.
1977-2	10482	9579	1428	15507	191	2961	40148	Not Available	Not Available
1976-2	10390	9393	1477	13881	143	2567	37851	396	38246
1975-2	10294	9774	1577	11421	122	1599	34787	206	34973
1974-2	10104	10432	1650	12778	152	2033	37149	496	37401
-1	9601	10191	1651	11975	133	2183	25734		
1973-2	8524	10077	1600	10826	138	2658	33724	Not Available	35437
-1	8118	9556	1490	10420	142	2919	32745		
1972-2	7511	9003	1308	9067	96	2201	29136	Not Available	30738
1971-2	7401	9140	1309	9524	89	2092	29555	Not Available	29749
-1	6051	8237	1153	9717	106	2037	27303		
1970-2	5502	7934	1161	10042	129	1677	26445	Not Available	26790
-1	4481	6734	620	7625	146	2050	21656		
1969-2	3525	4874	605	5888	162	1304	16359	Not Available	17190
-1	3087	3982	447	5072	124	1066	13777		
1968-2	2448	3180	416	4438	119	1161	11762	Not Available	Not Available
-1	2107	2749	424	3173			9403		
1967-2	1955	2450	394	2397	117		7924	Not Available	Not Available
-1	1691	2150	372	2268	139	620	7239		

Table 5.6.9.2. Land and Building Area  
Suzuki Automobile Company

Year	Land Area (Thousand m <sup>2</sup> )	Building Area (Thousand m <sup>2</sup> )
1977-2	2,518	628
1976-2	2,533	620
1975-2	2,533	616
1974-2	2,476	601
-1	2,398	559
1973-2	1,904	544
-1	1,893	528
1972-2	1,860	526
-1	1,847	522
1971-2	1,831	530
-1	1,591	460
1970-2	1,557	457
-1	1,680	414
1969-2	1,637	340
-1	1,389	284
1968-2	790	251
-1	686	226
1967-2	674	215
-1	653	198

Table 5.6.9.3 List of Machinery (Units)

Suzuki Automobile Company

Year	Lathes	Drilling Machine	Boring Machine	Milling Machine	Planing Machine	Grinding Machine	Gear-Cutting Machine	Shaping Machine	Slotting Machine	Metal Cut. & Sawing Machine	Hole-Making Machine	Broach. Machine
1977-2	348		298	181		300	214				422	
1976-2	312		290	170		282	200				412	
1975-2	307		242	156		247	193				377	
1974-2	350		238	169		267	196				398	
-1	329		226	159		261	187				367	
1973-2	319		216	154		256	174				401	
-1	355		216	162		267	180				429	
1972-2	346		207	161		258	176				424	
-1	342		202	158		252	172				412	
1971-2	346		198	158		252	172				434	
-1	336		177	132		230	172				404	
1970-2	317		175	127	7	209	171				395	12
-1	290	395	159	121	6	187	166					11
1969-2	272	358	160	112	6	166	154					10
-1	258	333	147	109	6	150	144					10
1968-2	226	327	136	107	6	133	119					9
-1	205	297	122	101	6	125	107					6
1967-2	177	285	102	93	6	125	93	1	2	17		
-1	174	277	101	87	6	122	83	1	2	11		

Table 5.6.9.3 (Cont.)

Year	Plastic Processing Machinery	Welding Machines	Foundry Machinery	Furnace Installation	Coating Installation	Chemical Machinery & Installation	Work Transportation & Lifting	Wood Working Machines
1977-2	345	859	148	141	120	146	703	
1976-2	352	970	155	131	134	172	759	
1975-2	344	992	162	131	145	159	821	
1974-2	354	997	163	137	145	151	617	
-1	342	988	134	134	148	144	804	
1973-2	338	1,011	117	118	143	141	793	
-1	331	977	114	117	139	139	780	
1972-2	328	871	107	110	118	138	741	
-1	316	862	106	96	118	133	719	
1971-2	313	794	103	94	109	122	711	
-1	262	500	82	82	101	104	561	
1970-2	255	467	87	82	93	13	555	15
-1	232	430	81	74	65	9	371	15
1969-2	199	321	74	62	61	9	307	15
-1	181	257	58	57	53	5	265	15
1968-2	160	233	56	53	55	5	252	14
-1	147	225	65	53	44	3	173	14
1967-2		167	75	48	50		148	14
-1		158	72	44	49		140	14

Table 5.6.9.3 (Cont.)

Year	Forging Machines	Press & Shearing Machines	Assembly Installation	Test & Research Installation	Power Installation	Electric Machinery Installation	Pump Compressor & Fan	Chemical & Metal Surface Treatment Installation	Freez. & Air- Conditioning Installation
1977-2				495		442			
1976-2				441		476			
1975-2				411		496			
1974-2				391		490			
-1				381		485			
1973-2				365		483			
-1				353		475			
1972-2				332		455			
-1				309		437			
1971-2				291		436			
-1				255		368			
1970-2				235		337	91	69	24
-1				188		326	76	49	23
1969-2				181		311	66	47	15
-1				163		285	68	36	12
1968-2				160		276	72	34	11
-1				163		275	74	34	10
1967-2	15	88	114	422	123			24	
-1	13	87	105	406	123			22	



Table 5.6.10.1 Total Plant and Equipment  
Hino  
Fiscal Year: April 1 - March 31 (¥ Million)

Year	Land	Building	Other Structures	Vehicles	Tools	Construction In Progress	Total
1977-2 -1	4470	10319	2118	658	2489	Not Available	37993 (N.A.)
1976-2 -1	4472	9730	2090	494	2432	1303	35982 (37286)
1975-2 -1	3599	10021	1740	438	2786	3449	34062 (37486)
1974-2 -1	3370 3370	9982 9687	1698 2470	440 378	3599 3109	2994 3686	38918 36118
1973-2 -1	3370 1224	9121 8702	1480 1434	352 355	2590 2321	3384 2148	33198 28255
1972-2 -1	1224 1224	7669 7369	1348 1318	377 369	2292 2581	1808 1086	26091 25923
1971-2 -1	1224 1024	7402 7463	1300 1348	359 397	1948 2046	2329 1637	26626 26650
1970-2 -1	1024 1024	6922 6938	1371 907	445 340	1867 2112	1951 1679	26287 23928
1969-2 -1	982 1011	5051 4882	800 763	354 260	2437 2852	1507 992	21014 20051
1968-2 -1	1001 1001	4630 4355	683 630	230 185	2867 2799	796 1191	18224 16934
1967-2 -1	1158 1201	4096 3033	541 398	206 228	2019 1235	1189 950	15049 11360

Note: Totals up to 1974 include the Construction in Progress, but totals for 1975-8 do not include C.I.P. Figures in parentheses are totals including the C.I.P. Account.

Table 5.6.10.2. Land and Building Area  
Hino

Year	Land Area (Thousand m <sup>2</sup> )	Building Area (Thousand m <sup>2</sup> )
1977-2	4,470	10,319
1976-2	4,472	9,730
1975-2	3,599	10,021
1974-2	3,370	9,982
-1	1,613	464
1973-2	1,613	452
-1	1,220	443
1972-2	1,220	419
-1	1,220	415
1971-2	1,220	413
-1	1,217	409
1970-2	1,217	396
-1	1,217	392
1969-2	1,216	359
-1	1,217	348
1968-2	1,217	333
-1	1,219	324
1967-2	1,220	314
-1	1,221	267

Table 5.6.10.3 List of Machinery (Units)

Hino

Year	Lathes	Drilling Machines	Milling Machines	Grinding Machines	Shaping Machines	Gear Cutting Machines	Boring Machines	Sawing Machines	Other Cutting Machines	Non-Cutting Machines	Welding Machines	Furnace	Testing Machines	Others
1977-2	900	1,324	524	493	77	392	297	54	187	391	770	72	275	5,775
1976-2	966	1,360	529	487	80	425	296	53	195	391	695	76	294	5,588
1975-2	957	1,326	521	480	81	406	287	52	185	373	686	77	297	5,511
1974-2	931	1,300	511	475	74	413	265	57	181	375	694	87	281	5,524
-1	902	1,230	508	456	71	391	252	56	159	363	691	88	281	5,283
1973-2	893	1,255	513	477	72	379	249	63	147	356	788	89	298	5,514
-1	837	1,249	519	467	69	372	246	59	144	341	713	90	305	5,260
1972-2	805	1,232	504	455	63	346	248	55	118	317	714	91	357	4,960
-1	811	1,246	511	458	63	346	253	54	111	312	712	94	357	4,821
1971-2	834	1,220	508	451	62	344	240	53	108	297	688	97	353	4,629
-1	828	1,196	504	434	61	344	235	53	103	290	643	97	349	4,397
1970-2	818	1,185	500	426	59	338	230	52	103	272	636	97	601	4,012
-1	767	1,050	439	401	59	326	211	51	99	242	622	100	339	3,988
1969-2	746	1,011	427	388	59	305	204	48	97	224	592	100	321	3,602
-1	724	972	418	374	51	286	194	47	92	210	553	101	312	3,244
1968-2	661	900	382	349	54	246	185	41	87	186	531	104	294	2,978
-1	632	828	344	329	50	226	178	38	84	153	502	105	280	2,633
1967-2	598	755	324	314	46	200	168	38	81	142	475	103	262	2,370
-1	554	720	311	300	26	182	170	37	81	135	409	102	257	2,050



## 6. RESEARCH AND DEVELOPMENT EXPENDITURE SERIES FOR THE JAPANESE AUTOMOBILE INDUSTRY

Table 5.1 already contains a series on industry investment in research and testing facilities disaggregated by assemblers, body manufacturers and parts manufacturers.<sup>1</sup> These series indicate that eighty-five to ninety percent of the investment in research and development in the Japanese automobile industry is being done by the assemblers.

Tables 6.1 through 6.20 present a finely detailed series of research and developments in the automobile industry taken from the Bureau of Statistics Survey of Research and Development. As can be seen from these tables, virtually all the information which is collected in this survey is available to the public, though not at the individual firm level.

Tables 6.1 through 6.20 reinforce earlier impressions of the organization of research and development in the Japanese automobile industry. Not only the bulk investment in research and development facilities, but also the bulk of all research and development expenditures has been made by the large assemblers. This research and development work has been mostly done by the assemblers in their own facilities with their own financing. During the last ten years only five to seven percent of all Japanese automobile research and development has been conducted by outside contractors. Moreover, during this same period, no more than one to two percent of all research and development conducted by the Japanese automobile industry has been financed by contracts, grants or explicit subsidy.

If the financing of most Japanese automotive research and development is clear, what is less clear is the character of research and development actually done and the overall intensity of the research and development effort. By comparison with the norm in all Japanese industries in general and Japanese manufacturing industries in particular, the Japanese automobile industry devotes a relatively small share of its research and development effort to basic and applied research. Eighty-five percent of its research and development expenditures are for developmental research. Moreover, in recent years the Japanese automobile assemblers have devoted a relatively smaller proportion of their effort on applied research than have the parts suppliers in the industry. Again, depending on whether automobile firms are grouped

---

1. Cf ante, page 5-3

according to the size of their labor force, the amount of their capitalization, the number of their research personnel, the amount of their operating profits on their sales, the largest firms may or may not be making the greatest research and development effort per available resources in the industry. For some, but not all, size classifications, the greatest research and development effort seems to be made by the larger parts suppliers. Finally, despite the world-wide prominence of the Japanese automobile industry it has remained a net importer of automotive technology. The industry continues to import over \$40 million of technology each year. This is almost twice what it exports in automotive technology. This imbalance, of course, is unlikely to persist. If only new contracts signed in fiscal year 1977 as opposed to contingency licensing agreements are considered, then the imbalance has already disappeared.

While the detailed research and development data collected by the Bureau of Statistics, in practice, is unavailable on an individual firm basis, the Yūka shoken hokokushō sōran does contain, for some of the assemblers that submit such a report, figures for investment in research and development equipment and structures. Some of this equipment information has already been presented in Table 5.6.<sup>1</sup> Table 6.21 presents for Hino, Suzuki, Isuzu, Toyota and Nissan a summary of their major investments in research and development facilities.

---

1. Cf ante pages 5-39 to 5-77

TABLE 6.1

Regular Research Workers in Japanese Automobile Industry  
(calendar year)

	<u># of workers</u>	<u>% change from previous year</u>
1966	2830	19.0%
1967	3465	22.4
1968	3948	13.9
1969	4712	19.4
1970	4847	2.9
1971	5770	19.0
1972	6307	9.3
1973	6918	9.7
1974	8373	21.0
1975	8486	1.3
1976	10679	25.8
1977	9331	-12.8
1978	9747	4.5

Source: Sōrifu, Tōkei Kyoku, Kagaku gijutsu kenkyū chōsa hokoku

TABLE 6.2

Regular Research Workers per 10,000 Total Employees  
 In Japanese Automobile Industry  
 (calendar year)

	<u># of regular research workers per 10,000 employees in industry</u>	<u>% change from previous year</u>
1966	135	14.4%
1967	142	5.2
1968	144	1.4
1969	149	3.5
1970	151	1.3
1971	158	4.6
1972	182	15.2
1973	192	5.5
1974	224	16.7
1975	212	-5.4
1976	167	-21.2
1977	240	43.7
1978	249	3.8

Source: Sōrifu, Tōkei Kyoku, Kagaku gijutsu kenkyū chōsa hokoku



TABLE 6.3

Total Research and Development Expenditure by  
Japanese Automobile Industry  
(fiscal year; disbursement basis)

	<u>¥ million</u>	<u>% change from previous year</u>
1965	24341	11.8%
1966	29780	22.3
1967	37677	26.5
1968	50775	34.8
1969	57663	13.6
1970	78529	36.2
1971	92736	18.1
1972	115584	24.6
1973	160245	38.6
1974	184128	14.9
1975	195930	6.4
1976	219344	12.0
1977	269499	22.9

The 19xx Japanese fiscal year ends March 31, 19xx+1

Source: Sōrifu, Tōkei Kyoku, Kagaku gijutsū kenkyū chōsa hokoku

TABLE 6.4

Total Research and Development Expenditure by  
Japanese Automobile Industry  
(fiscal year; cost basis)

	<u>¥ million</u>	<u>% change from previous year</u>
1965	21567	19.2%
1966	27367	26.9
1967	33117	21.0
1968	45651	37.8
1969	52476	15.0
1970	69316	32.1
1971	83211	20.0
1972	101935	22.5
1973	139774	37.1
1974	177292	26.8
1975	198246	11.8
1976	217474	9.7
1977	261037	20.0

Source: Sōrifu, Tōkei Kyoku, Kagaku gijutsū kenkyū chōsa hokoku

TABLE 6.5

Automobile Research and Development Expenditure as  
 a Percentage of Total Japanese Industrial Research  
 and Development Expenditure  
 (fiscal year)

	<u>% disbursement basis</u>	<u>% cost basis</u>
1965	9.6%	9.2%
1966	10.2	9.9
1967	9.9	9.9
1968	10.1	10.2
1969	9.2	9.4
1970	9.5	9.6
1971	10.4	10.2
1972	11.1	10.5
1973	12.3	11.7
1974	11.6	11.8
1975	11.6	12.3
1976	11.7	11.9
1977	12.8	12.9

Source: Sōrifu, Tōkei Kyoku, Kagaku gijutsū kenkyū chōsa hokoku

TABLE 6.6

Japanese Automobile Industry Research and Development  
Expenditure per Regular Research Worker  
(fiscal year; disbursement basis)

	<u>¥ 10,000</u>	<u>% change from previous year</u>
1965	860	-6.0%
1966	859	-0.1
1967	954	11.0
1968	1078	13.0
1969	1190	10.4
1970	1361	14.4
1971	1470	8.0
1972	1671	13.7
1973	1914	14.5
1974	2170	13.4
1975	1835	-15.4
1976	2351	28.1
1977	2765	17.6

Source: Sōrifu, Tōkei Kyoku, Kagaku gijutsū kenkyu chōsa hokoku

TABLE 6.7  
 Japanese Automobile Industry Research and Development  
 Expenditure as a Percentage of Sales  
 (fiscal year)

	<u>% disbursement basis</u>	<u>% cost basis</u>
1965	--	1.60%
1966	--	1.64
1967	--	1.57
1968	1.79%	1.61
1969	1.71	1.56
1970	1.90	1.68
1971	2.01	1.80
1972	2.21	1.95
1973	2.51	2.19
1974	2.38	2.29
1975	1.77	1.79
1976	2.20	2.19
1977	2.32	2.25

Source: Sōrifu, Tōkei Kyoku, Kagaku gijutsū kenkyū chōsa hokoku

Table 6.8

NUMBER OF PERSONS ENGAGED IN R&D, EXPENDITURES ON R&D, R&D FUNDS RECEIVED  
AND R&D FUNDS PAID OUT IN JAPANESE AUTOMOBILE INDUSTRY  
CROSS-CLASSIFIED BY CAPITALIZATION OF AUTOMOBILE FIRMS

Capital Size Class	Total No. of Companies A.	Companies Surveyed	Total No. of Employees	Total Sales ¥100 Million	Total Operating Profits ¥ Million	Companies Performing or Sponsoring R&D			Total No. of Employees C.	Sales ¥100 Million	Operating Profits ¥ Million
						Number of Companies B.	B/A%	Companies Performing R&D			
1978											
Total	1946	269	989100	133040	972507	189	1.9	186	392120	116217	516333
¥3 Million-¥10 Million	1129	16	87146	2379	12086	1	0.1	1	-	-	-
¥10 Million-¥100 Million	973	91	81565	7498	17878	68	11.8	68	12846	1511	6603
¥100 Million-¥1 Billion	196	120	97936	16130	61169	21	51.3	79	54321	11580	42118
¥1 Billion-¥10 Billion	28	32	97532	22156	96459	28	87.5	20	36050	18209	82617
over ¥10 Billion	10	10	228405	84917	384995	10	100.0	10	228903	84917	384995
1977											
Total	1977	281	521154	119880	554463	201	10.2	200	389069	99496	502028
¥3 Million-¥10 Million	919	13	23166	1861	15184	4	0.4	4	216	26	45
¥10 Million-¥100 Million	944	106	82990	12906	26116	73	8.4	73	10826	1368	5156
¥100 Million-¥1 Billion	155	125	96708	13755	56584	89	57.6	88	68299	9907	43684
¥1 Billion-¥10 Billion	27	27	89290	18450	91073	25	92.6	25	80801	15194	82617
over ¥10 Billion	18	10	228927	73000	375504	10	100.0	10	228927	73008	384995
1976											
Total	1675	229	752169	125996	435668	471	28.1	469	640775	110528	372855
¥3 Million-¥10 Million	631	12	28282	3891	10859	6	1.0	8	282	28	138
¥10 Million-¥100 Million	823	89	72095	7694	33544	98	15.7	97	15614	1642	7333
¥100 Million-¥1 Billion	386	93	343165	14533	87236	334	86.5	333	326510	32386	80210
¥1 Billion-¥10 Billion	29	25	82400	15330	72135	23	92.0	23	73342	12591	61424
over ¥10 Billion	10	10	225027	63880	229793	10	100.0	10	225027	63880	229793
1975											
Total	4329	241	553787	91016	218704	198	4.6	180	400750	77375	184290
¥1 Million-¥10 Million	3274	18	54702	2258	19506	4	0.1	3	180	19	87
¥10 Million-¥100 Million	903	98	90794	8982	9962	72	8.0	57	14074	1407	5658
¥100 Million-¥1 Billion	117	90	90236	11487	42468	88	75.2	86	77386	9925	37863
¥1 Billion-¥10 Billion	25	25	87297	14450	62446	24	96.0	24	78344	12194	56359
over ¥10 Billion	10	10	230758	53830	86329	10	100.0	10	230758	33830	84322
1974											
Total	2509	223	506778	75277	360548	321	12.8	320	373125	63789	302311
¥1 Million-¥10 Million	1612	16	41073	3040	17119	103	8.4	103	1268	244	2103
¥10 Million-¥100 Million	745	93	37985	6462	37377	102	13.7	101	16772	1244	5932
¥100 Million-¥1 Billion	119	81	87345	8560	42834	85	71.4	85	73502	7149	37684
¥1 Billion-¥10 Billion	24	24	82173	13560	59102	22	91.7	22	73381	11498	52477
over ¥10 Billion	9	9	208202	43655	204116	9	100.0	9	208202	43655	204116
1973											
Total	2935	211	487154	61766	381242	208	7.1	258	360168	52285	340231
¥1 Million-¥10 Million	2393	33	63149	2973	20814	53	2.2	3	1789	26	149
¥10 Million-¥100 Million	471	64	7076	2908	10249	54	13.5	54	10968	588	1934
¥100 Million-¥1 Billion	106	80	32208	5711	14318	68	64.2	68	64967	5198	29757
¥1 Billion-¥10 Billion	17	26	108633	13705	112707	25	92.6	25	11999	11999	105237
over ¥10 Billion	8	8	183468	34472	203154	8	100.0	8	183468	34472	203154
1972											
Total	3781	231	513311	55124	300367	251	6.6	251	346337	46198	264824
¥1 Million-¥10 Million	2923	37	46096	1718	8087	42	1.4	42	1534	34	189
¥10 Million-¥100 Million	667	87	107383	5288	26649	122	18.3	122	26074	1570	7998
¥100 Million-¥1 Billion	160	67	87308	6595	23856	58	36.3	58	54410	4509	21655
¥1 Billion-¥10 Billion	22	22	76362	8308	50663	20	90.9	20	68157	6867	43870
over ¥10 Billion	9	10	196162	33218	191112	9	100.0	9	196162	33218	191112
1971											
Total	2819	223	506630	50376	N.A.	374	13.3	373	364627	41372	N.A.
¥1 Million-¥10 Million	1773	37	44767	1552	N.A.	81	4.6	81	1565	40	N.A.
¥10 Million-¥100 Million	929	87	118711	7519	N.A.	207	22.3	206	42884	2339	N.A.
¥100 Million-¥1 Billion	85	67	64680	4397	N.A.	56	65.9	56	49276	3319	N.A.
¥1 Billion-¥10 Billion	22	22	77376	7338	N.A.	20	90.9	20	59806	6104	N.A.
over ¥10 Billion	10	10	201096	29570	N.A.	10	100.0	10	201096	29570	N.A.
1970											
Total	3185	223	481095	41778	N.A.	221	6.9	221	321762	33685	N.A.
¥1 Million-¥10 Million	2284	47	61603	2085	N.A.	52	2.7	52	1983	72	N.A.
¥10 Million-¥100 Million	791	94	92042	4857	N.A.	77	9.7	77	19668	353	N.A.
¥100 Million-¥1 Billion	90	62	71283	4222	N.A.	53	66.3	53	51017	2999	N.A.
¥1 Billion-¥10 Billion	21	21	74507	5032	N.A.	20	95.2	20	67434	5179	N.A.
over ¥10 Billion	9	9	181660	24582	N.A.	9	100.0	9	181660	24582	N.A.
1969											
Total	3570	218	458339	34046.2	N.A.	245	6.9	242	315624	28334.4	N.A.
under ¥100 Million	3463	126	144595	5079.6	N.A.	163	4.7	161	24401	1027.3	N.A.
over ¥100 Million	107	92	313744	28966.6	N.A.	82	76.6	81	291223	27307.1	N.A.

The dates on this and succeeding tables refer to the April 1 survey date. The survey relates to the previous year.

Source: Sōrifu, Tōkei Kyoku, Kagaku gijutsū chōsa hokoku

Table 6.8 (Continued)

Capital Size Class	Employees Engaged in R&D								Number of Regular Researchers per 10,000 Persons Employed (persons) F/Cx10,000	Within Firm Internal Expenditures on R&D				
	Total	Researchers			Asst. Research Workers	Technicians	Clerical & Other Support Personnel	Internal Consultants		Total	1			2
		Total	Regular F	Outside Consultants							Disbursement Basis (1+2+4+5) G.	Cost Basis (1+2+3+5) H.	Wages	
1978														
Total	34342	9829	9749	82	7799	12245	4469	830	249	269499	261037	110844	81211	
\$3 Million-\$10 Million	344	200	176	24	53	64	17	148	137	1623	1699	956	279	
\$10 Million-\$100 Million	2018	966	915	51	389	428	235	207	142	10332	10125	6039	1653	
\$100 Million-\$1 Billion	5222	2275	2212	3	983	1392	572	160	264	32691	32348	16565	8017	
\$1 Billion-\$10 Billion	26758	6388	6384	4	364	10361	645	235	279	224853	217065	87284	71268	
1977														
Total	22604	9351	9331	20	6840	12371	4042	591	240	219344	217474	95883	62326	
\$3 Million-\$10 Million	22	8	8	-	4	8	2	12	370	37	37	34	2	
\$10 Million-\$100 Million	116	185	179	6	85	27	13	128	165	1921	1668	959	575	
\$100 Million-\$1 Billion	1676	876	871	5	356	267	177	302	128	8929	8635	4892	1359	
\$1 Billion-\$10 Billion	6155	1996	1991	5	783	1080	496	39	246	27624	27540	13374	6929	
over \$10 Billion	14141	6286	6282	4	5612	10989	3354	110	274	180833	179594	76623	53660	
1976														
Total	36009	10763	10679	84	8182	12940	4124	444	167	195930	198246	90981	47270	
\$3 Million-\$10 Million	29	13	12	1	6	8	2	20	426	81	78	41	7	
\$10 Million-\$100 Million	607	316	280	36	138	119	34	112	179	2337	2123	1475	350	
\$100 Million-\$1 Billion	3585	2466	2427	39	373	561	185	155	74	16791	16326	10078	2653	
\$1 Billion-\$10 Billion	4790	1683	1679	4	1187	1357	563	10	229	23315	22783	12125	4138	
over \$10 Billion	26998	6285	6281	4	6478	10895	3340	147	279	153404	156936	47242	40122	
1975														
Total	33866	8580	8486	94	8382	12555	4349	624	212	184128	177292	76887	48174	
\$1 Million-\$10 Million	15	9	8	1	2	3	1	12	426	37	36	28	4	
\$10 Million-\$100 Million	395	207	205	2	102	65	21	103	146	1138	1032	755	167	
\$100 Million-\$1 Billion	2007	971	885	86	449	378	209	244	114	7982	7744	4270	1545	
\$1 Billion-\$10 Billion	4396	1594	1590	4	1080	1266	456	179	203	17517	17550	9349	3790	
over \$10 Billion	27053	5799	5798	1	6749	10843	3662	86	251	157455	150930	62486	42688	
1974														
Total	10337	8400	8373	27	7261	11159	3517	1019	224	160245	139774	52923	31141	
\$1 Million-\$10 Million	18	10	9	1	3	3	2	502	71	207	222	22	152	
\$10 Million-\$100 Million	461	291	280	11	121	26	23	98	167	1294	1129	751	185	
\$100 Million-\$1 Billion	1868	883	870	13	391	386	200	179	118	7620	7061	3431	1152	
\$1 Billion-\$10 Billion	4504	1703	1701	2	857	1410	534	160	232	17581	17235	7468	4994	
over \$10 Billion	23486	5513	5513	-	5889	9334	2750	80	265	133543	114127	41251	24697	
1973														
Total	20239	6944	6918	26	6874	10902	3519	469	192	115584	101935	39269	31426	
\$1 Million-\$10 Million	13	8	8	2	2	2	1	6	34	19	14	15	2	
\$10 Million-\$100 Million	299	174	171	3	26	26	26	83	156	612	554	378	97	
\$100 Million-\$1 Billion	1853	749	744	5	513	513	206	155	115	5676	5418	2059	897	
\$1 Billion-\$10 Billion	6186	1915	1911	4	1622	1622	879	150	193	20750	20104	8106	5810	
over \$10 Billion	19888	4098	4086	12	8739	8739	2407	75	223	88528	75841	20056	24120	
1972														
Total	24592	6385	6307	78	6180	8977	3050	1043	182	92736	83211	31218	26305	
\$1 Million-\$10 Million	10	5	4	1	2	2	1	44	26	19	9	6	3	
\$10 Million-\$100 Million	635	380	339	41	130	78	47	426	130	1405	1187	772	209	
\$100 Million-\$1 Billion	1326	644	626	18	259	297	126	102	115	2998	2884	1606	558	
\$1 Billion-\$10 Billion	4006	1306	1299	7	1111	1077	532	410	191	13956	10917	4787	3007	
over \$10 Billion	18615	4050	4039	11	4678	7523	2364	61	206	74359	68214	24047	22529	
1971														
Total	23390	5823	5770	53	5865	8737	2965	685	158	86978	78529	25011	22001	
\$1 Million-\$10 Million	6	1	1	-	2	2	1	171	6	29	29	3	4	
\$10 Million-\$100 Million	1703	465	451	14	594	475	169	212	105	2621	2519	1480	514	
\$100 Million-\$1 Billion	1207	494	482	12	318	262	133	77	98	2813	2579	1324	521	
\$1 Billion-\$10 Billion	3642	1114	1100	14	939	1232	457	125	158	11146	10287	3585	1978	
over \$10 Billion	16832	3749	3736	13	4112	6766	2205	100	186	70368	63115	16619	19034	
1970														
Total	20231	4883	4847	36	5167	7895	2286	392	151	57663	52476	20626	13668	
\$1 Million-\$10 Million	34	34	33	1	-	-	-	123	166	109	110	30	55	
\$10 Million-\$100 Million	504	232	218	14	99	129	44	136	111	778	708	443	137	
\$100 Million-\$1 Billion	1183	478	470	8	263	316	126	121	92	2241	2125	1040	450	
\$1 Billion-\$10 Billion	3423	963	952	11	998	1056	406	10	141	7275	6239	2426	1155	
over \$10 Billion	15087	3176	3174	2	3807	6394	1710	2	175	47260	43294	16186	11862	
1969														
Total	18851	4762	4712	50	4499	7449	2141	456	15	50775	45651	16450	12293	
under \$100 Million	1127	410	372	38	217	356	144	295	15	1075	1016	717	183	
over \$100 Million	17724	4352	4340	12	4282	7093	1997	161	15	49700	44634	15733	12110	

Table 6.8 (Continued)

Capital Size Class	Within Firm Expenditures on R&D (\$ Million)					R&D Expenditures Which Are Self-Financed			R&D Work Externally Financed		
	Depreciation of tangible fixed assets	Expenditure on tangible fixed assets				Other Expenses	Total \$ Million	Within the Firm	Outside the Firm	No. of Companies	R&D Funds Received (\$ Million)
		Total	Lands, Bldgs. etc.	Machinery, Utensils, Equipment etc.	Others						
1978											
Total	20315	28778	8097	19176	1506	48660	281261	265693	15567	25	3813
\$3 Million-\$10 Million	147	272	23	224	25	117	1591	1581	11	9	50
\$10 Million-\$100 Million											
\$100 Million-\$1 Billion	787	994	132	838	25	1646	10818	9770	1048	5	562
\$1 Billion-\$10 Billion	2185	2528	423	1830	276	5581	33219	32389	830	4	302
over \$10 Billion	17196	24984	7520	16284	1180	41317	235632	221953	13679	7	2899
1977											
Total	20284	22154	3535	18068	551	38981	228949	217488	11461	27	1888
\$3 Million-\$10 Million	0	-	-	-	-	1	37	36	1	1	1
\$10 Million-\$100 Million	63	316	15	298	3	71	1920	1915	4	1	5
\$100 Million-\$1 Billion	666	960	35	843	83	1717	8916	8421	496	14	541
\$1 Billion-\$10 Billion	2696	2781	945	1686	149	4540	28190	27511	679	3	113
over \$10 Billion	16857	18096	2539	15241	316	32653	189886	179604	10283	8	1229
1976											
Total	25577	23261	3439	18457	864	34418	202770	191632	11138	24	4406
\$3 Million-\$10 Million	1	4	-	4	-	9	83	75	4	2	2
\$10 Million-\$100 Million	65	279	27	244	8	233	2325	2275	46	6	56
\$100 Million-\$1 Billion	999	1454	61	1381	11	2407	16241	15761	480	4	1133
\$1 Billion-\$10 Billion	2519	3051	645	2372	35	4000	23315	22265	1050	4	1050
over \$10 Billion	22003	18473	3207	14456	810	27565	160805	151248	9557	8	2157
1975											
Total	21360	28196	8078	19740	378	30872	184919	177826	7093	21	6489
\$3 Million-\$10 Million	0	1	-	1	-	4	39	36	3	1	1
\$10 Million-\$100 Million	62	168	61	102	5	69	1237	1131	107	6	8
\$100 Million-\$1 Billion	600	838	58	738	32	1329	7571	7302	269	3	867
\$1 Billion-\$10 Billion	1818	1785	401	1361	23	2593	15894	15232	662	5	2286
over \$10 Billion	18879	25404	7548	17537	318	26878	160178	154126	6052	6	3328
1974											
Total	17819	38290	17258	20371	660	37872	158644	156087	2557	138	4158
\$3 Million-\$10 Million	15	0	-	0	-	33	146	145	0	101	62
\$10 Million-\$100 Million	94	259	9	250	-	119	1264	1232	32	26	63
\$100 Million-\$1 Billion	814	1373	187	998	187	1664	7364	7216	148	2	404
\$1 Billion-\$10 Billion	1716	2062	464	1586	13	3057	15526	15308	278	3	2273
over \$10 Billion	15180	34595	16599	17536	460	33000	134285	132186	2099	6	1356
1973											
Total	14893	28452	4969	20303	1180	15938	115326	112693	2643	13	2874
\$3 Million-\$10 Million	-	0	-	0	-	1	44	19	25	-	-
\$10 Million-\$100 Million	37	95	12	67	16	42	559	612	47	-	-
\$100 Million-\$1 Billion	629	987	163	639	85	1232	5741	5494	247	4	181
\$1 Billion-\$10 Billion	2106	2752	1008	1727	18	3024	19833	19447	386	3	1304
over \$10 Billion	12030	24717	5786	17871	1060	11638	89059	87122	1937	6	1389
1972											
Total	11586	21111	6727	12535	1849	14102	92603	91200	1420	18	2042
\$3 Million-\$10 Million	0	10	-	10	-	0	19	19	0	-	-
\$10 Million-\$100 Million	85	303	126	169	8	121	1421	1390	31	8	14
\$100 Million-\$1 Billion	188	301	56	237	8	533	2987	2943	44	1	55
\$1 Billion-\$10 Billion	1192	4231	2202	1862	167	1931	13385	13130	255	3	826
over \$10 Billion	10121	16266	4343	10256	1667	11517	74491	73700	1091	6	1147
1971											
Total	8449	17662	7464	9229	968	13805	78220	77503	717	8	1065
\$3 Million-\$10 Million	0	16	-	16	-	6	31	29	2	-	-
\$10 Million-\$100 Million	102	367	27	305	36	159	2550	2520	30	-	-
\$100 Million-\$1 Billion	234	331	35	218	77	403	2633	2510	123	2	69
\$1 Billion-\$10 Billion	859	2494	981	1472	40	2230	10067	9945	102	1	322
over \$10 Billion	7254	14454	6421	7218	815	11008	62941	62480	461	5	674
1970											
Total	6226	11413	3011	6803	1599	11955	53687	53037	650	11	6626
\$3 Million-\$10 Million	0	-	-	-	-	24	109	-	-	-	-
\$10 Million-\$100 Million	61	131	46	74	11	67	794	779	15	-	-
\$100 Million-\$1 Billion	216	331	47	226	59	411	2266	2188	82	6	57
\$1 Billion-\$10 Billion	672	1708	349	1035	323	1485	6883	4768	115	2	507
over \$10 Billion	5277	9243	2568	5467	1207	9969	43636	43197	437	3	6062
1969											
Total	5703	10828	4000	6460	368	10989	N.A.	N.A.	N.A.	15	900
under \$100 Million	22	91	1	72	9	85	N.A.	N.A.	N.A.	1	1
over \$100 Million	5681	10746	3999	6388	359	10904	N.A.	N.A.	N.A.	14	900



Table 6.8 (Continued)

Capital Size Class	R&D Funds Paid		% of Within Firm Expenditures on R&D to Sales		% of Within Firm Expenditures on R&D to Operating Profits		Within Firm Expenditures on R&D per company		Within Firm Expenditures on R&D per regular researcher		% Change from Previous Year		
	No. of Companies	R&D Funds \$100 Million	Disbursement Basis G/D	Cost Basis H/D	Disbursement Basis G/E	Cost Basis H/D	Disbursement Basis G/B	Cost Basis H/B	Disbursement Basis G/F	Cost Basis H/F	Regular Researchers	Within Firm Expenditures on R&D	
												Disbursement Basis	Cost Basis
1978													
Total	49	15567	2.32	2.25	52.2	50.6	143351	138849	2765	2678	4.5	22.9	20.0
\$3 Million-\$10 Million	12	11	1.07	0.99	24.6	22.7	2352	2172	922	852	-5.9	-17.1	-12.1
\$10 Million-\$100 Million	19	1048	0.89	0.87	24.5	24.0	12756	12500	1129	1107	5.1	15.7	17.2
\$100 Million-\$1 Billion	9	830	1.80	1.78	39.6	39.2	116755	115529	1439	1424	14.1	18.3	17.5
\$1 Billion-\$10 Billion	9	13679	2.65	2.56	58.4	56.4	248527	2170650	3522	3400	1.6	24.3	20.9
1977													
Total	39	11461	2.20	2.19	43.7	43.3	109126	106196	2351	2331	-12.6	12.0	9.7
\$3 Million-\$10 Million	1	1	1.45	1.45	82.8	82.8	925	932	462	466	-33.3	-54.3	-32.0
\$10 Million-\$100 Million	4	4	1.22	1.22	33.0	33.0	2631	2285	1073	932	-36.1	-17.8	-21.4
\$100 Million-\$1 Billion	17	495	0.87	0.87	19.8	19.8	10033	9703	1025	991	-64.1	-46.8	-47.1
\$1 Billion-\$10 Billion	8	679	1.81	1.81	35.4	35.4	110496	110158	1387	1383	18.6	18.5	20.9
over \$10 Billion	9	10283	2.46	2.46	47.8	47.8	1808330	1795938	2879	2859	0.0	17.9	14.4
1976													
Total	42	11138	1.77	1.79	51.7	52.3	41599	42090	1835	1856	25.8	6.4	11.8
\$3 Million-\$10 Million	4	4	2.85	2.74	58.6	56.3	1348	1295	674	647	50.0	116.9	115.2
\$10 Million-\$100 Million	6	46	1.42	1.29	31.9	28.9	2385	2166	835	758	36.6	105.4	105.6
\$100 Million-\$1 Billion	15	480	0.52	0.50	20.9	20.4	5027	4888	692	673	174.2	110.4	110.6
\$1 Billion-\$10 Billion	5	1050	1.85	1.81	38.0	37.1	101369	99055	1389	1357	5.6	33.1	25.8
over \$10 Billion	8	9557	2.40	2.46	66.8	68.3	1534055	1569358	2442	2499	8.3	-2.6	4.0
1975													
Total	63	7093	2.38	2.29	99.9	96.2	92994	89542	2170	2089	1.3	14.9	26.8
\$1 Million-\$10 Million	3	3	1.91	1.86	42.2	41.3	924	902	462	451	-11.1	-82.2	-83.7
\$10 Million-\$100 Million	24	107	0.81	0.73	20.1	18.2	1581	1434	555	504	-26.8	-12.1	-8.6
\$100 Million-\$1 Billion	17	269	0.80	0.78	21.1	20.5	9070	8800	902	875	1.7	4.7	9.7
\$1 Billion-\$10 Billion	11	662	1.44	1.44	31.1	31.1	72988	73125	1102	1104	-6.5	-0.4	1.8
over \$10 Billion	8	6052	2.93	2.80	186.7	179.0	1574545	1509300	2716	2603	5.2	17.9	32.2
1974													
Total	37	2557	2.51	2.19	53.0	46.2	49521	43543	1514	1669	21.0	38.8	37.1
\$1 Million-\$10 Million	1	0	0.85	0.91	9.8	10.6	201	215	2301	2465	50.0	1015.7	1105.2
\$10 Million-\$100 Million	7	32	1.04	0.91	21.8	19.0	1269	1107	462	403	63.7	111.5	103.9
\$100 Million-\$1 Billion	14	148	1.07	0.99	20.2	18.7	8564	8307	876	812	16.9	34.2	30.3
\$1 Billion-\$10 Billion	9	278	1.53	1.50	33.5	32.8	79915	78343	1034	1013	-11.0	-15.3	-14.3
over \$10 Billion	6	2099	3.06	2.61	65.4	55.9	1483806	1268081	2422	2070	34.9	50.8	50.5
1973													
Total	88	2643	2.21	1.95	34.0	30.0	55569	49007	1671	1473	9.7	24.6	22.5
\$1 Million-\$10 Million	51	25	0.71	0.70	12.5	12.4	35	35	309	307	50.0	-3.4	99.0
\$10 Million-\$100 Million	5	47	1.04	0.94	11.7	9.6	1134	1025	358	324	-49.6	-56.4	-53.4
\$100 Million-\$1 Billion	14	247	1.09	1.04	19.1	18.2	8347	7988	763	728	18.8	99.3	87.9
\$1 Billion-\$10 Billion	11	386	1.73	1.68	19.7	19.1	83001	80417	1086	1052	47.1	48.7	84.2
over \$10 Billion	7	1937	2.57	2.20	43.6	37.3	1106594	948412	2167	1856	1.2	19.1	11.2
1972													
Total	45	1420	2.01	1.80	35.0	31.4	36947	33152	1470	1319	9.3	18.1	20.0
\$1 Million-\$10 Million	1	0	0.56	0.27	10.2	4.9	46	22	480	231	300.0	-33.8	-28.8
\$10 Million-\$100 Million	16	31	0.89	0.76	17.6	14.8	1152	973	414	350	-24.8	-44.2	-47.3
\$100 Million-\$1 Billion	9	44	0.66	0.64	13.8	13.3	5168	4973	479	461	29.9	16.2	16.2
\$1 Billion-\$10 Billion	12	255	2.03	1.59	31.8	24.9	69780	54585	1074	840	18.1	35.7	26.2
over \$10 Billion	7	1091	2.24	2.05	38.9	35.7	826206	757931	1841	1689	8.1	17.8	22.0
1971													
Total	124	717	1.90	1.68	-	-	20997	18534	1361	1201	19.0	36.2	32.1
\$1 Million-\$10 Million	10	2	0.73	0.33	-	-	36	16	2900	1300	-97.0	-73.4	-88.2
\$10 Million-\$100 Million	88	30	1.08	0.96	-	-	1217	1089	559	500	106.9	223.8	218.4
\$100 Million-\$1 Billion	9	123	0.78	0.75	-	-	4605	4434	535	515	2.6	15.1	16.8
\$1 Billion-\$10 Billion	11	102	1.69	1.42	-	-	51435	43260	935	787	15.5	41.4	38.7
over \$10 Billion	6	461	2.13	1.89	-	-	631150	559140	1689	1497	17.7	33.5	29.1
1970													
Total	50	650	1.71	1.56	-	-	26092	23745	1224	1114	2.9	13.6	15.0
\$1 Million-\$10 Million	-	-	1.51	1.53	-	-	176	177	173	175	-47.6	-59.6	-57.7
\$10 Million-\$100 Million	26	15	0.91	0.83	-	-	1010	919	252	229	-29.4	-3.4	-6.5
\$100 Million-\$1 Billion	7	82	0.75	0.71	-	-	4228	4009	335	318	-29.6	-12.9	-4.7
\$1 Billion-\$10 Billion	10	115	1.40	1.20	-	-	36375	31195	1116	957	46.0	8.9	9.6
over \$10 Billion	7	438	1.92	1.76	-	-	525111	481044	1565	1434	5.1	16.9	17.9

Table 6.9

R&D WORKERS, WITHIN FIRM EXPENDITURES ON R&D,  
R&D FUNDS RECEIVED, R&D FUNDS PAID BY AUTO INDUSTRY  
CROSS-CLASSIFIED BY SIZE OF COMPANY EMPLOYMENT

Employment - Class	Number of Companies A.	Number of Same Size Companies	Total No. Persons Employed (Persons)	Total Sales ¥100 Million	Total Operating Profits ¥ Million	No. of Companies (B).	Percentage (%) S/A	Companies Conducting Intrafirm R&D	No. of Persons Employed (Persons) C.	Sales ¥100 Million
1978										
Total	1904	269	313100	133040	572587	188	9.9	186	392120	116217
1 - 299 (persons)	1721	126	83319	9334	29757	69	4.8	69	10688	1302
300 - 999	127	38	76271	11878	48398	69	54.3	58	42149	7347
1000 - 2999	31	31	49129	7893	40718	26	33.9	25	42670	5818
3000 - 9999	18	17	101518	26617	87630	17	94.4	17	93750	23432
over 10,000	7	7	202863	77318	366084	7	100.0	7	202863	77318
1977										
Total	1977	291	321154	119880	354465	201	10.2	200	389069	99496
1 - 299	1775	131	94733	13844	27132	76	4.3	76	3819	1155
300 - 999	146	35	30658	10864	43129	73	91.4	75	47238	7033
1000 - 2999	34	33	52632	7339	44566	29	35.3	29	47170	6506
3000 - 9999	15	15	38833	21079	81365	14	93.3	14	31544	18048
over 10,000	7	7	204298	66754	358272	7	100.0	7	204298	66754
1976										
Total	1675	229	752169	125336	433568	471	21.1	469	610775	110528
1 - 299	1277	111	96160	11525	43678	103	1.1	102	12927	1323
300 - 999	80	57	47781	6335	29667	40	75.0	40	37865	3267
1000 - 2999	297	40	324146	31386	81763	260	97.0	237	313822	30435
3000 - 9999	16	14	83607	17788	61159	13	92.9	13	75656	15200
over 10,000	7	7	200505	58303	217321	7	100.0	7	200505	56302
1975										
Total	4329	241	553787	91016	218704	198	4.6	180	400750	77375
1 - 299	4150	110	127062	9625	24964	78	1.9	62	11741	1257
300 - 999	118	72	67663	9218	36659	60	50.8	58	38900	6200
1000 - 2999	39	37	63274	6648	30182	39	100.0	39	63274	6948
3000 - 9999	15	15	91345	16796	58338	14	33.3	14	32392	14540
over 10,000	7	7	204443	48430	68562	7	100.0	7	204443	48430
1974										
Total	2509	223	506778	75277	360548	321	12.8	320	273121	63789
1 - 299	2344	106	114126	8637	50771	212	9.0	211	15473	1464
300 - 999	108	55	58783	6003	34131	51	48.1	51	12203	3719
1000 - 2999	36	30	57105	7014	28365	36	100.0	36	57105	7014
3000 - 9999	17	16	95557	14731	59897	16	94.1	16	37137	12700
over 10,000	6	6	181207	38893	187386	6	100.0	6	181207	38893
1973										
Total	2935	211	487154	61766	381242	208	7.1	158	360168	52285
1 - 299	2793	98	108673	6867	30894	106	3.8	56	10183	487
300 - 999	37	61	50327	4142	25231	50	57.5	50	34722	3041
1000 - 2999	33	31	58303	4636	27511	31	93.9	31	54783	4316
3000 - 9999	15	14	33037	10879	86550	14	93.3	14	73666	9198
over 10,000	7	7	186814	35242	211116	7	100.0	7	186814	35242
1972										
Total	3781	231	513311	55124	300367	251	6.6	251	345337	46198
1 - 299	3616	120	145391	6498	26325	153	4.2	153	19880	1104
300 - 999	115	54	61592	4429	20357	53	46.1	53	34088	2782
1000 - 2999	29	26	50234	4085	22382	25	36.2	25	44157	3628
3000 - 9999	14	14	76167	9092	46695	13	92.9	13	68291	7694
over 10,000	7	7	179927	31020	184607	7	100.0	7	179927	31020
1971										
Total	2819	223	506630	50376		374	13.3	373	364627	41372
1 - 299	2656	118	134983	7580		247	9.3	246	21503	1185
300 - 999	115	58	65998	4169		84	73.0	84	50166	3186
1000 - 2999	26	25	43176	2973		22	94.6	22	37751	2554
3000 - 9999	15	15	36578	9076		14	93.3	14	79312	7869
over 10,000	7	7	175895	26578		7	100.0	7	175895	26578
1970										
Total	3185	223	481095	41778		221	6.9	221	321762	33685
1 - 299	3036	119	131404	5990		133	4.0	122	11844	532
300 - 999	37	56	59544	3380		56	57.7	56	36206	2058
1000 - 2999	31	27	48677	2833		23	74.2	23	39315	2374
3000 - 9999	15	15	32394	8066		14	93.3	14	75341	7213
over 10,000	6	6	159076	21508		6	100.0	6	159076	21508
1969										
Total	3570	218	458339	34046.2		245	6.9	242	315624	28334.4
Less than 1000 persons (6)	3517	168	177258	7033.5		198	5.6	195	46504	2300.6
Above 1000 (7)	53	50	281071	27012.7		47	88.7	47	269120	26033.8

Source: Sōrifu, Tōkei Kyoku, Kagaku gijutsū chōsa hokoku

Table 6.9 (Continued)

Employment - Class	Operating Profits in Million \$	Number of Persons engaged in R & D (persons)					Asst. Research Workers	Techni- cians	Clerical & Other Support Personnel	Number of Internal Non-Reg. Researchers (persons)	Number of Regular Researchers per 10,000 Persons Employed (H2+H5) %/C10,000	Within Firm Expenditure On R&D in Million		
		Total	Researchers			Total						Disburse- ment (H2+H5) \$	Cost (H2+H5) \$	
			Total	Regular	Ex- ternal Non-Reg.									
<b>1978</b>														
Total	516333	34342	3829	3747	32	7790	12245	469	830	249	259499	251037		
1 - 299 (persons)	5811	227	56	133	23	42	35	4	138	124	1207	1149		
300 - 999	11758	1365	743	591	52	238	274	110	270	164	7667	7058		
1000 - 2999	14214	1152	540	539	1	229	355	128	76	126	5918	5960		
3000 - 9999	79866	7255	2912	2906	5	1222	2178	953	346	310	44875	44247		
over 10,000	366084	24323	5478	5478		5068	9503	3274		270	209833	202622		
<b>1977</b>														
Total	502028	32504	3351	3331	20	5840	12371	4042	591	240	219344	217474		
1 - 299	4595	290	179	174	5	56	37	9	129	197	1810	1567		
300 - 999	30207	1157	529	528	1	266	149	113	276	133	5045	5441		
1000 - 2999	38464	291	502	594	8	274	253	152	78	125	5728	5841		
3000 - 9999	70490	5215	2569	2563	5	953	1971	722	110	314	34439	34456		
over 10,000	398272	23651	5372	5372		5281	9951	3047		263	170322	168971		
<b>1976</b>														
Total	378669	36009	10763	10679	94	3102	12940	4124	444	167	195930	152466		
1 - 299	5269	486	342	212	20	39	120	25	129	164	2073	1668		
300 - 999	24627	1199	598	562	26	300	183	118	95	148	3048	4820		
1000 - 2999	78014	3339	2271	2258	13	335	556	177	73	72	15721	15509		
3000 - 9999	52568	5363	2081	2076	5	1307	2158	777	123	274	30564	33041		
over 10,000	217321	24622	5571	5571		5141	9863	3027	24	278	142524	143008		
<b>1975</b>														
Total	184290	13866	3580	3488	94	3382	12555	4349	624	212	184128	177292		
1 - 299	5624	305	183	178	5	53	32	17	102	152	983	892		
300 - 999	27972	1164	592	558	33	318	137	117	144	131	4120	4062		
1000 - 2999	30182	1705	722	730	2	386	405	182	130	115	5939	7102		
3000 - 9999	52250	3854	1912	1908	4	1286	1928	729	248	232	23833	23818		
over 10,000	58562	24857	5161	5161		6339	10033	3304		252	148053	141419		
<b>1974</b>														
Total	302311	30337	3400	3373	27	7251	11159	3517	1019	224	160245	139774		
1 - 299	7961	377	265	258	7	74	21	17	479	167	1385	1250		
300 - 999	25311	1143	515	501	14	256	220	142	109	156	4314	4237		
1000 - 2999	23265	1558	556	551	5	366	380	156	91	114	5050	5426		
3000 - 9999	53289	5849	2070	2069	1	1104	1977	598	240	237	25234	25009		
over 10,000	187186	21410	4894	4894		5461	5551	2504		270	123213	105852		
<b>1973</b>														
Total	140231	29239	5944	5918	25	6874	10902	3519	469	192	115584	101935		
1 - 299	4680	208	128	123	5	36	27	17	79	121	451	391		
300 - 999	22084	1078	508	506	2	256	184	130	87	146	3499	3605		
1000 - 2999	25970	1831	537	533	4	472	537	135	78	116	4778	4367		
3000 - 9999	79380	5715	1952	1949	3	1198	1803	762	150	255	17172	16457		
over 10,000	211176	19407	3719	3707	12	4912	3351	2425	75	198	39684	37115		
<b>1972</b>														
Total	254824	24592	5385	5307	78	6180	3977	3050	1043	182	92736	83211		
1 - 299	4486	250	215	173	42	51	47	27	466	87	963	765		
300 - 999	15290	986	515	500	15	225	157	99	45	147	2124	2044		
1000 - 2999	22419	1475	549	540	9	368	410	148	61	122	3868	2999		
3000 - 9999	40022	4907	1711	1710	1	1058	1447	591	410	250	14936	12645		
over 10,000	184507	16874	3395	3384	11	4468	5916	2095	51	188	70846	64838		
<b>1971</b>														
Total	N.A.	23290	3823	3770	53	5865	3737	2965	685	158	78529	69316		
1 - 299	N.A.	538	393	181	12	201	173	66	349	84	1058	952		
300 - 999	N.A.	1919	575	564	11	532	415	197	78	112	3064	2837		
1000 - 2999	N.A.	1122	437	428	3	274	311	100	38	113	2569	2342		
3000 - 9999	N.A.	4614	1515	1507	3	798	1684	617	160	190	14755	12569		
over 10,000	N.A.	5197	3103	3090	13	3960	2149	1985	50	176	56972	50616		
<b>1970</b>														
Total	N.A.	20231	4883	4847	36	5167	7995	2286	392	151	57563	52475		
1 - 299	N.A.	375	184	171	13	56	110	25	182	144	552	597		
300 - 999	N.A.	303	378	375	3	399	399	37	141	104	1544	1441		
1000 - 2999	N.A.	1136	444	420	6	311	373	108	57	109	2303	1957		
3000 - 9999	N.A.	4122	1167	1164	3	365	513	477	12	155	10081	3095		
over 10,000	N.A.	13695	2710	2709	1	2636	5770	1579		170	43082	39384		
<b>1969</b>														
Total	N.A.	19322	4752	4712	50	4499	7449	2141	456	150	56478	50775		
Less than 1000 persons	N.A.	2123	732	687	45	330	497	205	342	160	1379	1265		
above 1000 persons	N.A.	17199	4020	4025	5	4169	6952	1935	114	150	54099	48511		

Table 6.9 (Continued)

Employment - Class	Within Firm Expenditure on R & D ¥ Million							Other Expenses	Self- financed R&D fund ¥ Million	Within Firm Ex- penditure on R&D ¥ Million	R&D Fund Paid Outside ¥ Million
	Wages & Salaries	Materials	Deprecia- tion of tangible fixed assets	Expenditure on tangible fixed assets			Total				
				Lands, Bldgs., etc.	Machinery, Utensils, Equipment etc.	Others					
1978											
Total	110844	81217	20315	28778	8097	19176	1505	48660	281261	265695	15567
1 - 299	742	195	113	171		160	11	99	1188	1168	20
300 - 999	3824	1585	390	998	139	811	39	1259	8070	7547	413
1000 - 2999	3501	942	526	483	17	438	29	992	6449	5448	1001
3000 - 9999	21954	12053	3107	3735	491	2996	247	7133	43781	43069	712
over 10,000	80822	66443	16180	23391	7441	14771	1180	39177	221772	208351	13422
1977											
Total	95883	43236	20284	22154	3533	10068	551	38981	228949	217488	11461
1 - 299	913	548	47	290	15	274	1	59	1808	1804	4
300 - 999	3202	1117	276	580	38	557	85	1047	6178	6008	171
1000 - 2999	3977	901	692	579	26	523	30	1271	6940	6257	584
3000 - 9999	16011	8757	3465	3450	1007	2324	119	6220	34035	33414	621
over 10,000	71781	51002	13804	17155	2449	14391	316	30384	179987	170005	9982
1976											
Total	90981	47270	25577	23261	3939	18457	864	34418	202770	191432	11138
1 - 299	1286	320	51	255	27	222	6	212	2074	2023	51
300 - 999	2608	881	637	865	30	822	13	694	5115	5038	77
1000 - 2999	9887	2265	754	967	45	907	15	2603	15374	14691	663
3000 - 9999	14552	7731	6344	3866	1026	2821	20	4415	30128	29019	1109
over 10,000	62648	36073	17792	17308	2812	13666	810	26495	150079	140561	9218
1975											
Total	76887	48174	21360	28196	8076	19740	378	30872	184919	177826	7093
1 - 299	653	115	50	141	61	81		74	1087	977	109
300 - 999	2374	759	276	535	64	457	13	642	4371	4318	53
1000 - 2999	3624	1260	765	600	27	534	42	1452	6678	6259	418
3000 - 9999	11714	6809	2516	2532	477	2050	5	2778	22023	21161	862
over 10,000	58521	39220	17751	24306	7450	16618	318	25926	150761	145110	5651
1974											
Total	52923	31161	17819	38290	17258	20371	660	37872	158644	156087	2557
1 - 299	698	300	91	226	9	218		160	1292	1260	32
300 - 999	1916	804	477	554	40	433	80	1040	4317	4314	3
1000 - 2999	2757	606	620	1244	159	976	109	1443	5876	5646	230
3000 - 9999	9250	8137	2386	4660	1378	3272	10	3237	23015	22480	535
over 10,000	38302	21314	14245	31606	15673	15473	460	31992	124145	122387	1757
1973											
Total	39259	31926	14803	28452	6969	20303	1180	15938	115336	N.A.	N.A.
1 - 299	295	50	14	73	12	53	8	33	523	N.A.	N.A.
300 - 999	1625	780	475	369	53	260	56	725	3514	N.A.	N.A.
1000 - 2999	2514	532	498	909	133	738	38	824	4835	N.A.	N.A.
3000 - 9999	7120	5103	1881	2596	1204	1376	17	2352	15892	N.A.	N.A.
over 10,000	27714	25462	11936	24504	5568	17877	1060	12004	90572	N.A.	N.A.
1972											
Total	31218	26305	11586	21111	6727	12535	1849	14102	92603	N.A.	N.A.
1 - 299	485	145	37	235	119	117		97	979	N.A.	N.A.
300 - 999	1177	452	163	243	33	201	8	252	2128	N.A.	N.A.
1000 - 2999	1567	522	331	1300	802	490	8	479	3861	N.A.	N.A.
3000 - 9999	5468	3598	1432	3703	1612	1923	167	2167	1445	N.A.	N.A.
over 10,000	22521	21587	9623	15631	4160	9804	1667	11106	71190	N.A.	N.A.
1971											
Total	25011	22051	8449	17662	7464	9229	968	13805	78220	N.A.	717
1 - 299	660	169	19	125	1	124		104	1085	N.A.	27
300 - 999	1596	753	240	467	58	312	97	2248	3165	N.A.	125
1000 - 2999	1206	426	266	593	145	431	17	3443	2639	N.A.	14
3000 - 9999	4956	3318	1164	3359	1752	1559	39	3131	14620	N.A.	188
over 10,000	16594	17384	6760	13117	5498	6804	815	9878	56712	N.A.	364
1970											
Total	20626	13668	6226	11413	3011	6803	1599	11955	53687	N.A.	650
1 - 299	354	131	51	105	46	55	4	52	660	N.A.	9
300 - 999	740	343	147	250	53	157	40	211	1620	N.A.	85
1000 - 2999	998	447	249	595	171	363	61	364	2263	N.A.	9
3000 - 9999	3982	2368	887	1873	211	1114	549	1858	9747	N.A.	173
over 10,000	14653	10380	4892	8590	2530	5114	946	9460	39397	N.A.	375
1969											
Total	16450	12293	5703	10828	4000	6460	57.6	1098.9	50432	39877	555
Less than 1000	1186	425	114	398	129	261	2.6	23.8	2317	2264	52
At least 1000	15263	11868	5589	10429	3871	6200	55.8	1075.1	48116	47613	503

Table 6.9 (Continued)

Employment - Class	R & D Fund Received		R & D Fund Paid Outside		Percentage of Within Firm Expenditure on R & D to Sales		Percentage of Within Firm Expenditure on R & D to Operating Profits		Within Firm Expenditure on R & D per Company ¥ 10,000		Within Firm Expenditure on R & D on Regular Researcher ¥ 10,000	
	Number of Companies	R & D Fund ¥ Million	Number of Companies	R & D Fund ¥ Million	Disburse- ment G/D.	Cost H/O.	Disburse- ment G/E.	Cost H/E.	Disburse- ment A/B.	Cost H/B.	Disburse- ment G/F.	Cost H/F.
1978												
Total	25	3813	49	15567	2.32	2.25	52.2	50.6	143351	138849	2765	2678
1 - 299	8	39	12	20	0.93	0.88	21.5	20.5	1749	1665	907	864
300 - 999	3	17	14	413	1.04	0.96	24.1	22.2	11112	10229	1110	1021
1000 - 2999	3	469	6	1001	0.87	0.87	17.3	17.4	22760	22924	1098	1106
3000 - 9999	8	1806	10	712	1.92	1.89	57.0	56.2	263971	260276	1544	1523
over 10,000	4	1482	7	13422	2.71	2.52	57.3	55.3	2997614	2894603	3830	3699
1977												
Total	27	1888	39	11461	2.20	2.19	43.7	43.3	109126	108196	2351	2331
1 - 299	2	6	4	4	1.57	1.36	39.4	34.1	2382	2062	1040	901
300 - 999	12	37	13	171	0.86	0.80	20.0	18.7	8060	7522	963	898
1000 - 2999	2	504	8	684	1.03	1.05	17.5	17.8	23201	23589	1133	1152
3000 - 9999	6	1025	7	521	1.91	1.91	48.9	48.9	245992	246098	1344	1344
over 10,000	5	317	7	9982	2.55	2.53	47.5	47.2	2433171	2413870	3171	3165
1976												
Total	24	4400	42	11138	1.77	1.79	51.7	52.3	41599	42090	1835	1856
1 - 299	7	50	11	51	1.57	1.41	33.1	29.8	2012	1814	978	881
300 - 999	1	10	7	77	0.96	0.92	20.5	19.6	8413	8034	898	858
1000 - 2999	4	1133	10	683	0.52	0.51	20.2	19.9	5459	5385	696	687
3000 - 9999	6	1544	7	1109	2.01	2.17	58.0	62.7	235104	254164	1472	1592
over 10,000	6	1663	7	9218	2.44	2.45	65.6	65.8	2036060	2042966	2558	2567
1975												
Total	21	6489	63	7093	2.38	2.29	99.9	96.2	92994	89542	2170	2089
1 - 299	6	6	27	109	0.78	0.71	17.5	15.9	1260	1144	552	501
300 - 999	1	3	11	53	0.70	0.66	15.6	14.7	7201	6769	849	798
1000 - 2999	3	867	11	418	1.00	1.02	23.0	23.5	17792	18211	951	973
3000 - 9999	7	2672	7	862	1.64	1.64	45.6	45.6	170235	170126	1249	1248
over 10,000	4	2942	7	5651	3.06	2.92	215.9	206.3	2115042	2020266	2869	2740
1974												
Total	138	4151	37	2557	2.51	2.19	53.0	46.2	49921	43542	1914	1669
1 - 299	127	125	5	32	0.95	0.85	17.4	15.7	653	590	537	484
300 - 999			6	3	1.16	1.14	17.0	16.7	8458	8307	861	846
1000 - 2999	2	404	15	230	0.86	0.77	21.3	19.1	16805	15073	929	834
3000 - 9999	5	2804	6	535	1.99	1.81	47.4	43.2	158024	143809	1222	1112
over 10,000	4	826	5	1757	3.17	2.72	65.8	56.5	2053555	1764201	2518	2163
1973												
Total	13	2874	88	2543	2.21	1.95	34.0	30.0	55569	49007	1671	1473
1 - 299			56	73	0.93	0.80	26.8	23.3	425	369	367	316
300 - 999			5	15	1.15	1.19	15.8	16.3	6998	7210	691	712
1000 - 2999	4	181	14	238	1.11	1.01	18.4	16.8	15414	14088	755	690
3000 - 9999	5	1918	8	626	1.87	1.79	21.6	20.7	122658	117547	981	644
over 10,000	4	780	5	1691	2.54	2.19	42.5	36.5	1281199	1101650	2419	2080
1972												
Total	18	2042	45	1420	2.01	1.80	35.0	31.4	36947	33152	1470	1319
1 - 299	8	14	17	30	0.87	0.69	21.5	17.0	629	500	556	442
300 - 999			5	5	0.77	0.74	13.9	13.4	4007	3856	425	409
1000 - 2999	1	55	9	49	1.07	0.80	18.9	14.2	15471	11598	716	537
3000 - 9999	5	1317	9	363	1.94	1.65	37.3	31.6	114891	97426	873	741
over 10,000	4	657	5	974	2.28	2.09	38.4	35.1	1012090	926261	2094	1916
1971												
Total	8	1065	124	717	1.90	1.68	N.A.	N.A.	20997	18534	N.A.	N.A.
1 - 299			89	27	0.89	0.80	N.A.	N.A.	428	18534	N.A.	N.A.
300 - 999	1	25	15	125	0.96	0.89	N.A.	N.A.	3648	3377	N.A.	N.A.
1000 - 2999	1	44	8	14	1.05	0.92	N.A.	N.A.	12132	10645	N.A.	N.A.
3000 - 9999	3	372	8	188	1.88	1.60	N.A.	N.A.	105464	89779	N.A.	N.A.
over 10,000	3	624	4	364	2.14	1.90	N.A.	N.A.	813886	723086	N.A.	N.A.
1970												
Total	11	6626	50	650	1.71	1.56	N.A.	N.A.	26092	23745	N.A.	N.A.
1 - 299			13	9	1.23	1.12	N.A.	N.A.	534	489	N.A.	N.A.
300 - 999	4	9	17	86	0.75	0.70	N.A.	N.A.	2757	2573	N.A.	N.A.
1000 - 2999	2	48	7	9	0.97	0.82	N.A.	N.A.	10013	8509	N.A.	N.A.
3000 - 9999	3	599	8	173	1.40	1.26	N.A.	N.A.	72007	54964	N.A.	N.A.
over 10,000	2	5970	5	375	2.00	1.83	N.A.	N.A.	718033	656400	N.A.	N.A.

Table 6.10

R&D WORKERS, WITHIN FIRM EXPENDITURE ON R&D  
IN THE AUTO INDUSTRY CROSS CLASSIFIED BY TOTAL SALES

Sales Class	Number of Companies A.	Number of Sample Companies	Total Sales- ¥ 100 Million	Total Operating Profits ¥ Million	Companies Accompanying R & D					Number of Persons Engaged R & D Total
					Number of Companies B.	Companies Conducting Intramural R & D	Number of Persons Employed (persons) C.	Sales ¥ 100 Million D.	Operating Profits ¥ Million E.	
1978										
Total	1904	269	133040	572587	188	186	392120	116297	516333	34342
Less than ¥100 Million	364	9	151	1560	1	1	597	57	155	26
¥100 Million-¥1 Billion	1118	45	3751	12338	5	9				
¥1 Billion-¥10 Billion	319	123	10531	32691	96	95	27328	3403	15252	771
over ¥10 Billion	103	92	118597	525998	83	82	364195	112757	500926	33545
1977										
Total	1977	281	119880	554463	201	200	289069	99496	502028	23604
Less than ¥100 Million	423	8	165	775	1	1	1584	144	430	52
¥100 Million-¥1 Billion	1062	57	4104	12882	27	27				
¥1 Billion-¥10 Billion	406	133	16100	34527	98	98	36872	4468	15170	387
over ¥10 Billion	36	83	99511	506279	75	74	350613	94883	486428	31655
1976										
Total	1675	229	125336	433568	471	469	660775	110528	378899	34009
Less than ¥100 Million	357	7	179	135	1	1	2675	162	445	119
¥100 Million-¥1 Billion	540	45	2705	11684	48	48				
¥1 Billion-¥10 Billion	707	110	36849	88279	354	352	296111	27719	36845	2984
over ¥10 Billion	71	67	85602	333470	68	68	341389	82667	231608	32906
1975										
Total	4329	241	91016	218704	198	180	400730	77375	184290	33866
Less than ¥100 Million	2890	10	451	239	1	1	15	0	2	-
¥100 Million-¥1 Billion	1022	47	5315	7484	19	18	1196	115	754	61
¥1 Billion-¥10 Billion	338	114	9389	39938	106	91	43084	4273	19318	1105
over ¥10 Billion	79	70	75861	171521	72	70	356455	72987	154217	32700
1974										
Total	2509	223	75277	360558	321	320	373123	63789	302311	30337
Less than ¥100 Million	558	10	239	1900	1	1	15	0	1	-
¥100 Million-¥1 Billion	1514	52	5327	33041	161	161	6115	505	5576	134
¥1 Billion-¥10 Billion	277	106	7991	41437	103	102	47137	3980	20500	1155
over ¥10 Billion	60	55	61713	284169	56	56	319658	59224	276233	29041
1973										
Total	2935	211	61766	381242	208	158	360168	52295	340231	28239
Less than ¥100 Million	1038	18	384	1294	58	8	1720	19	136	-
¥100 Million-¥1 Billion	1612	53	4225	26124	25	25	2605	127	658	104
¥1 Billion-¥10 Billion	232	89	6146	23950	77	77	49103	3343	18865	1470
over ¥10 Billion	53	51	51011	329874	48	48	306740	48795	320571	26665
1972										
Total	3781	231	55124	300367	251	251	346337	46198	254824	24392
Less than ¥100 Million	2614	27	761	270	40	40	1400	30	175	-
¥100 Million-¥1 Billion	857	70	3559	16503	52	52	5332	245	1375	100
¥1 Billion-¥10 Billion	262	90	6560	29723	117	117	53659	3668	18862	1319
over ¥10 Billion	48	44	44245	253870	42	42	285946	42255	244411	23173
1971										
Total	2919	223	N.A.	N.A.	374	373	364627	41372	N.A.	23390
Less than ¥100 Million	1432	29	N.A.	N.A.	140	140	3140	54	N.A.	-
¥100 Million-¥1 Billion	1028	69	N.A.	N.A.	88	87	13464	615	N.A.	555
¥1 Billion-¥10 Billion	321	88	N.A.	N.A.	112	112	70558	4269	N.A.	2318
over ¥10 Billion	38	37	N.A.	N.A.	34	34	277455	36435	N.A.	20517
1970										
Total	3185	223	N.A.	N.A.	221	221	321762	33685	N.A.	20231
Less than ¥100 Million	1643	32	N.A.	N.A.	31	31	480	14	N.A.	31
¥100 Million-¥1 Billion	1342	74	N.A.	N.A.	79	79	9544	362	N.A.	293
¥1 Billion-¥10 Billion	165	82	N.A.	N.A.	78	78	55470	2775	N.A.	1456
over ¥10 Billion	35	35	N.A.	N.A.	33	33	256268	30534	N.A.	18451
1969										
Total	N.A.	N.A.	28334.4	N.A.	245	242	N.A.	N.A.	N.A.	18851
Less than ¥1 Billion	N.A.	N.A.	518.0	N.A.	135	133	N.A.	N.A.	N.A.	677
over ¥1 Billion	N.A.	N.A.	27816.5	N.A.	110	109	N.A.	N.A.	N.A.	18174

Source: Sōrifu, Tōkei Kyoku, Kagaku gijutsū chōsa hokoku

Table 6.10 (Continued)

Sales Class	Research- ers	Regular F.	Number of Regular Research- ers per 10,000 persons Employed /Ca10,000	Within Firm Expenditure on R & D ¥ Million						Percentage of Within Firm Expenditure on R & D to Sales		
				Total		Wage & Salaries	Materials	Depreci- ation of Tangible Fixed Assets	Expendi- ture on Tangible Fixed Assets	Other Expenses	Disburse- ment G/D.	Cost H/O.
				Disburse- ment H2+4+5 G.	Cost H2+3+5 H.							
1978												
Total	9529	9747	249	269499	261037	110844	81217	20315	28778	48660	2.32	2.25
Less than ¥100 Million	22	20	345	97	91	65	18	2	8	5	1.70	1.60
¥100 Million-¥1 Billion												
¥1 Billion-¥10 Billion	473	432	158	3769	3464	2231	539	344	650	350	1.11	1.02
over ¥10 Billion	9344	9295	255	265633	257482	108548	80660	19968	28119	48306	2.36	2.28
1977												
Total	9351	9331	240	219344	217474	95883	62326	20284	22154	38981	2.20	2.19
Less than ¥100 Million	72	71	259	153	149	109	29	3	7	8	1.06	1.03
¥100 Million-¥1 Billion												
¥1 Billion-¥10 Billion	489	484	131	4290	3885	2358	825	342	746	360	0.96	0.87
over ¥10 Billion	8820	8806	251	214901	213440	93417	61471	19939	21400	38613	2.26	2.25
1976												
Total	10763	10679	167	195930	198246	90981	47270	25577	23261	34418	1.77	1.79
Less than ¥100 Million	66	64	239	317	304	228	47	6	19	23	1.96	1.88
¥100 Million-¥1 Billion												
¥1 Billion-¥10 Billion	2143	2075	70	13319	12900	8423	2032	561	980	1884	0.48	0.47
over ¥10 Billion	8554	8540	250	182294	185042	82330	45190	25010	22262	32512	2.21	2.24
1975												
Total	8580	8486	212	184128	177292	76887	48174	21360	28196	30872	2.38	2.29
Less than ¥100 Million	-	-	-	0	0	-	-	-	-	0	0.93	0.93
¥100 Million-¥1 Billion	47	46	385	175	168	121	31	9	11	12	1.52	1.47
¥1 Billion-¥10 Billion	598	511	119	3723	3563	2344	464	273	432	482	0.87	0.83
over ¥10 Billion	7935	7929	222	180231	173561	74422	47679	21082	27752	30378	2.47	2.38
1974												
Total	8400	8373	224	160243	139774	52923	31161	17819	38290	37872	2.51	2.19
Less than ¥100 Million	-	-	-	0	0	-	-	-	-	0	1.13	1.13
¥100 Million-¥1 Billion	87	80	121	825	346	237	169	55	133	65	1.07	0.93
¥1 Billion-¥10 Billion	635	619	131	3999	3648	1964	445	536	888	702	1.00	0.92
over ¥10 Billion	7678	7678	240	155621	135580	30701	30547	17228	27269	37104	2.63	2.29
1973												
Total	6944	6918	192	115584	101935	39269	31926	14803	28452	13938	2.21	1.95
Less than ¥100 Million	-	-	-	1	1	-	0	-	-	1	0.07	0.07
¥100 Million-¥1 Billion	63	59	226	189	182	138	25	5	11	15	1.48	1.44
¥1 Billion-¥10 Billion	638	634	129	4303	4154	2038	629	566	716	920	1.29	1.24
over ¥10 Billion	6243	6225	203	111091	97598	37093	31271	14232	27725	15002	2.28	2.00
1972												
Total	6385	6307	182	92736	83211	31218	26305	11586	21111	14102	2.01	1.90
Less than ¥100 Million	-	-	-	12	2	-	2	0	10	-	0.41	0.07
¥100 Million-¥1 Billion	54	52	98	298	266	183	60	7	39	15	1.22	1.09
¥1 Billion-¥10 Billion	732	677	126	2871	2617	1519	459	196	444	444	0.78	0.71
over ¥10 Billion	5599	5578	195	89555	80326	29516	25784	11383	20612	13643	2.12	1.90
1971												
Total	N.A.	5770	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Less than ¥100 Million	N.A.	-	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
¥100 Million-¥1 Billion	N.A.	139	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
¥1 Billion-¥10 Billion	N.A.	835	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
over ¥10 Billion	N.A.	4796	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
1970												
Total	N.A.	4847	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Less than ¥100 Million	N.A.	30	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
¥100 Million-¥1 Billion	N.A.	129	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
¥1 Billion-¥10 Billion	N.A.	565	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
over ¥10 Billion	N.A.	4124	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
1969												
Total	N.A.	4712	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Less than ¥1 Billion	N.A.	232	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
over ¥1 Billion	N.A.	4480	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

Source: Sōrifu, Tōkei Kyoku, Kagaku gijutsū chōsa hokoku

Table 6.11

R&D WORKERS, WITHIN FIRM EXPENDITURE ON R&D, R&D FUND RECEIVED  
AND R&D FUND PAID IN AUTO INDUSTRY  
CROSS-CLASSIFIED BY FIRM REGULAR RESEARCH WORKERS

Size Class (Regular Researchers)	Number of Companies A.	Number of Sample Companies	Total No. of Persons Employed (persons)	Total Sales ¥ 100 Million	Total Operating Profits ¥ Million	Companies Accompanying R & D				
						Number of Companies B.	Percen- tage (%) B/A.	Companies Conducting Within Firm R & D	Number of Persons Employed (persons) C.	Sales ¥ 100 Million D.
1978										
Total	1904	269	513100	133040	572387	188	9.9	186	392120	116217
0	1749	140	129820	18330	61692	33	1.9	31	8840	1508
1 - 29	119	94	71931	11923	53976	119	100.0	119	71931	11923
30 - 99	19	18	39164	7051	13049	19	100.0	19	39144	7051
over 100	17	17	272185	95735	423870	17	100.0	17	272185	95735
1977										
Total	1977	281	521154	119880	554463	201	10.2	200	389069	99496
0	1808	156	148924	22859	50058	32	1.8	31	15839	2475
1 - 29	134	91	69175	10063	53993	134	100.0	134	69175	10063
30 - 99	19	18	35454	5337	30782	19	100.0	19	35454	5337
over 100	16	16	257601	81621	409630	16	100.0	16	257601	81621
1976										
Total	1675	229	752169	125336	433568	471	28.1	469	640775	110529
0	1233	95	120350	15791	56431	29	2.4	27	3956	983
1 - 29	409	103	338734	33670	92805	409	100.0	409	338734	33670
30 - 99	18	16	44873	7577	35393	18	100.0	18	44873	7577
over 100	15	15	248212	68298	246938	15	100.0	15	248212	68298
1975										
Total	4329	241	553787	91016	218704	198	4.6	180	400750	77375
0	4161	105	164325	14884	38416	30	0.7	12	11298	1243
1 - 29	137	105	95694	12975	58330	137	100.0	137	95694	12875
30 - 99	17	17	45090	5338	30148	17	100.0	17	45090	6338
over 100	14	14	248668	56919	91610	14	100.0	14	248668	56919
1974										
Total	2509	223	506778	75277	360548	321	12.9	320	373125	63789
0	2299	104	138379	12054	62062	111	4.9	110	4726	566
1 - 29	179	89	91361	10576	54188	179	100.0	179	91361	10576
30 - 99	17	16	277038	52647	244299	17	100.0	17	277038	52647
over 100	14	14				14	100.0	14		
1973										
Total	2935	211	487154	61766	381242	308	7.1	158	360168	52285
0	2793	95	134401	10027	44151	66	2.4	16	7415	545
1 - 29	112	88	32335	6425	39016	112	100.0	112	32335	5425
30 - 99	16	14	270418	45315	298075	16	100.0	16	270418	45315
over 100	14	14				14	100.0	14		
1972										
Total	3781	231	513311	55124	300367	251	6.6	251	346337	46198
0	3598	125	175865	9632	39462	68	1.9	68	3891	705
1 - 29	155	79	30065	5023	20881	155	100.0	155	30065	5023
30 - 99	15	14	257381	39470	230024	15	100.0	15	257381	39470
over 100	13	13				13	100.0	13		
1971										
Total	2819	223	N.A.	N.A.	N.A.	374	13.3	373	364627	41372
0	2623	115	N.A.	N.A.	N.A.	178	6.8	178	12542	534
1 - 29	173	85	N.A.	N.A.	N.A.	173	100.0	172	52502	5583
30 - 99	12	12	N.A.	N.A.	N.A.	12	100.0	12	52502	5214
over 100	11	11	N.A.	N.A.	N.A.	11	100.0	11	200575	29061
1970										
Total	3185	223	N.A.	N.A.	N.A.	221	6.9	221	321762	13685
0	3018	121	N.A.	N.A.	N.A.	54	1.3	54	10347	593
1 - 29	142	77	N.A.	N.A.	N.A.	142	100.0	142	75492	3992
30 - 99	15	15	N.A.	N.A.	N.A.	15	100.0	15	239923	29100
over 100	10	10	N.A.	N.A.	N.A.	10	100.0	10		
1969										
Total	N.A.	N.A.	315624	20334.4	N.A.	245	N.A.	242	N.A.	N.A.
Less than 30	N.A.	N.A.	91446	4963.6	N.A.	218	N.A.	215	N.A.	N.A.
over 30	N.A.	N.A.	224178	23370.8	N.A.	27	N.A.	27	N.A.	N.A.

Source: Sōrifu, Tōkei Kyoku, Kagaku gijutsū chōsa hokoku



Table 6.11 (Continued)

Size Class	Within Firm Expenditure on R & D * Million							Self Financed R&D Fund * Million			
	Wages & Salaries	Materials	Depreciation of Tangible Fixed Assets	Expenditures on Tangible Fixed Assets				Other Expenses	Within Firm Expenditure on R&D	R&D Fund Paid Outside	
				Total	Land, Bldg., etc.	Machinery, Utensils, Equipment etc.	Others				
1978											
Total Regular Researcher	110844	81217	20315	26778	8097	19176	1505	48660	281261	265693	15567
0	40	41	60	66	13	53	-	123	709	270	439
1 - 29	5901	2075	787	1334	141	1156	38	1481	10981	10278	613
30 - 99	5034	1793	553	1023	278	697	48	1729	10701	10278	423
over 100	9869	77309	18816	26354	7665	17270	1419	45327	258960	244868	14093
1977											
Total	95883	62326	20284	22154	3535	18068	551	39981	226949	217488	11461
0	39	39	70	134	0	133	1	251	513	498	16
1 - 29	5195	1845	731	1358	78	1179	101	1092	9845	9474	371
30 - 99	5178	1983	1289	509	16	472	21	1601	9231	9758	473
over 100	35472	58398	18194	20152	3440	16264	428	36037	209360	198799	10601
1976											
Total	90981	47270	25577	23261	3939	18457	864	34418	202770	191632	11138
0	10	139	33	131	9	122	-	155	651	394	257
1 - 29	11220	2806	1019	1581	74	1461	26	2680	18300	18183	117
30 - 99	6829	3342	1006	701	25	668	8	2410	13050	12137	913
over 100	72922	40983	23518	20869	3832	16207	830	29172	170770	160919	9861
1975											
Total	76887	48174	21360	28196	8078	19740	378	30872	184919	177826	7093
0	14	61	7	29	2	22	16	59	271	173	98
1 - 29	6008	2591	1036	1930	501	1403	26	1694	12533	12163	370
30 - 99	4148	1778	731	507	25	463	18	1128	7069	6814	255
over 100	56716	43744	19985	25719	7549	17851	318	27991	165047	158676	6370
1974											
Total	52923	31161	17819	38290	17258	20371	660	37872	158644	156087	2557
0	16	173	32	36	-	35	-	82	249	246	3
1 - 29	3970	1163	913	1667	379	1101	188	1561	8993	9656	156
30 - 99	48937	29826	16873	36587	16879	19235	472	35830	149502	147145	2357
over 100											
1973											
Total	39269	31926	14803	28452	6969	20303	1180	15938	115336	N.A.	N.A.
0	18	20	2	1	-	1	-	36	103	N.A.	N.A.
1 - 29	3024	1149	833	1093	141	907	46	1155	6494	N.A.	N.A.
30 - 99	36227	30757	13968	27358	6828	19396	1134	14747	108740	N.A.	N.A.
over 100											
1972											
Total	31218	26305	11586	21111	6727	12535	1849	14102	92603	N.A.	N.A.
0	8	39	1	13	-	13	-	19	82	N.A.	N.A.
1 - 29	2622	824	415	1602	918	676	8	667	5710	N.A.	N.A.
30 - 99	28589	25442	11171	19497	5810	11845	1842	13415	86811	N.A.	N.A.
over 100											
1971											
Total	25011	22051	8449	N.A.	N.A.	N.A.	N.A.	13805	78220	N.A.	N.A.
0	70	106	3	N.A.	N.A.	N.A.	N.A.	31	289	N.A.	N.A.
1 - 29	2270	1094	479	N.A.	N.A.	N.A.	N.A.	766	5213	N.A.	N.A.
30 - 99	2411	2038	515	N.A.	N.A.	N.A.	N.A.	1465	7180	N.A.	N.A.
over 100	19260	18813	7446	N.A.	N.A.	N.A.	N.A.	11543	64539	N.A.	N.A.
1970											
Total	20826	13668	6226	N.A.	N.A.	N.A.	N.A.	11956	53687	N.A.	N.A.
0	44	96	6	N.A.	N.A.	N.A.	N.A.	62	272	N.A.	N.A.
1 - 29	1536	634	351	N.A.	N.A.	N.A.	N.A.	455	3347	N.A.	N.A.
30 - 99	19046	12948	5869	N.A.	N.A.	N.A.	N.A.	11439	50068	N.A.	N.A.
over 100											
1969											
Total	18450	12293	5703	N.A.	N.A.	N.A.	N.A.	10989	N.A.	N.A.	N.A.
Less than 30 persons	1924	667	238	N.A.	N.A.	N.A.	N.A.	586	N.A.	N.A.	N.A.
At least 30 persons	14526	11626	5465	N.A.	N.A.	N.A.	N.A.	10403	N.A.	N.A.	N.A.

Table 6.11 (Continued)

Size Class	R&D Fund Received		R&D Fund Paid		Percentage of Within Firm Expenditure on R&D to Sales		Percentage of Expenditure on R&D to Operating Profits		Within Firm Expenditure on R&D per company * 10,000		Within Firm Expenditure on R&D per regular researcher * 10,000	
	Number of Companies	R&D Fund \$ Million	Number of Companies	R&D Fund \$ Million	Disbursement G/D	Cost H/D	Disbursement G/E	Cost H/E	Disbursement G/B	Cost H/B	Disbursement G/F	Cost H/F
1978												
Total Regular Researcher	25	3813	49	15567	2.32	2.25	52.2	50.6	143351	138849	2765	2678
0	1	1	10	439	0.18	0.17	5.0	4.8	219	798	-	-
1 - 29	11	514	19	613	0.91	0.86	20.0	19.0	9066	8609	1211	1150
30 - 99	3	308	7	423	1.50	1.45	32.0	30.9	55678	53731	1230	1187
over 100	10	2991	13	14093	2.59	2.51	58.5	56.7	1457994	1413648	3100	3006
1977												
Total	27	1888	39	11461	2.20	2.19	43.7	43.3	109126	108196	2351	2331
0	11	26	5	16	0.21	0.19	6.9	6.0	1635	1433	-	-
1 - 29	3	17	15	371	5.94	0.82	14.6	16.4	7083	6614	1081	1009
30 - 99	3	545	6	473	1.74	1.88	30.1	32.7	48796	52900	1168	1256
over 100	10	1300	13	10601	2.45	2.45	48.8	48.4	1250367	1238132	2612	2567
1976												
Total	24	4400	42	11138	1.77	1.79	51.7	52.3	41599	42090	1835	1856
0	3	42	8	257	0.44	0.34	11.6	9.0	1522	1165	-	-
1 - 29	6	83	14	117	0.54	0.53	19.7	19.1	4466	4334	744	722
30 - 99	4	1248	7	913	1.75	1.75	37.5	38.4	73788	75485	1634	1671
over 100	11	3027	13	9851	2.40	2.44	66.4	67.5	1092974	1110638	2212	2248
1975												
Total	21	6487	63	7093	2.38	2.29	99.9	96.2	92994	89542	2170	2089
0	1	1	20	98	0.14	0.11	4.3	3.5	580	473	-	-
1 - 29	7	11	26	370	0.95	0.88	21.0	19.4	8922	8269	1259	1167
30 - 99	3	994	4	255	1.19	1.23	25.1	25.8	44476	45795	988	1018
over 100	10	5494	13	6370	2.88	2.78	178.8	172.1	1172646	1128832	2432	2341
1974												
Total	136	4181	37	2557	2.51	2.19	53.0	46.2	49921	43543	1914	1669
0	100	80	2	3	0.54	0.54	8.0	7.9	275	273	-	-
1 - 29	27	65	22	196	0.83	0.76	16.2	14.8	4894	4473	859	821
30 - 99	11	4074	13	2357	2.87	2.50	61.9	53.8	487874	624081	2044	1777
1973												
Total	13	2874	88	2643	2.21	1.95	34.0	30.0	55569	49007	1671	1473
0	-	-	51	28	0.14	0.14	2.4	2.4	113	115	-	-
1 - 29	4	181	21	254	1.00	0.96	16.3	15.8	5733	5501	767	736
30 - 99	9	2592	16	2361	2.41	2.11	36.5	32.1	163627	118993	1794	1574
over 100	1	-	-	-	-	-	-	-	-	-	-	-
1972												
Total	18	2042	45	1420	2.01	1.80	35.0	31.4	36947	33152	1470	1319
0	-	-	10	3	0.11	0.10	2.0	1.7	116	99	-	-
1 - 29	9	69	20	65	0.95	0.75	18.5	14.7	3687	2921	700	565
30 - 99	9	1973	15	1352	2.20	1.99	37.8	34.2	110511	280775	1583	1432
over 100	1	-	-	-	-	-	-	-	-	-	-	-
1971												
Total	8	1065	124	717	N.A.	1.18	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
0	-	-	80	5	N.A.	0.40	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
1 - 29	2	69	33	160	N.A.	0.85	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
30 - 99	2	333	4	35	N.A.	1.23	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
over 100	4	663	7	516	N.A.	1.98	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
1970												
Total	11	6626	50	650	N.A.	1.56	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
0	3	0	5	3	N.A.	0.33	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
1 - 29	3	57	32	99	N.A.	0.75	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
30 - 99	5	6569	13	548	N.A.	1.34	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
over 100	1	-	-	-	-	-	-	-	-	-	-	-
1969												
Total	15	900	245	50432	N.A.	1.61	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
At least 30	7	226	218	3996	N.A.	0.69	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
over 30	8	675	27	46437	N.A.	1.81	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

Table 6.11 (Continued)

Class Size	Operating Profits v. Million E	Number of Persons Engaged in R & D							Number of Internal Non-Reg. Researchers (persons)	Number of Regular Researchers per 10,000 Persons Employed F/10,000	Within Firm Expenditure on R&D v. Million	
		Total	Researchers			Assist. Research Workers	Technicians	Clerical & Other Support Person.			Disbursement 1+2+4+5	Cost H2+3+5
		Total	Regular	External Non-Reg.								
<b>1978</b>												
Total Regular Researchers	516333	34342	9829	9747	82	7799	12245	4469	530	249	269499	261037
0	5438	8	5	-	6	-	2	-	150	-	270	263
1 - 29	53976	1956	960	891	69	361	448	187	311	124	10791	10244
30 - 99	33049	1972	862	860	2	437	456	217	24	220	10579	10209
over 100	423870	30406	8001	7996	5	7001	11339	4065	345	294	247859	240320
<b>1977</b>												
Total	502028	32604	9351	9331	20	6840	12371	4042	591	240	219344	217474
0	7522	16	-	-	-	-	4	12	251	-	523	459
1 - 29	43993	1861	889	878	11	444	367	181	218	127	3491	3263
30 - 99	30782	1477	798	794	4	337	302	130	12	224	3271	10051
over 100	409630	29130	7664	7649	5	6059	11696	3709	110	286	200059	198101
<b>1976</b>												
Total	378899	36009	10763	10679	84	8182	12940	4124	444	167	195930	192426
0	3762	6	-	-	-	-	4	2	155	-	435	338
1 - 29	92805	4131	2523	2454	69	582	780	246	139	72	18267	17725
30 - 99	35393	2676	823	813	30	687	876	290	125	181	13282	13587
over 100	246938	29196	7417	7412	5	6913	11260	3586	25	299	163946	166596
<b>1975</b>												
Total	184290	13866	8580	8486	94	8382	12555	4349	624	212	184128	177292
0	4002	5	-	-	-	-	3	2	56	-	174	142
1 - 29	58330	2781	1060	971	89	832	622	267	254	101	12223	11329
30 - 99	30148	1888	767	765	2	366	575	180	313	170	7561	7385
over 100	91810	29192	6753	6750	3	7184	11355	3900	1	271	164170	158037
<b>1974</b>												
Total	307111	30337	8400	8373	27	7261	11159	3517	1019	224	160245	139774
0	3826	8	-	-	-	-	3	-	58	-	306	204
1 - 29	54111	2238	598	975	23	535	463	242	178	107	9761	8006
30 - 99	244182	28091	7402	7396	4	6726	10693	3270	293	267	191179	131465
<b>1973</b>												
Total	340231	28239	2944	2918	26	6874	10902	2519	469	192	115584	101935
0	3140	3	-	-	-	-	3	-	58	-	75	76
1 - 29	39016	2228	845	837	8	532	572	279	184	102	5421	6161
30 - 99	298075	26008	6099	6051	18	6342	10327	3240	227	225	109088	95690
<b>1972</b>												
Total	254824	24592	6385	6307	78	6180	8977	3050	1043	182	92736	83211
0	3919	5	-	-	64	496	548	218	440	102	5714	4528
1 - 29	30881	2142	880	816	14	5684	8427	2828	504	213	86943	78617
30 - 99	230024	22444	5505	5491	14	5684	8427	2828	504	213	86943	78617
over 100												
<b>1971</b>												
Total	23390	N.A.	5770	N.A.	N.A.	N.A.	N.A.	N.A.	158	-----	69316	-----
0	30	N.A.	-	N.A.	N.A.	N.A.	N.A.	N.A.	0	-----	216	-----
1 - 29	3311	N.A.	1001	N.A.	N.A.	N.A.	N.A.	N.A.	101	-----	5609	-----
30 - 99	2248	N.A.	572	N.A.	N.A.	N.A.	N.A.	N.A.	128	-----	5430	-----
over 100	17801	N.A.	4097	N.A.	N.A.	N.A.	N.A.	N.A.	204	-----	57061	-----
<b>1970</b>												
Total	20231	N.A.	4847	N.A.	N.A.	N.A.	N.A.	N.A.	151	-----	52476	-----
0	49	N.A.	-	N.A.	N.A.	N.A.	N.A.	N.A.	0	-----	198	-----
1 - 29	1832	N.A.	682	N.A.	N.A.	N.A.	N.A.	N.A.	90	-----	2975	-----
30 - 99	18350	N.A.	4165	N.A.	N.A.	N.A.	N.A.	N.A.	177	-----	49302	-----
over 100												
<b>1969</b>												
Total	18851	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	150	-----	45651	-----
Less than 30	2596	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	30	-----	3438	-----
over 30	16255	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	170	-----	42213	-----

Table 6.12

R&D WORKERS & WITHIN FIRM EXPENDITURE ON R&D IN AUTO INDUSTRY  
CROSS CLASSIFIED BY SIZE OF OPERATING PROFITS (COMPANY)

Size of Operating Profits	Number of Companies A	Number of Sample Companies	Total Sales ¥100 Million	Total Operating Profits ¥ Million	Companies Accompanying R&D					Number of Persons Engaged in R&D Total
					Number of Companies g	Companies Conducting Intramural R&D	Number of Person Employed (persons) C	Sales ¥ 100 Million D	Operating Profits ¥ Million	
1978										
Total	1904	269	133040	572587	168	186	392120	116217	516335	34342
Less than ¥10 M	1064	44	2836	-611	4	4	324	30	2	11
¥10 - 100 Million	631	79	6733	22124	61	61	11465	1424	3421	341
¥100 M - ¥ 1 B	143	105	13872	58989	90	78	53319	9041	35118	1417
Above ¥ 1 Billion	46	45	109598	492085	43	43	327012	105722	477792	32573
1977										
Total	1977	281	119880	554463	201	200	389069	99496	502028	32604
Less than ¥10 M	980	42	7454	-2079	6	5	1375	187	-549	50
¥10 - 100 Million	781	85	7313	21509	80	80	17695	2043	3512	425
¥100 M - ¥ 1 B	167	106	11107	50529	70	70	46394	5964	31118	1192
Above ¥ 1 Billion	49	48	94007	484503	45	44	323605	90302	467916	30927
1976										
Total	1675	229	125136	433568	471	469	640775	110528	378899	36009
Less than ¥10 M	613	43	10862	-23459	43	42	51381	8875	-19729	6358
¥10 - 100 Million	545	55	7688	26556	48	47	12631	1290	2903	306
¥100 M - ¥ 1 B	479	33	36395	96966	345	345	325732	32827	74081	4673
Above ¥ 1 Billion	30	30	70491	333505	35	35	251031	67536	321643	24612
1975										
Total	4329	241	91016	218704	198	180	400750	77375	184250	33866
Less than ¥10 M	3293	25	7514	-33852	8	5	18930	5250	-6317	4879
¥10 - 100 Million	798	79	7150	40591	56	41	10937	1130	2504	216
¥100 M - ¥ 1 B	206	105	14605	56596	103	100	90459	11516	38822	3218
Above ¥ 1 Billion	32	32	61735	156369	31	31	262424	59479	149281	23689
1974										
Total	2509	223	75277	380548	321	320	373325	63789	202311	30337
Less than ¥10 M	379	24	1240	1786	6	6	2265	203	-757	113
¥10 - 100 Million	1318	85	7238	36287	187	186	15205	1402	4981	413
¥100 M - ¥ 1 B	177	80	8780	51100	94	94	65123	5295	13318	1774
Above ¥ 1 Billion	35	34	57920	271376	34	34	290532	55890	264768	28037
1973										
Total	2935	211	61766	381242	208	158	360168	52285	140231	28239
Less than ¥10 M	1390	47	4515	-5811	76	26	19335	2237	-5570	1630
¥10 - 100 Million	1434	54	5271	30495	37	37	9845	591	1738	289
¥100 M - ¥ 1 B	80	70	6141	32836	65	55	71386	5298	27511	2534
Above ¥ 1 Billion	31	30	45839	323722	30	30	259602	44158	316552	23786
1972										
Total	3781	231	55124	300367	251	251	346337	46198	264824	24502
Less than ¥10 M	2946	61	4012	-9025	70	70	18228	2197	-1742	1541
¥10 - 100 Million	674	72	6429	24177	91	91	29995	2421	4128	1441
¥100 M - ¥ 1 B	134	72	6168	38216	64	64	58086	4474	23111	1886
Above ¥ 1 Billion	27	26	28515	246000	26	25	240029	37107	239327	19724

NOT AVAILABLE BEFORE 1972

Source: Sōrifu, Tōkei Kyoku, Kagaku gijutsū chōsa hokoku

Table 6.12 (Continued)

Size of Operating Profits	Number of Persons Engaged in R&D		Number of Regular Researchers per 10,000 Employed (persons) F/Cx10,000	Within Firm Expenditure on R&D, Y Million						Other Excesses	Percentage of Intramural Expenditure on R&D to Operating Profits		
	Researchers	Regular		Total	Disburse-ment H2+4+1 G	Cost H2+3+5	Wages & Salaries 1	Materials 2	Deprecia-tion of Tangible Fixed Assets 3		Expendi-ture on Tangible Fixed Assets 4	Disburse-ment G/E	Cost H/E
1978													
Total	9829	9747	249	269499	261037	110844	81217	20315	28778	48660	52.2	50.4	
Less than \$10 M	3	2	247	42	42	31	7	1	1	3	2116.0	2116.5	
\$10 - 100 Million	216	189	165	1506	1411	934	210	129	224	138	44.0	41.2	
\$100 M - \$1 B	750	701	131	7601	7120	4056	1451	473	955	1140	21.6	20.3	
Above \$1 Billion	8855	8849	71	260350	252464	105824	79548	19713	27599	47379	54.5	52.8	
1977													
Total	9351	9331	240	219344	217474	95883	52326	20284	22154	38981	43.7	43.3	
Less than \$10 M	34	34	247	229	170	132	19	2	62	16	-41.8	-30.9	
\$10 - 100 Million	245	240	136	2240	2022	1134	595	96	314	196	63.8	57.6	
\$100 M - \$1 B	561	555	120	5229	5024	3472	942	472	677	1138	20.0	19.4	
Above \$1 Billion	6511	6502	263	210646	209258	91145	50759	19713	21101	37630	48.0	44.7	
1976													
Total	10763	10679	167	195930	196246	90981	47270	25577	23261	34418	51.7	52.3	
Less than \$10 M	1517	1515	295	20234	20159	11864	4649	2025	2111	1611	-102.6	-102.2	
\$10 - 100 Million	173	146	116	1589	1435	1093	155	56	211	129	54.8	49.4	
\$100 M - \$1 B	2732	2683	82	19664	23260	11631	3759	5188	1593	2581	26.5	31.4	
Above \$1 Billion	6341	6335	252	154442	153393	66391	38707	18297	19346	29997	48.0	47.1	
1975													
Total	8980	8486	212	184128	177292	76887	48174	21360	28196	30872	99.9	96.2	
Less than \$10 M	373	973	263	11511	10964	7215	2628	848	1395	273	-182.2	-173.6	
\$10 - 100 Million	171	169	155	828	534	631	82	31	24	91	33.1	33.3	
\$100 M - \$1 B	1231	1144	216	11426	10854	5788	2466	1003	1576	1597	29.4	28.0	
Above \$1 Billion	6205	6200	236	160363	154640	63254	42998	19478	25201	28911	107.4	103.6	
1974													
Total	8400	8373	224	160245	139774	52923	31161	17819	28290	37872	53.0	46.2	
Less than \$10 M	40	39	172	215	257	152	33	49	3	21	-	-	
\$10 - 100 Million	272	264	134	1289	1313	726	314	71	147	203	27.9	26.4	
\$100 M - \$1 B	842	826	127	6839	6839	3158	1010	796	1381	1576	21.4	19.6	
Above \$1 Billion	7246	7244	249	151516	131665	38887	29604	18903	36753	36072	57.2	49.7	
1973													
Total	6944	5918	192	115584	101935	39269	31926	14803	28452	15938	34.0	30.0	
Less than \$10 M	457	455	235	6904	5963	2304	1689	1116	2158	754	-123.9	-105.2	
\$10 - 100 Million	198	195	198	328	746	547	56	17	99	116	47.7	43.0	
\$100 M - \$1 B	941	936	131	5389	6244	3148	983	352	997	1361	23.2	22.7	
Above \$1 Billion	5348	5332	205	101464	99082	33271	29288	12817	25198	13707	32.1	28.1	
1972													
Total	6385	6307	182	92736	83211	31218	26305	11586	21111	14102	35.0	31.4	
Less than \$10 M	465	464	255	3660	5356	1870	1771	944	1249	771	-328.0	-307.5	
\$10 - 100 Million	576	533	178	2788	2491	1438	589	213	509	251	67.5	50.3	
\$100 M - \$1 B	869	848	146	4465	3505	1958	711	134	1394	503	20.2	15.6	
Above \$1 Billion	4475	4462	186	79623	71759	25963	23234	10095	17959	12477	33.3	30.0	
NOT AVAILABLE BEFORE 1972													

Table 5.13  
REGULAR RESEARCHERS IN AUTO INDUSTRY BY SPECIALTY (COMPANIES)

Total	% of Total in the Industry	Natural Science & Technology										
		Total	Physical Science					Engineering				
			Total	Mathematics & Physics	Chemistry	Biology	Geology	Total	Mechanical Shipping & Aircraft Eng.	Electrical & Telecomm. Eng.	Civil Eng. & Architecture	
1978	1747	6.3	9724	919	445	473	2	1	8290	7165	765	13
1977	9931	6.2	9284	906	450	437	3	16	7888	6867	662	25
1976	10679	7.4	10639	1151	457	693	1	-	8905	6827	684	16
1975	8488	9.8	8464	899	442	456	1		6969	5974	641	14
1974	8373	6.4	8344	993	524	467	2		6793	9819	666	12
1973	6916	9.5	6885	785	369	411	2	3	5686	4937	492	10
1972	6307	5.6	6283	699	349	347	-	3	5170	4475	640	0
1971	5770	5.2	5752	622	297	322	-	3	4686	4017	401	11
1970	4847	5.2	4829	569	296	270	-	3	3947	3441	303	10
1969	4712	5.7	4499	N.A.	N.A.	N.A.	N.A.	N.A.	3867	N.A.	N.A.	N.A.

	Engineering		Agriculture				Health			Others	Social Science & Humanities
	Metallurgy & Metal Eng.	Textiles & Eng.	Total	Agriculture & Forestry	Animal Husbandry & Veterinary	Fishery	Total	Medical Science & Dentistry	Pharmacy		
1978	325	22	7	7	-	-	-	-	-	508	80
1977	313	21	9	9	-	-	-	-	-	481	47
1976	350	28	16	16	-	-	-	-	-	565	
1975	316	24	13	13	-	-	-	-	-	582	22
1974	278	18	6	6	-	-	-	-	-	552	29
1973	227	20	5	5	-	-	2	-	2	407	331
1972	229	17	4	4	-	-	-	-	-	619	24
1971	198	59	2	2	-	-	-	-	-	442	18
1970	182	11	2	1	-	1	24	-	24	287	18
1969	NOT AVAILABLE										

Source: Sōrifu, Tōkei Kyoku, Kagaku gijutsū chōsa hokoku

Table 6.14

WITHIN FIRM EXPENDITURE ON R&D (DISBURSEMENT) IN AUTO INDUSTRY  
CROSS-CLASSIFIED BY FIRM CAPITALIZATION AND TYPE OF R&D

Capital Class	Number of Companies Conducting R&D	Within Firm Expenditure on R&D by Type of R&D (Million)			Percentage Distribution			
		Total	Basic Research	Applied Research	Developmental Research	Basic Research	Applied Research	Developmental Research
<b>1978</b>								
Total	186	269499	5591	36650	227258	2.1	13.6	64.3
¥ 3 - 10 Million	1	1623	8	127	1488	0.5	7.6	91.7
¥ 10 - 100 Million	68							
¥ 100 M - ¥ 1 B	79	10332	16	415	9901	0.2	4.0	95.8
¥ 1 - 10 Billion	28	32691	1753	6611	24327	5.4	20.2	74.4
Above ¥ 10 Billion	10	224853	3814	29497	191542	1.7	13.1	85.2
<b>1977</b>								
Total	200	219344	9956	29264	180125	4.5	13.3	82.1
¥ 3 - 10 Million	4	37	-	-	37	-	-	100.0
¥ 10 - 100 Million	73	1921	-	37	1884	-	1.9	98.1
¥ 100 M - ¥ 1 B	88	6929	5	243	8681	0.1	2.7	97.2
¥ 1 - 10 Billion	25	27624	1087	5425	21112	3.9	19.6	76.4
Above ¥ 10 Billion	10	180833	8863	23559	148411	4.9	13.0	82.1
<b>1976</b>								
Total	469	195930	8033	27622	160276	4.1	14.1	81.1
¥ 3 - 10 Million	6	81	-	-	81	-	-	100.0
¥ 10 - 100 Million	97	2337	-	47	2290	-	2.0	98.0
¥ 100 M - ¥ 1 B	333	16791	5	218	16568	0.0	1.3	98.7
¥ 1 - 10 Billion	23	23315	528	1852	20934	2.3	7.9	89.8
Above ¥ 10 Billion	10	153406	7499	25504	120402	4.9	16.6	78.5
<b>1975</b>								
Total	180	184128	15341	30689	138098	8.3	16.7	75.0
¥ 3 - 10 Million	3	37	-	-	37	-	-	100.0
¥ 10 - 100 Million	57	1138	1	130	1007	0.1	11.4	88.5
¥ 100 M - ¥ 1 B	96	7982	18	378	7585	0.2	4.7	95.0
¥ 1 - 10 Billion	24	12517	365	1026	16126	2.1	5.9	92.1
Above ¥ 10 Billion	10	157455	14957	29155	113343	9.5	18.5	72.0
<b>1974</b>								
Total	320	160245	10362	21819	128064	6.5	13.6	79.9
¥ 3 - 10 Million	103	207	-	-	207	-	-	100.0
¥ 10 - 100 Million	101	1294	-	96	1198	-	7.4	92.6
¥ 100 M - ¥ 1 B	38	7820	6	469	7144	0.1	6.2	93.8
¥ 1 - 10 Billion	22	17581	279	761	16541	1.5	4.3	94.1
Above ¥ 10 Billion	9	133543	10077	20493	102973	7.5	15.3	77.1
<b>1973</b>								
Total	158	115584	8231	22457	84896	7.1	19.4	73.4
¥ 3 - 10 Million	3	19	1	1	17	3.5	7.1	89.4
¥ 10 - 100 Million	54	612	5	130	477	0.8	21.2	78.0
¥ 100 M - ¥ 1 B	68	5676	118	357	5201	2.1	6.3	91.6
¥ 1 - 10 Billion	25	20750	1984	4740	14027	9.6	22.8	67.6
Above ¥ 10 Billion	3	88528	6123	17230	65175	6.9	19.5	73.4
<b>1972</b>								
Total	251	92736	7419	22364	62953	8.0	24.1	67.9
¥ 3 - 10 Million	42	19	1	1	18	2.8	4.4	92.8
¥ 10 - 100 Million	122	1405	52	373	980	3.7	26.5	69.8
¥ 100 M - ¥ 1 B	58	2998	155	501	2342	5.2	16.7	78.1
¥ 1 - 10 Billion	20	13956	735	4907	3314	5.3	35.2	59.6
Above ¥ 10 Billion	9	74359	6477	16582	51299	8.7	22.3	69.0
<b>1971</b>								
Total	373	78529	7313	16884	54331	9.3	21.5	69.2
¥ 3 - 10 Million	81	29	-	-	29	-	-	100.0
¥ 10 - 100 Million	206	2519	109	929	1482	4.3	36.3	58.8
¥ 100 M - ¥ 1 B	56	2579	178	461	1940	6.9	17.9	75.2
¥ 1 - 10 Billion	20	10287	1235	2009	7043	12.0	19.5	68.5
Above ¥ 10 Billion	10	63115	5791	13486	43838	9.2	21.4	69.5
<b>1970</b>								
Total	221	57663	5850	10098	41714	10.1	17.5	72.3
¥ 3 - 10 Million	62	109	-	8	101	-	7.3	92.7
¥ 10 - 100 Million	77	778	9	273	796	1.2	35.1	63.8
¥ 100 M - ¥ 1 B	53	2241	132	509	1600	5.9	22.7	71.4
¥ 1 - 10 Billion	20	7275	979	1391	4905	13.5	19.1	67.4
Above ¥ 10 Billion	9	47260	4730	7917	34613	10.0	16.8	73.2
<b>1969</b>								
Total	242	5077.5	391.8	898.0	3790.7	7.7	17.6	74.7
Less than ¥100 M	161	107.5	19.7	14.4	73.4	18.3	13.4	68.3
Above ¥100 Million	81	4970.0	372.1	883.6	3717.3	7.5	17.7	74.8

Source: Sōrifu, Tōkei Kyoku, Kagaku gijutsu chōsa hokoku

Table 6.15

R&D FUND RECEIVED & R&D FUND PAID IN AUTO INDUSTRY  
CROSS-CLASSIFIED BY FIRM CAPITALIZATION

Capital Class	From General Local Govt.			R&D FUND RECEIVED From Non-Govt.			From Foreign Countries		
	Number of Companies	R&D Fund ¥ Million	Within Company Expend.	Number of Companies	R&D Fund ¥ Million	Within Company Expend.	Number of Companies	R&D Fund ¥ Million	Within Company Expend.
1978									
Total	11	258	258	14	3472	3465	2	83	83
¥ 3 - 30 Million	-	-	-	1	1	1	-	-	-
¥ 30 - 100 Million	7	38	38	1	11	4	-	-	-
¥ 100 M - ¥ 1 B	-	-	-	4	561	961	1	1	1
¥ 1 - 10 Billion	1	15	15	4	287	287	-	-	-
Above ¥ 10 Billion	3	205	205	4	2613	2613	1	82	82
1977									
Total	11	346	346	21	1459	2428	1	x	x
¥ 3 - 30 Million	-	-	-	1	x	x	-	-	-
¥ 30 - 100 Million	1	x	x	-	-	-	-	-	-
¥ 100 M - ¥ 1 B	-	-	-	14	341	509	-	-	-
¥ 1 - 10 Billion	2	x	x	2	x	x	-	-	-
Above ¥ 10 Billion	8	279	279	4	867	867	1	x	x
1976									
Total	13	386	386	16	3891	3788	2	124	124
¥ 3 - 30 Million	-	-	-	2	2	2	-	-	-
¥ 30 - 100 Million	4	8	8	2	50	50	-	-	-
¥ 100 M - ¥ 1 B	-	-	-	4	1133	1031	-	-	-
¥ 1 - 10 Billion	2	73	73	2	977	977	-	-	-
Above ¥ 10 Billion	7	305	305	6	1729	1729	2	124	124
1975									
Total	10	659	659	16	5754	5567	2	76	76
¥ 3 - 30 Million	-	-	-	1	1	1	-	-	-
¥ 30 - 100 Million	2	5	5	4	3	3	-	-	-
¥ 100 M - ¥ 1 B	-	-	-	3	867	680	-	-	-
¥ 1 - 10 Billion	2	44	44	3	2241	2241	-	-	-
Above ¥ 10 Billion	6	610	610	5	2643	2643	2	76	76
1974									
Total	30	790	790	110	3324	3324	1	45	45
¥ 3 - 30 Million	-	-	-	101	62	62	-	-	-
¥ 30 - 100 Million	26	63	63	-	-	-	-	-	-
¥ 100 M - ¥ 1 B	-	-	-	2	404	404	-	-	-
¥ 1 - 10 Billion	-	-	-	3	2273	2273	-	-	-
Above ¥ 10 Billion	4	727	727	4	585	585	1	45	45
1973									
Total	6	616	596	12	2193	2187	1	65	65
¥ 3 - 30 Million	-	-	-	-	-	-	-	-	-
¥ 30 - 100 Million	-	-	-	-	-	-	-	-	-
¥ 100 M - ¥ 1 B	-	-	-	4	181	181	-	-	-
¥ 1 - 10 Billion	-	-	-	3	1304	1304	-	-	-
Above ¥ 10 Billion	6	616	596	5	708	701	1	65	65
1972									
Total	12	37	70	7	1839	1377	2	106	106
¥ 3 - 30 Million	-	-	-	-	-	-	-	-	-
¥ 30 - 100 Million	3	14	14	-	-	-	-	-	-
¥ 100 M - ¥ 1 B	-	-	-	1	55	55	-	-	-
¥ 1 - 10 Billion	-	-	-	3	826	826	-	-	-
Above ¥ 10 Billion	4	33	56	3	358	495	2	106	106
1971									
Total	2	59	59	6	951	912	1	54	54
¥ 3 - 30 Million	-	-	-	-	-	-	-	-	-
¥ 30 - 100 Million	-	-	-	-	-	-	-	-	-
¥ 100 M - ¥ 1 B	-	-	-	2	69	69	-	-	-
¥ 1 - 10 Billion	-	-	-	1	322	322	-	-	-
Above ¥ 10 Billion	2	59	59	3	561	521	1	54	54
1970									
Total	-	-	-	10	6570	4569	1	56	56
¥ 3 - 30 Million	-	-	-	-	-	-	-	-	-
¥ 30 - 100 Million	-	-	-	-	-	-	-	-	-
¥ 100 M - ¥ 1 B	-	-	-	5	57	57	-	-	-
¥ 1 - 10 Billion	-	-	-	2	507	507	-	-	-
Above ¥ 10 Billion	-	-	-	2	5006	4005	1	56	56
1969									
Total	9	25	23	7	875	875	-	-	-
Less than ¥100 M	1	1	1	-	-	-	-	-	-
Above ¥100 Million	8	24	22	7	875	875	-	-	-

Source: Sōrify, Tōkei Kyoku, Kagaku gijutsū chōsa hokoku



Table 6.15 (Continued)

Industry & Capital Class	R&D FUND PAID								
	To Central & Local Govt.			To Non-Govt.			To Foreign Countries		
	Number of Companies	R&D Fund \$ Million	Self- Finance	Number of Companies	R&D Fund \$ Million	Self- Finance	Number of Companies	R&D Fund \$ Million	Self- Finance
1978									
Total	10	69	69	42	14649	14649	8	730	730
\$ 3 - 10 Million	-	-	-	1	1	1	-	-	-
\$10 - 100 Million	1	0	0	10	10	10	-	-	-
\$100 M - \$1 B	3	10	10	13	798	798	1	174	174
\$ 1 - 10 Billion	1	1	1	9	796	796	1	31	31
Above \$ 10 Billion	5	58	58	9	13044	13044	6	525	525
1977									
Total	13	34	34	32	11096	11096	7	331	331
\$ 3 - 10 Million	-	-	-	1	5	5	-	-	-
\$10 - 100 Million	-	-	-	4	-	-	-	-	-
\$100 M - \$1 B	6	9	9	10	459	459	1	332	332
\$ 1 - 10 Billion	1	-	-	8	677	677	1	-	-
Above \$ 10 Billion	6	25	25	9	9956	9956	5	-	-
1976									
Total	14	28	28	38	9879	9879	9	1231	1231
\$ 3 - 10 Million	-	-	-	4	4	4	-	-	-
\$10 - 100 Million	-	-	-	6	46	46	-	-	-
\$100 M - \$1 B	4	2	2	12	478	478	-	-	-
\$ 1 - 10 Billion	4	6	6	8	557	557	2	487	487
Above \$ 10 Billion	6	20	20	8	8794	8794	7	743	743
1975									
Total	16	39	39	54	6247	6247	8	808	808
\$ 3 - 10 Million	-	-	-	3	3	3	-	-	-
\$10 - 100 Million	4	8	8	20	99	99	-	-	-
\$100 M - \$1 B	4	3	3	14	266	266	-	-	-
\$ 1 - 10 Billion	3	6	6	9	506	506	2	151	151
Above \$ 10 Billion	5	22	22	8	5373	5373	6	657	657
1974									
Total	11	21	21	32	1867	1867	8	669	669
\$ 3 - 10 Million	-	-	-	1	0	0	-	-	-
\$10 - 100 Million	-	-	-	7	32	32	-	-	-
\$100 M - \$1 B	6	3	3	11	145	145	-	-	-
\$ 1 - 10 Billion	1	2	2	8	200	200	2	75	75
Above \$ 10 Billion	4	16	16	5	1489	1489	6	593	593
1973									
Total	12	94	94	32	2065	2045	7	483	460
\$ 3 - 10 Million	-	-	-	51	25	25	-	-	-
\$10 - 100 Million	1	0	0	4	47	47	-	-	-
\$100 M - \$1 B	3	2	2	12	245	245	-	-	-
\$ 1 - 10 Billion	4	8	8	9	374	374	1	4	4
Above \$ 10 Billion	4	84	84	6	1374	1353	6	479	456
1972									
Total	15	31	31	37	852	851	7	537	537
\$ 3 - 10 Million	-	-	-	1	0	0	-	-	-
\$10 - 100 Million	2	1	1	14	29	29	-	-	-
\$100 M - \$1 B	2	1	1	7	43	43	-	-	-
\$ 1 - 10 Billion	7	15	15	9	237	237	1	2	2
Above \$ 10 Billion	4	14	14	6	542	541	6	535	535
1971									
Total	34	30	30	103	240	240	7	447	447
\$ 3 - 10 Million	-	-	-	10	2	2	-	-	-
\$ 10 - 100 Million	32	5	5	75	11	11	2	14	14
\$100 M - \$1 B	4	2	2	5	30	30	1	92	92
\$ 1 - 10 Billion	4	4	4	8	84	84	1	13	13
Above \$ 10 Billion	4	19	19	5	114	114	3	328	328
1970									
Total	18	20	20	42	267	267	6	363	363
\$ 3 - 10 Million	-	-	-	-	-	-	-	-	-
\$10 - 100 Million	7	1	1	24	14	14	-	-	-
\$100 M - \$1 B	2	1	1	5	6	5	1	76	76
\$ 1 - 10 Billion	4	4	4	7	95	95	2	16	16
Above \$ 10 Billion	5	14	13	6	151	151	3	272	272
1969									
Total	25	32	32	79	232	228	3	294	294
Less than \$ 100 M	13	4	4	59	31	31	-	-	-
Above \$ 100 Million	13	28	28	20	201	198	3	294	294

Table 6.16

WITHIN FIRM EXPENDITURE ON R&D (DISBURSEMENT) BY AUTOMOBILE INDUSTRY  
 FIRMS CROSS-CLASSIFIED BY PRODUCT FIELD  
 (Companies with the capital of 100 million yen or more)

	Number of Companies Conducting Intramural R&D	Companies accompanying R&D in two or more Product Fields	Total (Million ¥)	Agricultural, Forest and Fishing Products	Mining Products	Bldg Construc- tion and Civil Engineering	Food Pro- ducts	Textile Products	Pulp and Paper Products	Printing and Publishing
1978	117	38	267876	-----	-----	381	2	179	-----	-----
1977	123	34	217386	-----	-----	1151	168	-----	-----	-----
1976	366	38	193512	43	-----	3117	69	145	-----	-----
1975	120	41	182953	-----	-----	360	63	143	2	1
1974	114	33	158744	23	-----	19	-----	72	-----	-----
1973	101	30	114918	21	-----	24	1	54	1	1
1972	87	26	90352	-----	-----	12	1	17	1	2
1971	86	26	75864	-----	-----	-----	1	88	2	0
1970	29	12	54054	-----	-----	115	-----	-----	-----	-----

(figures not available before 1970.)

Source: Sōrifu, Tōkei Kyoku, Kagaku gijutsū chōsa hokoku

Table 6.16 (Continued)

	Chemical Fertilizers and Inorganic Chemical Prod.	Chemical Fibers	Oils and Paints	Other Chemical Products	Drugs and Medicine	Rubber Products	Ceramic Products	Iron and Steel	Non-ferrous Metals	Fabricated Metal Products	Ordinary Machinery	Household Electric Equipment
1978	193	-----	80	10	-----	34	129	404	164	439	5415	246
1977	103	-----	76	9	-----	55	122	413	170	333	5861	598
1976	159	-----	67	0	-----	77	106	345	179	216	4555	37
1975	111	68	-----	28	9	-----	103	329	128	475	3762	76
1974	143	-----	58	155	-----	-----	72	246	99	1037	3108	92
1973	119	4	43	4	28	-----	53	245	72	170	6047	91
1972	55	4	55	1	7	0	39	80	89	249	2003	24
1971	117	4	53	107	11	1	64	590	131	220	2050	34
1970	-----	-----	-----	130	-----	-----	-----	258	42	-----	1164	86

(figures not available before 1970.)

Table 6.16 (Continued)

	Petroleum Products	Communication and electronics Equipment	Other Electronic Equipment	Automobiles	Ships	Aircrafts	Railroad Equipment	Other Transportation Equipment	Precision Instruments	Other Mfg. Products	Electricity and Gas	Others
1978	-----	558	106	248601	33	1622	520	7027	318	1343	72	-----
1977	39	459	68	200541	22	1481	333	4600	289	917	-----	-----
1976	20	734	589	169381	462	2853	222	1524	370	243	0	-----
1975	23	596	200	171566	1052	1335	178	1637	275	307	80	-----
1974	19	437	181	145045	39	1226	242	5630	252	317	183	11
1973	10	265	77	104494	203	1408	118	896	225	114	105	25
1972	13	325	134	84274	380	1346	112	904	240	173	11	-----
1971	14	354	178	67882	16	824	109	2544	360	108	5	-----
1970	-----	145	-----	50704	-----	454	125	382	289	153	-----	-----

(figures not available before 1970.)

Table 6.17

NUMBER OF R&D WORKERS WITHIN FIRM EXPENDITURE ON R&D  
R&D FUNDS RECEIVED: R&D PAID IN THE AUTOMOBILE INDUSTRY, CROSS-  
CLASSIFIED BY SIZE OF FIRM R&D EXPENDITURE

Firms Classified According to Size of Expenditure on R&D	Companies Conducting R&D				Number of Persons Engaged in R&D					
	Number of Companies A	Number of Persons Employed (persons) B	Sales ¥100 Million	Percentage (%)	Operating Profits ¥ Million	Percentage (%)	Total E	Percentage (%)	Researchers F	Regular G
1978										
Top 5	9	179114	69551	59.9	336122	65.3	21438	62.4	4140	4140
Top 10	10	228034	84848	73.1	390672	75.9	27034	78.7	6649	6648
Top 20	20	283524	98212	84.6	436207	84.7	31003	90.3	8180	8174
1977										
Top 5	5	177281	59966	60.5	333908	66.7	20848	63.9	4108	4108
Top 10	10	226069	72369	73.0	377508	75.4	25874	79.4	6312	6310
Top 20	20	281112	93813	84.5	423172	84.6	29831	91.5	7920	7914
1976										
Top 5	5	172563	52736	47.8	214627	56.6	21839	60.6	4401	4401
Top 10	10	222537	63787	57.8	232317	61.2	27110	75.3	6267	6266
Top 20	20	274253	73093	66.2	266817	70.9	31106	65.4	7694	7686
1975										
Top 5	5	175522	43467	56.6	61580	33.8	21912	-----	4044	4044
Top 10	10	228253	53461	69.6	96416	47.4	26177	-----	5820	5817
Top 20	20	276596	61814	80.5	117100	65.2	30623	-----	6988	6984
1974										
Top 5	5	166518	37346	58.6	183961	50.9	20206	-----	4333	4333
Top 10	10	214104	44369	59.6	206440	88.3	24628	-----	5989	5989
Top 20	20	257289	51106	80.1	237354	78.5	27405	-----	6940	6939
1973										
Top 5	5	162994	32319	-----	201323	-----	17939	-----	3118	3112
Top 10	10	209760	38230	-----	225876	-----	21625	-----	4214	4201
Top 20	20	249777	43421	-----	269287	-----	25173	-----	5619	5605
1972										
Top 5	5	155796	28458	-----	174682	-----	15460	-----	2834	2828
Top 10	10	195685	33096	-----	199376	-----	19057	-----	4066	4055
Top 20	20	244094	38470	-----	223109	-----	21919	-----	5092	5074
1971										
Top 5	5	151785	24043	-----	N.A.	-----	13821	-----	2545	2639
Top 10	10	195139	28801	-----	N.A.	-----	17448	-----	3970	3957
Top 20	20	248779	34042	-----	N.A.	-----	19913	-----	4641	4619
1970										
Top 5	5	145971	20532	-----	N.A.	-----	12554	-----	2326	2325
Top 10	10	185814	24595	-----	N.A.	-----	15955	-----	3317	3315
Top 20	20	229551	28576	-----	N.A.	-----	18018	-----	3940	3931
1969										
Top 5	5	140361	16813.6	-----	N.A.	-----	11516	-----	2372	2372
Top 10	10	179303	20230.3	-----	N.A.	-----	14000	-----	3155	3155
Top 20	20	219624	23394.6	-----	N.A.	-----	15936	-----	3606	3606

Source: Sōrifu, Tōkei Kyoku, Kagaku gijutsū chōsa hokoku

Table 6.17 (Continued)

	Number of Persons Engaged in R&D (cont'd.)					Number of Regular Researchers per 10,000 Persons Employed (persons) F/B x 10,000	Intramural expenditure on R&D (\$ million)			
	Regular Researchers (%)	Assistant Research Workers	Technicians	Clerical & Other Supporting Personnel	Number of Internal non-regular Researchers (persons)		Total Disbursement (H2 + 4 + 5) G	Percentage (%)	Cost (H2+3+5) H	Wages & Salaries
1978										
Top 5	42.5	5623	8667	3008	-----	236	193599	71.8	186526	71203
Top 10	68.2	6415	10222	3748	-----	292	227703	84.5	220564	38442
Top 20	83.9	7152	11547	4124	349	288	252060	93.5	244279	100856
1977										
Top 5	44.0	4806	7080	2854	-----	232	157188	71.7	155526	63550
Top 10	67.5	5598	10558	3406	-----	279	184272	84.0	181879	78171
Top 20	84.8	6264	11888	3759	110	282	204529	93.2	203262	87730
1976										
Top 5	41.2	5588	9017	2833	1	255	129278	66.0	130155	55310
Top 10	58.7	6816	10565	3462	25	281	158414	80.9	151989	66719
Top 20	72.0	7536	12067	3809	147	280	174094	88.9	177042	77753
1975										
Top 5	47.7	9746	9085	3037	-----	230	135602	73.5	129388	51839
Top 10	68.5	6818	10673	3666	1	255	158941	86.3	151989	63239
Top 20	82.3	7678	11946	4011	96	252	172175	93.5	165605	69849
1974										
Top 5	51.7	5015	8431	2427	-----	250	119402	74.5	101972	35853
Top 10	71.5	6064	9601	2974	-----	280	138661	86.5	119209	43086
Top 20	82.9	6607	10608	3250	80	270	149232	93.1	129567	47767
1973										
Top 5	-----	4451	8086	2314	-----	191	84122	-----	71627	25323
Top 10	-----	5451	9233	2727	75	200	98758	-----	85540	30789
Top 20	-----	6109	10264	3181	75	224	107001	-----	93750	36973
1972										
Top 5	-----	4092	6533	2001	-----	102	66741	-----	60756	20559
Top 10	-----	4959	7527	2505	250	207	79049	-----	70985	24962
Top 20	-----	5571	9455	2801	312	208	86876	-----	77804	28164
1971										
Top 5	-----	3537	5744	1895	-----	174	53038	-----	47031	14955
Top 10	-----	4171	5951	2356	-----	203	64162	-----	56605	18966
Top 20	-----	4814	7853	2605	-----	186	71977	-----	63338	21597
1970										
Top 5	-----	3221	5369	1538	-----	159	40926	-----	37778	13011
Top 10	-----	4148	6649	1841	-----	179	48972	-----	44650	16748
Top 20	-----	4662	7367	2049	-----	172	53609	-----	48650	18724
1969										
Top 5	-----	2807	4901	1436	-----	170	36550	-----	33304	10540
Top 10	-----	3477	5781	1675	-----	180	42652	-----	38603	12842
Top 20	-----	3893	6605	1842	-----	160	46764	-----	42049	14453

Table 6.17 (Continued)

	Intramural expenditure on R&D (million yen) cont'd.							Self-financed R&D Fund (million yen)	R&D Fund Received			
	Materials	Depreciation of Tangible Fixed Assets	Expenditures on Total	Tangible Lands, Bldgs, etc.	Fixed Assets Machinery, Utensils, Equipment, etc.	Other	Other Expenses		Number of Companies	Intramural Expenditure on R&D (companies)	R&D Fund (million yen)	Intra- mural Expen- diture on R&D
1978												
Top 5	632.32	14764	21827	7230	13834	774	37327	205153	3	3	1376	1376
Top 10	72527	17575	24794	7917	14097	1180	42020	238898	6	6	2838	2838
Top 20	78271	19094	26874	7736	17711	1424	46049	263161	10	10	2991	2991
1977												
Top 5	48865	14308	15970	2049	13631	291	28803	166658	4	4	267	267
Top 10	53795	17229	19622	3398	15806	418	32684	193566	8	8	1234	1234
Top 20	59692	19244	20510	3453	16613	444	36597	214110	11	11	1342	1342
1976												
Top 5	33664	16227	15350	2648	12064	639	24954	136497	5	5	1661	1661
Top 10	39895	19171	20552	3702	16040	810	29247	166320	8	8	2153	2153
Top 20	43880	24224	21277	3842	16602	832	31185	181487	12	12	3207	3207
1975												
Top 5	36664	16201	22415	7118	15121	176	24684	137967	4	4	2942	2942
Top 10	42402	19981	25933	7902	17712	318	27368	160619	6	6	4741	4741
Top 20	46110	20337	26907	7932	18647	328	29308	173250	11	11	5614	5614
1974												
Top 5	20595	13892	31321	15663	15247	411	31633	120216	3	3	825	825
Top 10	26597	15536	34989	16826	17702	460	33990	137796	7	7	3059	3059
Top 20	29437	16665	36330	17000	18866	464	35698	147894	9	9	3630	3630
1973												
Top 5	23696	11399	23893	5420	17448	1025	11209	85005	3	3	720	720
Top 10	28758	12643	25862	6336	18466	1060	13349	98931	6	6	1834	1807
Top 20	30311	13872	27123	6786	19256	1080	14694	106610	9	9	2692	2666
1972												
Top 5	20207	9213	15198	4090	9442	1666	10777	67011	3	3	619	618
Top 10	23037	10420	18483	5679	10988	1816	12567	79193	6	5	1643	1153
Top 20	25197	11140	20210	6523	11853	1834	13303	86729	9	8	1973	1483
1971												
Top 5	16300	6377	12304	5367	6204	814	9308	52791	2	2	575	575
Top 10	18755	7403	14980	6903	7246	831	11481	64075	4	3	663	624
Top 20	20742	7932	16571	7301	8416	854	13067	71574	5	5	996	957
1970												
Top 5	9905	4626	7774	2104	4274	946	9436	37236	2	2	5970	4061
Top 10	11747	5430	9752	2643	5651	1458	10724	45002	4	3	6376	4375
Top 20	12782	5817	10777	2910	6339	1527	11327	49590	5	4	6569	4568
1969												
Top 5	9517	4412	7659	2790	4606	263	8715	-----	2	2	309	309
Top 10	10635	5109	9158	3445	5434	279	9845	-----	5	5	665	663
Top 20	11595	5436	10150	3953	5871	326	10376	-----	8	8	849	847

Table 6.17 (Continued)

	R&D Fund Paid Outside				Percentage of Within Firm Expenditures on R&D to Sales		Percentage of Intramural Expenditure on R&D to operating Profits		Within Firm Expenditure on R&D per Company (10,000 yen)		Within Firm Expenditure on R&D per Regular Researcher (10,000 yen)	
	Number of Companies	R&D Fund (million yen)		Disbursement G/D	Cost H/D	Disbursement G/E	Cost H/E	Disbursement G/B	Cost H/B	Disbursement G/F	Cost H/F	
		Self-Financed R&D Fund	Self-Financed R&D Fund									
1978												
Top 5	9	9	12930	12930	2.78	2.68	57.6	55.5	3871514	3730514	4676	4505
Top 10	9	9	13953	13953	2.68	2.60	58.3	56.5	2277834	2205643	3426	3318
Top 20	13	13	14093	14093	2.57	2.49	57.8	56.0	1260299	1221396	3084	2988
1977												
Top 5	5	5	9737	9737	2.62	2.59	47.1	46.6	3143768	3110524	3826	3786
Top 10	10	10	10528	10528	2.55	2.51	48.8	48.2	1842721	1818790	2920	2882
Top 20	14	14	10924	10924	2.44	2.43	48.3	48.0	1022643	1016311	2584	2568
1976												
Top 5	5	5	8879	8879	2.45	2.47	60.2	60.6	258556.2	260309.4	293.7	295.7
Top 10	10	10	10059	10059	2.48	2.46	68.2	67.6	158414.0	157032.2	252.8	250.6
Top 20	15	15	10600	10600	2.38	2.42	64.8	65.9	87047.0	88520.9	226.4	230.3
1975												
Top 5	5	5	5307	5307	3.12	2.98	220.1	210.1	2712046	2587758	3353	3200
Top 10	10	10	6418	6418	2.97	2.84	183.9	175.9	1589413	1519892	2732	2613
Top 20	15	15	6689	6689	2.79	2.68	147.0	141.4	860874	828024	2465	2371
1974												
Top 5	4	4	1640	1640	3.20	3.20	64.9	55.4	2388034	2039437	2756	2353
Top 10	7	7	2193	2193	3.13	2.69	67.2	57.7	1386611	1192089	2315	1990
Top 20	11	11	2292	2292	2.92	2.54	62.9	54.6	746160	647835	2151	1867
1973												
Top 5	4	4	1627	1583	2.60	2.22	41.8	35.6	1682434	1432542	2703	2302
Top 10	8	8	2024	1979	2.58	2.24	43.7	37.9	987584	855397	2351	2036
Top 20	14	14	2319	2275	2.46	2.16	39.7	34.8	535006	468750	1909	1673
1972												
Top 5	4	4	890	889	2.35	2.13	38.2	34.8	1334814	1215129	2360	2148
Top 10	9	9	1298	1297	2.39	2.14	39.6	35.6	790489	709853	1949	1751
Top 20	15	15	1339	1339	2.26	2.02	38.9	34.9	434372	389022	1712	1533
1971												
Top 5	3	3	328	328	2.21	1.96	----	----	1060760	940620	----	----
Top 10	7	7	516	516	2.23	1.97	----	----	641820	566050	----	----
Top 20	12	12	553	553	2.11	1.86	----	----	359885	3.6690	----	----
1970												
Top 5	4	4	371	371	1.99	1.84	----	----	818520	755560	----	----
Top 10	9	8	485	485	1.99	1.82	----	----	489720	446500	----	----
Top 20	14	15	549	548	1.88	1.70	----	----	268045	243250	----	----
1969												
Top 5	5	8	366	366	2.17	1.98	----	----	731000	666080	----	----
Top 10	10	16	424	424	2.11	1.91	----	----	426520	386030	----	----
Top 20	20	30	464	464	2.00	1.80	----	----	233820	210245	----	----



Table 6.18  
NUMBER OF CASES OF TECHNOLOGY EXPORT AND RECEIPTS BY AUTO INDUSTRY (COMPANIES)

	Number of Companies	Companies Conducting within company R&D	Sales (100 million ¥)	Operating Profits (¥ million)	Within Company Expenditure on R&D disbursement (mil. ¥)	Number of cases of Technology Export		Receipts (¥ million)		
						Total	New Programs	Total	New Programs	
1978	27	26	89202	429496	230430	122	27	9169	264	4905
1977	30	23	54277	244094	120129	99	21	4731	98	4633
1976	19	10	41910	129210	98311	70	19	4253	403	3850
1975	21	19	35730	76651	90211	61	8	3118	23	3095
1974	17	17	27865	114967	76962	57	7	2018	83	1935
1973	13	13	23080	138730	43267	38	4	1508	45	1443
1972	15	13	21008	126779	47798	38	7	1564	372	1191

Source: Sōrifu, Tōkei Kyoku, Kagaku gijutsū chōsa hokoku, Annual Issues

Table 6.19  
NUMBER OF CASES OF TECHNOLOGY IMPORT & PAYMENT BY AUTO INDUSTRY

Industry	Number of Companies	Companies Conducting Within Company R&D	Sales ¥100 Million	Operating Profits ¥ Million	Intramural Expenditure on R&D (disbursement) ¥ Million	Number of Cases of Tech. Import			Payment ¥ Million		
						Total	New Programs	Continuing Programs	Total	New Programs	Continuing Programs
1978	61	98	99849	467337	248755	285	31	254	8421	292	8130
1977	57	52	78139	409179	182228	237	27	210	7498	198	7300
1976	306	304	88458	297579	158094	987	42	945	13802	846	12958
1976	59	58	98157	113849	152976	220	27	198	9841	554	5202
1974	94	50	35851	181230	93301	171	29	142	12959	1004	11955
1973	51	49	39073	272217	95640	184	44	140	5183	455	4728
1972	42	40	33270	206745	78055	191	35	146	4335	1140	3195

Source: Sōrifu, Tōkei Kyoku, Kagaku gijutsū chōsa hokoku, Annual Issues

Table 6.20  
NUMBER OF CASES AND VALUES OF TECHNOLOGY EXCHANGE BY INDUSTRY & TECHNOLOGY (COMPANIES)

EXPORT	Total		Asia, South, Eastern		Asia, West		America, North		America, South	
	Number of Cases	Receipts for Tech. Export ¥ Million	Number of Cases	Receipts for Tech. Export ¥ Million	Number of Cases	Receipts for Tech. Export ¥ Million	Number of Cases	Receipts for Tech. Export ¥ Million	Number of Cases	Receipts for Tech. Export ¥ Million
1978	122	9169	73	2610	9	x	14	693	9	201
1977	99	4731	56	2301	4	x	11	732	2	x
1976	70	4253	40	1520	3	x	4	x	3	x
1975	61	3118	35	1022	2	128	5	616	3	16
1974	57	2018	24	567	2	x	13	754	2	x

---

EXPORT (Continued)	Europe		Others		IMPOR Total		America, North		Europe		Others	
	Number of Cases	Receipts for Tech. Export ¥ Million	Number of Cases	Receipts for Tech. Export ¥ Million	Number of Cases	Receipts for Tech. Import ¥ Million	Number of Cases	Receipts for Tech. Import ¥ Million	Number of Cases	Receipts for Tech. Import ¥ Million	Number of Cases	Receipts for Tech. Import ¥ Million
1978	19	200	12	1297	285	8421	160	4922	123	3500	2	x
1977	16	74	10	1377	237	7498	143	4381	92	3113	2	x
1976	8	41	12	1250	587	13802	137	3891	849	9903	1	x
1975	6	60	10	1262	216	5764	314	3045	82	2719	-	-
1974	10	174	6	444	165	12857	12	2560	73	10297	-	-

Source: Sōrifu, Tōkei Kyoku, Kagaku gijutsū chōsa hokoku, Annual Issues

TABLE 6.21.1  
NISSAN AUTOMOBILE INVESTMENT  
FOR RESEARCH AND DEVELOPMENT FACILITIES

YEAR	PLANNED MONEY	MONEY ALREADY SPENT	MONEY NEEDED HEREAFTER	STARTING DATE	EXPECTED COMPLETION DATE	REFERENCE
1977-2	25,220 million yen	5,720	19,500	10/77	9/78	Expansion of research, experiment, and new-model makings and their test-runs for safety of vehicles, noise and development of new technologies.
1976-2	14,120	3,010	11,110	10/76	9/78	Research and development for vehicle emissions from vehicles, safety of cars and for new technology.
1975-2	13,050	4,980	8,070	10/75	9/77	Same
1974-2	14,140	4,170	9,970	10/74	9/76	Same
-1	15,580	6,640	8,940	4/74	3/76	Same
1973-2	11,000	3,950	7,050	10/73	9/75	Same
-1	19,720	4,270	15,450	4/73	3/75	Same
1972-2	21,100	3,540	17,560	4/72	9/74	Same
-1	14,770	3,730	11,040	3/72	3/74	Same
1971-2	13,930	2,680	11,250	8/71	9/73	Same
-1	18,980	10,100	8,880	3/69	2/73	Same
1970-2	15,680	7,810	7,870	3/69	2/72	Basic research and expansion of various experimental facilities for the research of vehicle emissions and safety of vehicles.
1970-1	11,974	9,015	2,959	3/68	2/72	Same
1969-2	14,658	10,146	4,512	4/67	3/72	Expansion of R & D facilities for developing new products and new technology.
1969-1	12,860	8,243	4,617	4/67	9/71	Same
1968-2	13,409	8,427	4,982	1/66	3/71	R & D to cope with the vehicle emissions restrictions and safety of vehicles. Expansion of various research facilities.
1968-1	13,533	6,728	6,805	1/66	9/70	R & D for vehicle emissions and safety of vehicles.
1967-2	13,800	8,570	5,230	4/65	3/70	Same
-1	13,472	6,478	6,994	12/64	9/69	R & D for vehicle emissions and safety of vehicles, and quality improvement & technology development.

SOURCE: Same as Table 6.1

TABLE 6.21.2

TOYOTA AUTOMOBILE INVESTMENT  
FOR RESEARCH AND DEVELOPMENT FACILITIES

YEAR	PLANNED MONEY	MONEY ALREADY SPENT	MONEY NEEDED HEREAFTER	STARTING DATE	EXPECTED COMPLETION DATE	REFERENCE
1977-2	17,500 million yen	1,300	16,200	4/78	9/79	Safety of car body, energy conservation & expansion of facilities for developing new technology.
1976-2	19,080	1,224	17,856	4/77	9/78	Expansion of R & D for public hazards by products and safety of products.
1975-2	31,770	7,450	24,320	4/76	9/77	Expansion of R & D facilities for vehicle emissions and safety of products.
1974-2 -1	29,458 19,377	6,063 1,477	23,395 17,900	3/75 10/74	9/76 3/76	Same Same
1973-2	18,566	1,066	17,500	4/74	9/75	Expansion of R & D facilities for safety of product and public hazard.
1973-1	25,065	2,865	22,700	10/73	3/75	Expansion of R & D facilities for public hazard by products and safety of products.
1972-2 -1	26,764 26,027	664 867	26,100 25,160	4/73 10/72	9/74 3/74	Same Same
1971-2 -1	18,444 16,090	74 50	18,370 16,040	4/72 10/71	9/73 3/73	Same Same
1970-2 -1	12,470 13,166	1,600 844	10,870 12,322	4/71 10/70	9/72 3/72	Same Expansion of R & D for new technology, safety of products and public hazards by products.
1969-2 -1	11,127 12,617	454 380	10,673 12,237	4/70 10/69	9/71 3/71	Same Expansion of R & D and various testings for improving quality of products.
1968-2 -1	9,829 6,779	394 73	9,435 6,706	1/69 10/68	9/70 3/70	Same Same
1967-2	8,165	1,025	7,140	4/68	9/69	Same

TABLE 6.21.3

HINDO AUTOMOBILE INVESTMENT  
FOR RESEARCH AND DEVELOPMENT FACILITIES

YEAR	PLAINED MONEY	MONEY ALREADY SPENT	MONEY NEEDED HEREAFTER	STARTING DATE	EXPECTED DATE OF COMPLETION	REFERENCE
1977-2	2,319 million yen	728	1,591	10/76	3/79	Expansion of facilities for R & D of vehicle emissions, noise and safety of vehicles.
1976-2	2,350	571	1,779	10/75	3/78	R & D for vehicle emissions and safety of vehicles.
1975-2	1,760	650	1,110	10/74	3/77	Same
1974-2	1,916	546	1,370	4/74	3/76	Same

TABLE 6.21.4

SUZUKI AUTOMOBILE INVESTMENT  
FOR RESEARCH AND DEVELOPMENT FACILITIES

YEAR	ITEMS FOR INVESTMENT	QUANTITY	PLANNED MONEY	MONEY ALREADY SPENT	MONEY NEEDED HEREAFTER	STARTING DATE	EXPECTED COMPLETION DATE	REFERENCE
1977-2			409 million yen	0	409	3/78	3/79	Expansion of experimental facilities.
1976-2			876	0	876	4/76	9/77	Expansion of research facilities for vehicle emissions (pollution).
1975-2			153	0	153	4/75	4/76	Same

## TABLE OF INVESTMENT FOR RESEARCH AND DEVELOPMENT AND POWER EQUIPMENT

1974-2	Tape recorders Electric dynamometer and others		117	0	117	4/75	8/75	Expansion of research facilities for vehicle emissions.
1974-1	Same		134	1	133	3/74	8/75	Same
1973-2	Same		356	6	350	11/72	10/74	Same
1973-1	Same		199	0	199	9/72		Same
1972-2	Same		410	0	410	3/72	11/73	Same
1972-1	Same		566	0	566	6/71	7/73	Same
1971-2	Same		263	5	258	4/71	10/72	Same
1971-1	Same		551	5	546	1/71	4/72	Same
1970-2	Electric dynamo- meter, chassis dynamometer		933	0	933	8/70	3/72	Same
1970-1	Elec. dynamo- meter & others		633	27	607	9/69	3/71	Expansion of installation.
1969-2	Same		1,145	119	145	6/69	1/71	Same
1969-1	Elec. dynamo- meter. Low and high experimental facilities.	38	248	14	234	10/68	8/70	Same
1968-2	Elec. dynamometer, infrared rays gas analysis meter & others	42	321	11	310	2/68	3/70	Same
1968-1	Elec. dynamometer, vibration testing equipment.	17	155	4	151	11/67	4/69	New installation and rationalization.

TABLE 6.21.4 (continued)

Suzuki Automobile Investment

YEAR	ITEMS FOR INVESTMENT	QUANTITY	PLANNED MONEY	MONEY ALREADY SPENT	MONEY NEEDED HEREAFTER	STARTING DATE	EXPECTED COMPLETION DATE	REFERENCE
1967-2	Same	30	150	0	149	7/67	2/69	Same
-1	Electric dynamometer and other	21	83	0	83	1/67	8/68	Expansion of installation.
1966-2	Electric dynamometer and other	36	205	95	205	7/66	5/68	Same

TABLE 6.21.5  
ISUZU AUTOMOBILE INVESTMENT  
FOR RESEARCH AND DEVELOPMENT FACILITIES

YEAR	PLANNED MONEY	MONEY ALREADY SPENT	MONEY NEEDED HEREAFTER	STARTING DATE	EXPECTED COMPLETION DATE	REFERENCE
1977-2	3,350	604	2,746	11/76	10/78	Vehicle emissions and safety research.
1976-2	2,216	479	1,737	11/75	11/77	Safety of product and vehicle emissions.
1975-2	3,534	1,242	2,292	11/74	4/77	Safety of product and vehicle emissions.
1974-2	6,167	4,065	2,102	11/73	4/76	Safety of product and vehicle emissions.
1974-1	7,274	4,314	2,960	5/73	10/75	Safety of product and vehicle emissions.
1973-2	7,153 million yen	2,080	5,073	11/72	4/75	Strengthened research for vehicle emissions and safety of product.



## 7. GOVERNMENT INCENTIVES FOR CAPITAL INVESTMENT IN THE JAPANESE AUTOMOBILE INDUSTRY

Historically, loans at low interest rates from public financial institutions, government subsidies, special depreciation provisions, exemption of import duties on necessary machinery and equipment and protection in the home market have all been important if not critical to the development of the Japanese automobile industry. In recent years, however almost all special Japanese government programs designed specifically to encourage investment in the automobile industry have ceased. There do remain programs, however, which encourage investment in broader classes of Japanese industries. Some of these programs, including the tax-free reserves and depreciation allowances, are different from or more generous than American programs and despite their general purpose do really benefit the Japanese automobile industry.

Special tax-free reserves are a potentially important source of financing for new investment by automobile companies. These reserves reduce reported corporate income before taxes, reduce the effective tax rate and increase internal funds available for use at the firm's discretion. For some of the automobile companies, these reserves will reach as high as ten percent of total liabilities. In some years these reserves will account for a substantially higher percentage of the financing for new investment. Table 7.1 describes the major types of tax exempt reserves.

Though this was not always true, presently the special depreciation provisions of the Japanese tax code are probably more important than special tax-free reserves as an encouragement to investment in the Japanese automobile industry. In no major industry in Japan are depreciation reserves as large a proportion of total assets as they are in the automobile industry. In 1977, depreciation reserves were 25 percent of total assets plus depreciation. In Japanese manufacturing as a whole the comparable figure was no more than 15 percent. Cross-nationally the Japanese depreciation rate is two and one half times the present American and English rates and perhaps 15 percent higher than the German rate.

Under the provisions of various pieces of legislation passed by the Diet during the past fifteen years, including Tokutei kikai jōhō sangyō shinkō rinji sodu hō (The Particular Machinery and Information Industry Special Measure Law) and Tokutei denshi kōgyō oyobi tokutei kikai kōgyō shinkō rinji sochi hō (The Particular Electronics Industry and Particular Machinery Industry Special Measure Law), the Japanese automobile industry, in common with certain other industry, has had access to tax provisions which allow special bonus first year depreciation write-off, larger than 100 percent total write-offs and special shortening of useful lives for certain specific kinds of investments or practices.

As was noted in Section 5 of this report, a significant share of Japanese automobile industry investment over the last five years has been in pollution abatement control equipment or in the facilities for making such equipment. On such investment, in addition to the special tax reserves just described and in addition to normal depreciation, the Japanese automobile industry is allowed a special 33-1/3 percent first year depreciation write-off. In addition, to the extent that the Japanese automobile industry locates its facilities in specially designated structurally depressed regions (often where ship-building had been concentrated) the industry is allowed a special first year depreciation write-off of 25 percent of the cost of machinery and equipment and a write-off of 16-2/3 percent of the cost of new structures. Finally, the auto parts section of the Japanese automobile industry greatly benefits from provisions which allow a special 16-2/3 percent special first year depreciation write-off on many kinds of machinery and equipment investment made by suppliers designated as small and medium scale enterprises. These same provisions also allow a 50 percent bonus depreciation over the useful life of equipment purchased by small and medium scale enterprises.

As with tax-free reserves, there was a time when access to loans at preferential rates from the Japan Development Bank and the Small Business Finance Corporation were extremely important in the development of the Japanese automobile industry. Since the late 1950's, however, such loans have had at best a minor role in the industry's development. Indeed, over the last thirteen years no more than 1-2 percent of all automobile industry investment has been financed by loans from government sources. In recent years loans from government financial institutions to the automobile industry for investment purposes have been concentrated in the area of pollution control and safety related equipment.

TABLE 7.1

## MAJOR TYPES OF TAX-EXEMPT RESERVES

TYPE OF RESERVE	PROVISIONS
Allowance for Doubtful Receivables	Permits setting aside of fixed percentage of <u>total receivables</u> . Automobile companies are allowed 1.5% of total receivables. Net growth in receivables permits net growth in reserves.
Allowance for Retirement Payments	Permits setting aside 50% of the increase in retirements payments a company would have to make under the assumption that all employees retired at the end of the present financial reporting period.
Reserve for Price Fluctuations	Permits setting aside 2% of the book value of automobile inventories as a reserve for price fluctuations. Reserve can be added to only if inventory grows.
Reserve for Overseas Market Development	Permits setting aside 2.3% of revenues from overseas operations if company's capitalization is less than ¥ 100 million. If capitalization is greater than ¥ 100 million but less than ¥ 1 billion, 1.15% of revenues from overseas operations can be set aside. Where a company has a capitalization of greater than ¥ 1 billion, no such provision can be made. One fifth of the reserve must be added back to taxable income in five subsequent periods.
Reserve for Pollution Abatement Investment	Permits setting aside 0.15% of automobile revenues sales as a reserve for pollution abatement investment. Must be added to taxable profits after a period of three years.
Reserves for Product Warranties and Repairs	Permits setting aside a variable percentage of revenues as a reserve for product warranties and mandated repairs.

Source: Nihon kokuzai cho (Japan National Tax Agency)  
kokuzai seido (National Tax System)



## 8. GOVERNMENT AUTOMOTIVE RESEARCH AND DEVELOPMENT AND GOVERNMENT INCENTIVES AND SUBSIDIES FOR PRIVATE AUTOMOTIVE RESEARCH AND DEVELOPMENT

By contrast with virtually all the world's major industrialized nations, the Japanese government plays a comparatively small role in the direct financing of research and development. Whereas in the United States and Europe, almost half of all research and development expenditure is financed by the government, in Japan this figure is closer to one-quarter. Similarly, in France and England one-quarter of all research and development is conducted by the government; in the U.S.A. it is over 15 percent; but as can be seen in Table 8.1, in Japan only 13 percent of all research and development is conducted by the government.

### 8.1 RESEARCH CONDUCTED BY THE JAPANESE GOVERNMENT

What is true for Japanese research and development in general is also true specifically for Japanese automotive research and development. Relatively little research and development work is done in Japanese government facilities. Table 8.2 contains a listing of automobile-related research and development projects being conducted in Japan's National Research Institutes during the past fiscal year. As can be seen in Table 8.3, there are as many as sixty specialized national research institutes attached to various Japanese government ministries and agencies. Of these sixty, only three do even modest amounts of automotive-related research and development. These three include the Mechanical Engineering Laboratory and the National Research Institute for Pollution and Resources of the Agency of Industrial Science and Technology (Kogyō gijutsu-in) of MITI and the Traffic Safety and Nuisance Research Institute at the Ministry of Transportation. Even at these institutes only a relatively small amount of their total activity is devoted to automotive-related research and development. For example, only 2 percent or 3 percent of the expenditures at the Mechanical Engineering Laboratory (or perhaps 9 or 10 researchers) are devoted to automotive-related research and development. Again at the National Research Institute for Pollution and Resources, no more than 1 percent of expenditures (or perhaps four researchers) are engaged in automotive research and development. The largest concentration of government conducted automotive-related research and development takes place at the Traffic Safety and Nuisance Research Institute. At least one-third of all research conducted at this institute is directly automotive related. Twenty researchers are engaged in automotive-related research and development.

In addition to the projects listed in Table 8.2, major automotive-related research and development is promoted by the Japanese government's Large Scale Project - National Research and Development Program (NRDP). NRDP - Large Scale Projects are organized and administered by MITI's Agency of Industrial Science and Technology. Unlike the projects listed in Table 8.2, NRDP projects are broadly conceived, involve a great deal of expense and risk, utilize technology and engineering resources from a great many fields and require the delicate coordination of the work of a number of

government sector laboratories with the work of private contractors.

Since the NRDP - Large Scale Projects first began in 1966, there have been among the sixteen projects funded two which relate to the automobile industry. The first, the Electric Car Project, began in April, 1971 and involved the expenditure of ¥ 5.7 billion over a seven year period. The project which involved work on experimental vehicles, batteries, electric motors and control devices, body materials, utilization systems and charging method was completed with satisfactory results in March, 1978. Table 8.4 shows how public and private interests were organized in pursuit of project objectives. Of the ¥ 5.7 billion spent, ¥ 4.9 billion was contracted out to private companies. In addition, private companies spent an equivalent amount of their own resources.

Following the conclusion of this project, work on the Electric Car continues in Japan under the auspices of an Electric Car Research Association. The Electric Car Research Association is composed of the contractors in the now-ended NRDP Electric Car Project and other major interests in the Japanese automobile industry. Except for office space, the Research Association does not presently have joint facilities. The Research Association is, however, the legal entity through which the government will make further grants for development of the electric car in Japan. Furthermore, all Research Association members are allowed to take a 100 percent first year deduction on all fixed assets used in connection with Research Association activities.

The Comprehensive Automobile Control Technology Project, the second automobile related NDRP large scale project began in April, 1973, involved the expenditure of ¥ 7 billion and is ending this year. The objectives of this project are to ease traffic congestion, reduce traffic accidents and air pollution and increase the social and public utility of cars by developing an integrated traffic control system which can re-route vehicles around highly polluted areas, give right-of-way priority to public service vehicles and provide advance indications or warnings concerning traffic regulations and information regarding emergencies. Specific tasks in the project include: 1) detailed design of the pilot system and sub-system and the prototype of the processing program; 2) basic design of the computer network and coordination; 3) development of the prototype of small, specialized simulators; 4) study and analysis of traffic flow in the pilot area; 5) fundamental research and evaluation of the social and financial aspects of the system; 6) pilot construction of devices for general evaluation of roadside and vehicle devices for route guidance and driving information and 7) pilot construction of emergency communication devices and ferrite coil antennas. This project has some similarity with the Electric Route Guidance System sponsored by the U.S. Department of Transportation. The Comprehensive Automobile Traffic Control System Research Association will sponsor new research after this project ends.

## 8.2 RESEARCH SPONSORED BUT NOT CONDUCTED BY THE JAPANESE GOVERNMENT

The aggregate figures on government sponsored research and development conducted by private firms in the automobile industry for the past 11 years are available in Table 8.5. As was pointed out earlier, the government's role in directly sponsoring this research and development is really very small. In Japanese fiscal year 1977, no more than 1.5 percent of all automotive research and development was funded by the government.

Apart from the NRDP Program, what money is made available for the sponsoring of specific automobile related projects comes from grant in aids and other programs for research and development sponsored by the Ministry of International Trade and Industry, the Ministry of Transportation, the Environmental Protection Agency, the Science and Technology Agency, Japan Development Bank and the Small Business Finance Corporation.

(1) Ministry of International Trade and Industry. Between 1950 and 1978, the Technology Promotion Division of the Agency of Industrial Science and Technology has provided more the ¥ 40 billion in subsidies to encourage development and use of new industrial technologies to meet social and industrial needs. Typically 50-50 matching grants are given to firms that propose the development of "core and important large-scale technologies" which would not otherwise be undertaken by the private sector. In recent years, support has been given for the development of technologies in areas such as opto-electronics, high precision instrumentation, alternative materials for wood and carbon utilization, housing systems and technologies for the conservation of resources and energy and pollution control. Support in 1978 came to ¥ 3.2 billion covering 87 individual projects. None of these projects could be considered directly automotive related.

(2) Ministry of Transportation. For the past twenty-five years, the Ministry of Transportation has had a Research Subsidies for Practical Technology program. In fiscal year 1978, this program made ¥ 176 million in awards. Table 8.5 gives a list of automotive research and development awards made under this program.

(3) Japan Development Bank (Nihon kaiatsu ginkō). In 1978, the Japan Development Bank made loans of over \$4 billion to assist industrial and social transformation. Approximately 10 percent of this \$4 billion went for the promotion of research and development. About half of this latter amount went for aiding the development of computers and the remainder helped the rest of the electronics industry, the distribution industry, high technology enterprises and heavy machinery. Until 1976, the development of automobile safety and anti-pollution equipment had also been a priority of the Japan Development Bank. In the early 1970's, ¥ 200 million annually had been given to the auto parts manufacturers for research and development in this area.

(4) Science and Technology Agency. The New Technology Development Agency of the Science and Technology Agency gives financial assistance to private companies to allow them to commercialize techniques developed by government research institutes and universities. In case commercialization efforts by private companies are not successful, the private companies do not have to repay the financial assistance they received from the New Technology Development Corporation. The Corporation introduces new techniques developed by government research institutes and universities to private companies and encourages private companies to undertake marketable commodities based on these techniques. In 1978 the Corporation gave 12 companies \$14 million in financial assistance. The Corporation helped secure loans for another 13 companies. As yet there have been no projects under this program in the automotive area.

(5) Small Business Finance Corporation. Due to relatively inadequate capitalization, smaller firms in Japan are heavily dependent on outside sources of financing. Given the uneven character of the Japanese capital market, these firms must turn to banks for loans. Smaller enterprises, however, are at a considerable disadvantage when dealing with commercial banks. Their small size and relatively poor credit rating makes them relatively unattractive customers for commercial banks. The administrative costs of such loans are relatively large and in consequence, commercial banks charge such enterprises relatively high rates of interest, demand substantial collateral and make only relatively short-term loans. The Small Business Finance Corporation is designed to cope with the special problems faced by small and medium size enterprises. The Small Business Finance Corporation is affiliated with the Small and Medium Size Enterprise Agency which is in turn a part of the Ministry of International Trade and Industry. While SBFC made almost \$3 billion in new loans in fiscal 1978, only \$25 million was explicitly for the commercialization of new technologies. As a matter of policy, SBFC follows the industrial and social priorities set by the JDB. Prior to 1976 it aided many of the smaller auto parts companies developing new safety and pollution control technologies.

### 8.3 TAX INCENTIVES FOR RESEARCH AND DEVELOPMENT EXPENDITURES

The Japanese fiscal system has a number of provisions designed to encourage research and development expenditures. If research and development expenditures exceed the largest amount of the expenditures of any preceding accounting period since 1966, 20 percent of the excess may be taken as a credit against the corporate income tax. Any individual firm may deduct as much as ten percent of its corporate tax liability. In addition, firms which are members of research associations (which have been discussed above) can take an immediate 100 percent depreciation deduction which extends to all fixed assets used in connection with research association activities.



TABLE 8.1

Use and Provision of Research and Development Monies

<u>Country</u>	<u>% PERFORMED BY</u>				<u>% FUNDED BY</u>		
	<u>Industry</u>	<u>Gov't</u>	<u>Non-Profit Institute</u>	<u>Univ.</u>	<u>Industry</u>	<u>Gov't</u>	<u>Other</u>
Japan(1969)	67.3	12.1	1.6	19.0	66.8	26.3	6.9
Japan(1974)	65.6	12.9	3.1	18.4	66.9	26.5	6.6
Japan(1975)	64.3	13.3	2.8	19.7	64.9	27.5	7.6
Japan(1976)	64.0	13.1	2.9	20.0	64.7	27.2	8.0
U.S.A.(1975)	68.1	15.6	3.6	12.7	43.4	53.0	3.6
W.Germany(1973)	64.7	15.4	0.2	19.7	51.4	47.1	1.5
France(1973)	59.4	25.0	1.2	14.4	39.1	43.2	17.7
U.K.(1972)	63.1	25.7	2.3	8.8	43.6	48.7	7.6
Netherlands(1973)	58.5	19.9	2.0	19.6	50.2	44.5	5.3

SOURCE: Kagaku gijutsu cho, (Science and Technology Agency),  
Kagaku gijutsu hakusho (Science and Technology White Paper)

TABLE 8.2

## R &amp; D PROJECTS AT JAPAN'S NATIONAL RESEARCH INSTITUTES

R & D Classification	Topics	Research Targets	Section, Laboratory in Charge of Projects	Unit (1000 yen) Budget in fiscal 1978 (the total budget during the project period)	Project Period
1. Automobile-related R & D projects in the Mechanical Engineering Laboratory, the Agency of Industrial Science & Technology, the Ministry of International Trade and Industry.					
Special R & D based on expenditures for pollution control related R & D at national research institutes.	Research on combustion control factors of automobile internal combustion engines for reduction pollution.	This project is to conduct research on combustion control methods through fuel supply controls in order to develop low pollution internal combustion engines for automobiles.	Combustion Engineering Section, Basic Research Division.	27,440 (94,402)	1976-78
Ordinary R & D	Research on the combustion of liquidized natural gas and its exhaust gas in 4 cycle engines.	R & D on the effective combustion conditions of liquidized natural gas (LNG) in order to reduce the pollution level due to exhaust gas when LNG is used in 4 cycle engines.	Combustion Engineering Section, Basic Research Division.	1,200	1977-78
Ordinary R & D	Research on the dispersion of automobile exhausts along roads.	In order to prevent life environments from worsening further, this project is intended to analyze the data on the dispersion of automobile exhausts along roads.	Mathematical Engineering Section, System Engineering Division.	1,140	1978-82
Ordinary R & D	Research on raising capabilities of "intelligent automobiles."	R & D on pattern-recognition and problem-solving capabilities which "intelligent automobiles" must have in order to move between given targets on roads.	Traffic System Engineering Section, Automobile Safety & Pollution Division.	2,400	1977-78
Ordinary R & D	Research on walking-capacity and control of multi-leg moving machines (walking & running robots).	R & D on control methods of multi-leg moving machines which can walk and run in several types of environments. Also, this project is to design and construct such multi-leg moving machines.	Traffic System Engineering Section, Automobile Safety & Pollution Division.	300	1978-79
Ordinary R & D	Research on the synthetic information system for automobile traffic.	R & D on measurement technologies of automobile traffic information, and R & D on control methods of urban traffic.	Traffic System Engineering Section, Automobile Safety & Pollution Division.	400	1974-79

SOURCE: Kagaku gijutsu chō (Science and Technology Agency) Kuni no shiken kenkyū gyomu keikaku (National Research and Development Project)

TABLE 8.2 (continued)

<u>R &amp; D Classification</u>	<u>Topics</u>	<u>Research Targets</u>	<u>Section, Laboratory in Charge of Projects</u>	<u>Unit (1000 yen) Budget in fiscal 1978 (the total budget during the project period)</u>	<u>Project Period</u>
1. (continued)					
Ordinary R & D	Research on driving technique, using automobile simulator.	Research on quantitative evaluation methods of simulation capabilities of high-speed automobile simulators, and research on objective evaluation methods of driving technique using high-speed automobile simulators.	Traffic System Engineering Section, Automobile Safety & Pollution Division.	1,200	1978-79
Ordinary R & D	R & D on dual mode hybrid trolley-bus.	R & D on the automatic trolley-pole system for dual mode hybrid trolley-bus.	Control Mechanics Section, Automobile Safety & Pollution Division.	2,100	1974-80
Ordinary R & D	Research on automatic driving using indoor automobile tester.	Research for establishing the criteria for indoor-testing of electric-powered automobiles.	Control Mechanics Section, Automobile Safety & Pollution Division.	2,100	1977-78
Ordinary R & D	R & D on bus-stop-signs.	R & D on bus-stop signs using magnetic phones and photo tubes. Survey on the currently used bus-stop signs.	Control Mechanics Section, Automobile Safety & Pollution Division.	600	1976-78
Ordinary R & D	Research on automobile brake system.	Research on brake lining to improve automobile brake system.	Safety-Design Section, Automobile Safety & Pollution Division.	1,200	1977-79
Ordinary R & D	R & D on low HC (carbon monoxide) 2 cycle gasoline engine.	This project is to develop low HC 2 cycle gasoline engine which will be the low pollution and energy-saving type.	Exhausts Section, Automobile Safety & Pollution Division.	400	1978-80
Ordinary R & D	R & D on special type of engine.	R & D on new engines which are the application of the transformation of light to energy.	Exhausts Section, Automobile Safety & Pollution Division.	2,750	1978-79
Ordinary R & D	R & D on automobile safety-related technology.	R & D on measurement and safety measure technologies necessary to improve automobile safety.	Safety-Design Section, Automobile Safety & Pollution Division.	4,800	1978-79

TABLE 8.2 (continued)

R & D Classification	Topics	Research Topics	Section, Laboratory in Charge of Projects	Unit (1000 yen) Budget in fiscal 1978 (the total budget during the project period)	Project Period
2. Automobile-related R & D projects in the National Research Institute for Pollution and Resources, the Agency of Industrial Science & Technology, the Ministry of International Trade & Industry.					
Special R & D based on expenditures for pollution control-related R & D at national research institutes.	R & D on measures to control automobile NO <sub>x</sub> exhausts.	Research on automobile NO <sub>x</sub> exhausts controls using catalyst. R & D of hydrogen gas-generator for automobile engines to reduce the NO <sub>x</sub> levels.	The 1st Section, the Second Pollution Division.	33,850 (134,886)	1976-78
Ordinary R & D	Research on catalyst for automobiles.	Basic research on catalyst-converter for diesel-exhaust, catalyst for hydrogen-gas generators and catalyst for reducing NO <sub>x</sub> exhausts.	The 1st Section, the Second Pollution Division.	3,200	1978-80
3. Automobile-related R & D projects in the Traffic Safety and Nuisance Research Institute, the Ministry of Transportation.					
Special R & D	Research on the effects of the deterioration of suspension systems on driving stability.	This project is to develop the testing methods to test the degrees of the deterioration of suspension systems and to obtain the technological standards of driving stability.	Driving Performance Laboratory, Traffic Safety Division.	17,449 (47,652)	1977-79
Special R & D	Research for securing the safety of motor bicycles.	This project is to develop the evaluation methods of control systems, steering system, and the stability of motor bicycles.	Automobile Structure Laboratory, Traffic Safety Division.	2,577 (37,382)	1976-78
Special R & D based on expenditures for pollution control related R & D at national research institutes.	Research on the technological evaluation of the automobile emission control system.	This project is to investigate the operational stability of the automobile emission control system under the normal driving conditions, to analyze the relation between the abnormal operation of automobiles and the abnormal levels of NO <sub>x</sub> exhausts, and to establish the high performance prediction method of NO <sub>x</sub> exhausts under practical driving conditions.	Engine Laboratory, Traffic & Pollution Division.	7,540 (72,282)	1976-78

TABLE 8.2 (continued)

R. & D Classification	Topics	Research Topics	Section, Laboratory in Charge of Projects	Unit (1000 yen) Budget in fiscal 1978 (the total budget during the project period)	Project Period
3. (continued)					
Special R & D based on expeditedures for pollution control related R & D at national research institutes.	Research on the reliability of the automobile emission control system.	This project is to investigate the durability of catalyst and other emission control related parts, and to measure the effects of heat from the emission control system on the other parts of automobile body. Also, the project is to investigate secondary pollution materials from the emission control system.	Engine Laboratory, Traffic & Pollution Division.	45,730 (101,835)	1976-78
Special R & D based on expeditedures for pollution control related R & D at national research institutes.	Research on the measurement methods of low-density automobile exhausts.	This project is to measure exhausts and gasoline consumption under several types of driving conditions, and especially to develop the measurement methods of low-density automobile exhausts.	Measurement & Testing Laboratory, Traffic & Pollution Division.	22,650 (77,933)	1976-78
Special R & D based on expeditedures for pollution control related R & D at national research institutes.	Research on the relationship between the volume of automobile noise and the general traffic noise.	This project is to measure automobile noise by types of automobile and driving conditions, and to develop the simulation method of the general traffic noise. Also, the project is to test automobiles with special devices for reducing noise and evaluate such devices. Also, the synthetic measurement method of general traffic noise is studied.	Noise Laboratory, Traffic & Pollution Division.	15,730 (41,348)	1976-78
Ordinary R & D	Research on the controllability and stability of automobiles.	This project is to develop the evaluation method of the controllability and stability of automobiles. For this purpose, data on the experiment methods and the evaluation methods of the controllability and stability of automobiles are obtained through experiments using automobile models and real automobiles.	Driving Performance Laboratory, Traffic and Safety Division.	2,540	1977-80

TABLE 8.2 (continued)

<u>R &amp; D Classification</u>	<u>Topics</u>	<u>Research Topics</u>	<u>Section, Laboratory in Charge of Projects</u>	<u>Unit (1000 yen) Budget in fiscal 1978 (the total budget during the project period)</u>	<u>Project Period</u>
3. (continued)					
Ordinary R & D	Research for improving the brake-system.	This project is to evaluate the effects of specific brake systems and their maintenance on the functioning of the brake systems under high-speed conditions.	Automobile Structure Laboratory, Traffic Safety Division.	4,380	1969-80
Ordinary R & D	Research on the optimal front-view for driving.	In order to reduce traffic accidents, this project is to collect the data on the optimal front-view for driving.	Safety-Equipment Laboratory, Traffic Safety Division.	6,760	1976-81
Ordinary R & D	Research for improving the visibility of indicator lamps.	Research for improving the visibility of rear-turning signals of trucks, and the durability of other signals.	Safety-Equipment Laboratory, Traffic Safety Division.	1,090	1976-80
Ordinary R & D	Research for improving inspection equipments and gauges.	R & D on inspection gauges and equipments which are suitable for high-speed automobiles.	Safety-Equipment Laboratory, Traffic Safety Division.	1,860	1972-81
Ordinary R & D	Research on the measures to cope with abnormal vibrations of automobile body and parts.	This project is to investigate the relationship between the abnormal vibrations of automobile and the conditions of parts assembled.	Traffic Accident Analysts Laboratory, Traffic Safety Division.	6,820	1974-78
Ordinary R & D	Research on the measures for protecting pedestrians.	This project is to study the effects of the shapes of automobile bodies on pedestrians at the time of collision.	Traffic Accident Analysts Laboratory, Traffic Safety Division.	1,000	1977-80
Ordinary R & D	Research on the durability of major safety-related parts.	This project is to study the durability of major safety-related parts under the driving conditions.	Traffic Accident Analysts Laboratory, Traffic Safety Division.	2,190	1977-79
Ordinary R & D	Research on the experiment method of the inflammability of interior materials.	This project is to collect the data necessary for establishing the experiment method of the inflammability of interior materials.	Aviation Research Laboratories, Traffic Safety Division.	2,780	1972-81

TABLE 8.2 (continued)

<u>R &amp; D Classification</u>	<u>Topics</u>	<u>Research Topics</u>	<u>Section, Laboratory In Charge of Projects</u>	<u>Unit (1000 yen) Budget in fiscal 1978 (the total budget during the project period)</u>	<u>Project Period</u>
3. (continued)					
Ordinary R & D	Research on the method of reducing harmful exhausts through the maintenance and improvements of engines.	This project is to study the effects of emission control systems of automobiles and to establish the evaluation methods of engine performance.	Engine Laboratory, Traffic & Pollution Division.	7,310	1969-78
Ordinary R & D	Research on the effects of radio noise removers.	This project is to study radio noise caused by automobiles and the effects of radio noise removers attached to automobiles, etc.	Engine Laboratory, Traffic & Pollution Division.	109	1970-78
Ordinary R & D	Research on the relationship between the driving conditions and the automobile exhausts.	This project is to study the exhaust levels of motorcycles under various experimental driving conditions.	Measurement & Testing Laboratory, Traffic & Pollution Division.	2,670	1967-80
Ordinary R & D	Research on the noise caused by automobiles.	This project is to collect the data necessary for establishing the measurement method of automobile noises.	Noise Laboratory, Traffic & Pollution Division.	4,100	1971-78
Synthetic R & D projects in the Mechanical Engineering Laboratory, the Agency of Industrial Science & Technology, the Ministry of International Trade & Industry.					
Large Scale Industrial Technology R & D.	Research on the communication methods and on the evaluation methods of the durability of ground equipments.	This project is to develop the optimal control technology of traffic flows in cities through the improvements of communication methods between automobiles and traffic control centers.	Traffic System Engineering Section, Automobile Traffic Safety & Pollution Division.	4,505 (7.3 billion yen)	1973-78

TABLE 8.3  
 JAPAN'S GOVERNMENT-AFFILIATED  
 RESEARCH INSTITUTES

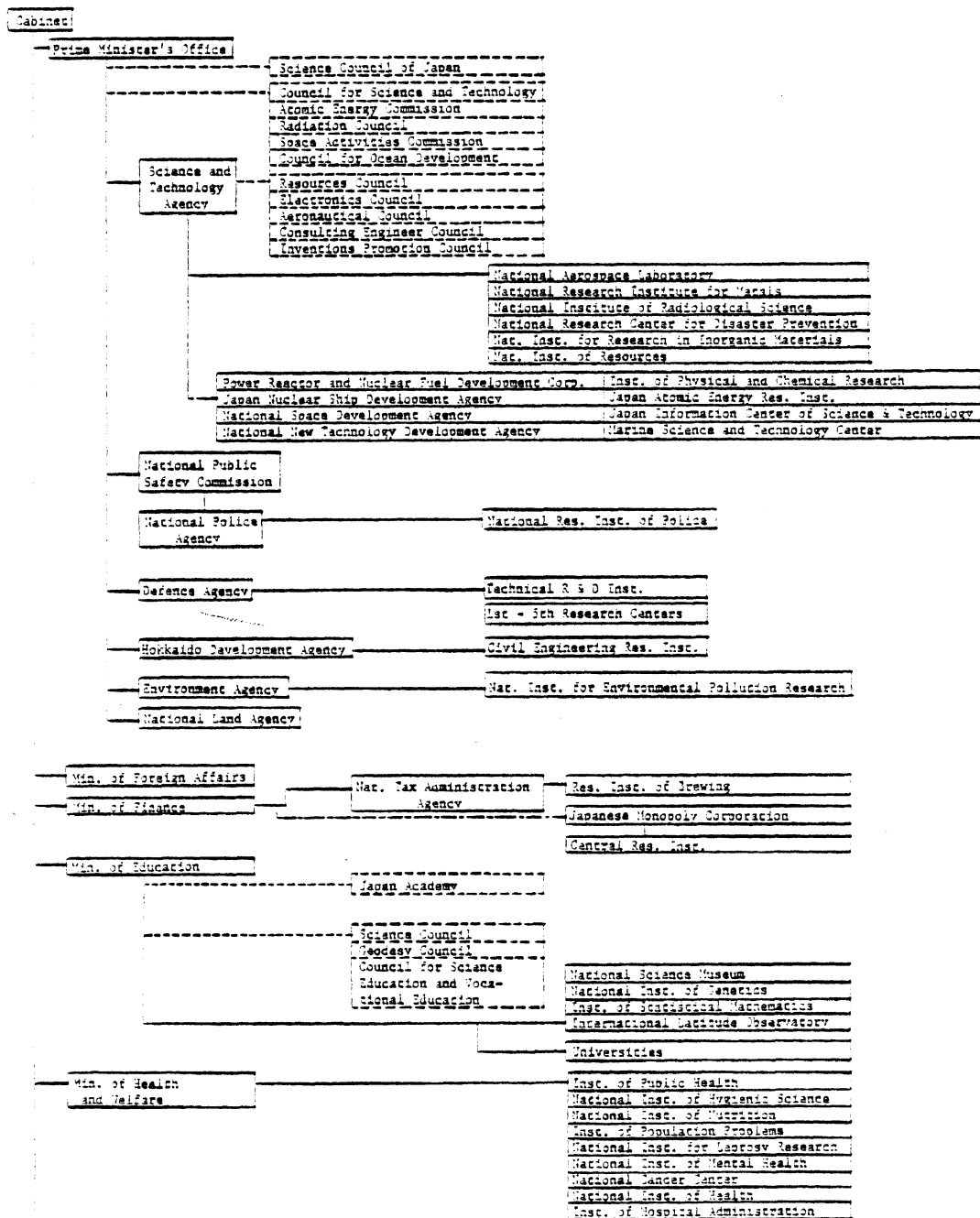




TABLE 8.3 (continued)

Min. of Agriculture and Forestry	Agriculture, Forestry and Fisheries Research Council	Nat. Inst. of Agricultural Sciences	Central Agric. Experiment Station	
		Nat. Res. Inst. of Agricultural Economics	Pericultural Experiment Station	
		Nat. Inst. of Animal Industry	Fruit Tree Research Station	
		Nat. Inst. of Animal Health	Nat. Grassland Res. Station	
		Vegetable and Ornamental Corps Res. Station	Nat. Res. Inst. of Tea	
		Nat. Foods Research Inst.	Nat. Res. Inst. of Agric. Eng.	
		Agricultural Experiment Stations	Inst. for Plant Virus Research	
		Tropical Agricultural Res. Center		
		Forestry Agency	Forest Experiment Station	
		Fisheries Agency	Fisheries Research Labs Pearl Research Lab Inst. of Agricultural Machinery	
Min. of International Trade and Industry	Industrial Technology Council	Patent Agency		
		Agency of Natural Resources & Energy		
		Agency of Industrial Science and Technology	Nat. Res. Lab. of Metrology Res. Inst. for Polymers & Textiles Electro Technical Lab. Nat. Res. Inst. for Pollution & Resources Government Chemical Industrial Res. Inst. Tokyo Government Industry Development Lab. Hokkaido Government Industrial Res. Inst. Tohoku Government Industrial Res. Inst. Suisu	Mechanical Engineering Lab. Geological Survey of Japan Industrial Products Res. Inst. Fermentation Res. Inst. Government Industrial Res. Inst. Nagoya Government Industrial Res. Inst. Osaka Government Industrial Res. Inst. Chugoku Government Industrial Res. Inst. Shikoku
Min. of Transportation	Council for Transport Technics	Meteorological Agency	Meteorological Res. Inst. Ship Technical Res. Inst. Port and Harbour Technical Res. Inst. Electronics Navigation Inst. Traffic Safety and Nuisance Res. Inst. Japanese National Railways Railway Technical Res. Inst. Railway Labour Science Res. Inst.	
Min. of Posts and Telecommunications	Radio Technical Council		Radio Res. Lab. Res. Lab. Telecommunication Lab. NKK Technical Res. Lab.	
		Hokusei Denshin Denwa Co. Ltd. (Japanese Overseas Radio and Cable System)		
		Nippon Telegraph and Telephone Public Corporation		
		Japan Broadcasting Corp.		
Min. of Labour		Res. Inst. of Industrial Safety Nat. Inst. of Industrial Health		
Min. of Construction		Geographical Survey Institute Public Works Res. Inst. Building Res. Inst.		
Min. of Home Affairs	Fire Defence Agency	Fire Res. Inst.		

TABLE 8.4

ORGANIZATION OF NATIONAL RESEARCH & DEVELOPMENT PROGRAM SYSTEM (LARGE-SCALE PROJECT SYSTEM - ELECTRIC VEHICLE PROJECT)

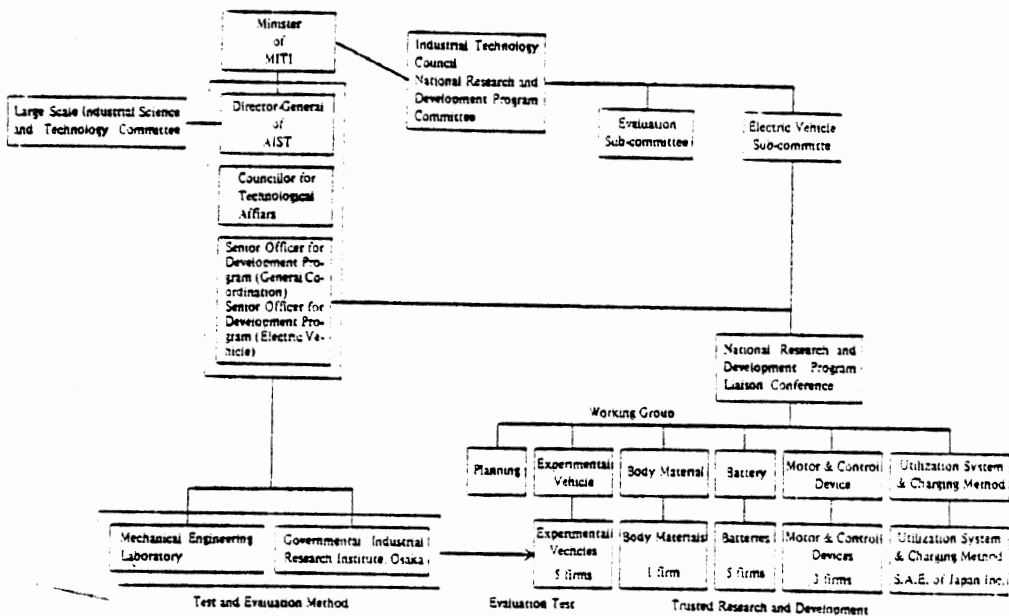


TABLE 8.5

RESEARCH GRANTS MADE BY THE MINISTRY  
OF TRANSPORTATION

The following is the list of R&Ds on automobile safety and environmental pollution based on the grants for scientific and technological researches which were granted by the Ministry of Transportation according to Article 3 of the Enterprise Rationalization Promotion Act (Law No. 5, 1952).

Fiscal Year	R & D Topics		R&D Grant (1000 yen)	Total Expenditure on R&D (1000 yen)	Total Grant
1968	R&D on the practical use of the after-burners for 2-cycle gasoline engines for automobiles	Daihatsu Kōgyō (Daihatsu Motor Co.)	2479	5837	5299
	R&D on trial production of the practical measurement devices for automobile carurector	Aisan Kōgyō	2820	7388	
1969	R&D on the mat-type electro-magnetic detectors of iron fragments on the tires	Sōden sha	3255	3628	5389
	R&D on the devices to continuously measure the concentration of smoke in diesel-engine automobile emission gas in driving condition	Tokyo Seimitsu Kiki (Tokyo Seimitsu Co., Ltd.)	1014	3429	
	R&D on the experimental devices for short-distance measurement for special-shape headlights	Yayoi Kōgyō	1120	3505	
1970	R&D on the simple measurement devices of nitrogen oxides in automobile emission gas	Horiba Seisaku-sho (Horiba, Ltd.)	2650	12990	5957
	R&D on the simple measurement devices of the concentration of all hydrocarbons in automobile emission gas	Yanagimoto Seisaku-sho	1032	4335	
	R&D on the optimal combination of engines for the prevention of environmental pollution	Daihatsu Kōgyō	2275	12120	
1971	R&D on the measurement devices of chemical luminescence of nitrogen oxides in automobile emission gas	Horiba Seisaku-sho	3052	8254	5865
	R&D on trial production of glass that gives the lower degree of damages to human heads at time of collision	Nippon Ito Garasu (Nippon Sheet Glass Co., Ltd.)	2813	7171	
1972	R&D on the improvement of the vehicle structure of buses for use in large cities	Nippon Jidosha Kōgyō kai & Nippon Jidosha Shatai Kōgyō kai (Japan Automobile Manuf. Assoc., Inc. & Japan Auto-Body Industries Assoc.)	9600	37000	9600
1973	R&D on the technology of the practical measurement devices of automobile emission gas for the automobile examination	Horiba Seisaku-sho (Horiba, Ltd.)	10200	25563	10200
1974	R&D on the practical measurement devices of automobile noises	Rion	2903	10817	15053
	R&D on the synthetic automatic testing devices for automobiles	Mitsubishi Jū-Kōgyō (Mitsubishi Heavy Industries, Ltd.)	2789	9859	
	R&D on the synthetic measurement system for examining automobile emission gas	Horiba Seisaku-sho	9361	58056	
1975	R&D on the power-absorption devices for the measurement devices of nitrogen oxides in automobile emission gas	Hitachi Jidōsha Buhin Hanbai	13875	40430	35451
	R&D on the devices to diagnose the aptitude (of persons) for driving automobiles	Nippon Densō (Nippon Denso Co.)	2271	11217	
	R&D on the calculation methods of the operational characteristics of super chargers for automobiles	Mitsubishi Jū-Kōgyō Mitsubishi Heavy Industries, Ltd.	5775	20900	
	R&D on trial production of the practical pressure indicators for internal combustion engines	Rion	3597	30597	
1976	R&D on the measurement devices and the measurement methods of carbon monoxide and hydrocarbon from low-pollution automobiles in use	Hitachi Jidōsha Buhin Hanbai	17000	42843	33947
	R&D on the simple evaluation system of the performance of automobile engines	Rion	6947	56546	
1977	R&D on the system improvements of the correction method of the concentration of nitrogen oxides in the atmosphere	Nippon Jidōsha Kenkyū-sho (Japan Automobile Research Inst.)	18346	73480	85902
	R&D on the diagnosis methods and the diagnosis devices of troubles in the automobile electric system	Hitachi Jidōsha Buhin Hanbai	7556	30139	

SOURCE: Okuranhō, Hojokin benran 1978



9. SURVEY ON THE ESTIMATES OF INCREASES IN THE DEMAND FOR JAPANESE AUTOMOBILES, DOMESTICALLY AND ABROAD FOR THE PERIOD TO 1985

Tables 9.1, 9.2 and 9.3 present a variety of forecasts on future automobile use, registration and demands facing the Japanese automobile industry. The forecasts have been taken from the following sources:

- Industrial Structure Council A - Shōwa rokujū-nen no jidōsha sangyō (The Automobile Industry in 1985), 1975.
- Industrial Structure Council B - (1) Tenkanki no jidōsha sangyō (The Automobile Industry in Transition); (2) Nakazawa Tadayoshi, "Seijuku-ki no kuruma - shakai to jidōsha sangyō (The Automobile Society in the Mature Period and the Automobile Industry)" Tsusan Journal Vol. 9, No. 1 (April 1976) pp. 83-94; (3) Kawashima Tatsuhiko, "Wakingu grupu sagyō omoi dasu mama (On the Work of the Working Group)" Tsusan Journal Vol. 9, No. 1 (April 1976) pp. 96-98; (4) Yamada Harunobu, "Tenkanki no jidōsha sangyō (The Automobile Industry in the Transition Period)" Denki (August 1976) pp. 15-21.
- Nomura Research Institute A. - Suzuki Yukio, "Aratana seichō kiban o kakuritsu suru jidōsha buhin gyōkai (The Automobile Parts Industry Establishing the New Foundation for Growth)" Zaikai kansoku Vol. 43, No. 1 (January 1978) pp. 29-59.
- Nomura Research Institute B. - "Jidosha" Sangyō - kai tenbō, 1978.
- Nomura Research Institute C. - "Nihonsha mada nobiru" Nikku sangyō shimbun 11/24/1978.
- Ministry of Construction (1) Dōrō seisaku no kadai (Road Policy Issues) 1978; (2) Dai hachiji dōrō seibi go-kanen keikaku oyobi setsumei shiryō (The Eight Road Equipment Five Year Plan with Explanatory Materials).
- Predicasts, Special Study - World Motor Vehicles, 1978.
- Japan Economic Research Center, Dai gō-kai go-ka-nen keizai yosoku (The Fifth Five Year Economic Forecast), 1979.
- Economic Planning Agency - unpublished work-sheets used in preparation of new Medium-Term Social and Economic Plan. This plan but not the automobile use forecast was released in July of this year.

In addition to the above published and unpublished documents, interviews specifically on the subject of the future demand for Japanese automobiles were held with the following:

- Yukio Suzuki, Security Analyst, Nomura Research Institute
- Minoru Fukuda, President, Management Intelligence
- Kazumasa Kusaka, Director, Automobile Division,  
Ministry of International Trade and Industry
- Takafusa Nakamura, Director, Economic Research Institute,  
Economic Planning Agency
- Haruo Sekiguchi, Editor, Nikkan jidōsha shimbun (Daily  
Automotive News)
- Yukio Kimura, General Research Division, Japan Economic  
Research Center
- Akira Kamata, Planning Division, Toyota Motor Sales
- Hiroshi Watariguchi, Road Division, Ministry of Construction
- Tadao Miyakawa, Professor of Management Science, Hitotsubashi  
University
- Kenichi Sugimoto, Isuzu Motors, Inc.
- Yoshiyuki Mizuno, Manager, Product Planning and Coordination  
Department, Nissan Motor Co.

## 9.1 DOMESTIC DEMAND FOR AUTOMOBILES

On the basis of the documents summarized in Tables 9.1, 9.2 and 9.3 and the interviews (described above), it is possible to state a range of reasonable estimates for domestic and foreign demand for Japanese automobiles. In the case of Japanese domestic demand in 1985, virtually all formal forecasts and conjectures put Japanese domestic demand at between 5 million and 7.25 million vehicles in 1985. Five million vehicles sold would imply no growth at all in demand between now and 1985. By contrast, 7.25 million implies as much as 6.4 percent average annual growth in sales. Between these extremes, most forecasters put growth in domestic demand at 2 - 3 percent average annual rate between now and 1985.

The above forecasts on the future state of domestic demand have been developed using a wide variety of sources. As in the United States, automobile demand forecasts rest on computer based econometric models, consumer surveys, social and historical analysis and on other ad hoc procedures. Table 9.4 summarizes the economic and social considerations which are given important weight in the forecasting of automobile demand. The

flow chart in Table 9.4 is taken from a forecasting model which was especially prepared for a special common forecasting committee of JAMA.

Japanese commentators who expect no significant increase in domestic demand for automobiles lay great stress on the lack of space in Japan for additional roads and parking facilities. In 1978, Japan had 278 vehicles per 1000 individuals, well below half the equivalent American figure and still below all the major Western European countries. Even more significant, forty per cent of Japanese vehicles are not passenger cars; a proportion well above any of the other major industrialized nations. On the other hand, among these same nations Japan has by far the most vehicles and passenger cars per kilometer of paved road. Thus, increased domestic demand is seen by some to rest heavily on the provision of new roads. With a replacement rate of 13 per cent, even stable domestic demand still means an increase in total car registrations. Given the high price of land in Japan and given energy-conscious policies which might discourage road building, a scenario of little growth in domestic demand is not without merit.

The no-growth-in-domestic-demand view, however, has been heavily criticized in Japan. It is usually suggested that outside the major cities in Japan cars remain a necessity for commuting and for business. Spatial restrictions are not severe in these local areas and it can be expected that demand will continue to grow there. In Table 9.5 the growth in automobile registrations for a number of representative prefectures have been sketched. It will be noted that while growth in automobile registrations in Tokyo and Osaka have been slow since 1973, growth in registrations in Gumma, Tochigi Gifu and Aichi (includes Nagoya) have continued high. Quite apart from such regional considerations, only in the late 1970's have Japanese women begun to drive in large numbers. Most analysts expect that the rising number of women drivers will translate into a new source of automobile demand, particularly for second cars. Another new source of demand will come from older drivers. By international standards, the current age distribution of Japanese drivers is very young. As these younger drivers get older, the demand for automobiles among older people will be much greater than at present.

At the other extreme from the no-growth forecasters are the American-based Predicast forecast and the public estimate made by Masataka Matsuura, the president of Tokyo Toyopet, Toyota's largest dealership. Both these high forecasts imply 50 million vehicle registrations in Japan in 1985 and a 6.25-6.5 per cent average annual increase in domestic demand. Either implicitly or explicitly both forecasts see domestic automobile demand as determined primarily by the growth in Japanese personal income. With personal income projected to grow at approximately six per cent between now and 1985, it is assumed that the income elasticity of demand for automobiles is approximately 1.0. Of course, the sets of factors considered in Table 9.4 suggests that this approach to forecasting domestic automobile demand is too simplistic.

In deriving the most common estimate of from 2-3 per cent average annual rate of growth, in addition to considering the new regional and demographic demands discussed above, it is assumed that the average life of Japanese automobiles will increase. Presently, 13 per cent of the Japanese automobile stock is scrapped each year. A number of forecasts assume this figure will drop to 10 per cent in the future. This implies an average age for the Japanese automobile stock of some seven years. The scrapping rate is assumed to fall because Japanese automobiles will have a lower utilization rate in the future. For example, from Tables 9.1 and 9.3 it is clear that a lower utilization rate is implicit in the new Economic Planning Agency forecasts. It should be noted that an average age of 7 years for Japanese automobiles is still below the 10 or 11 year figure in the U.S. Because of Japan's very strict motor vehicle inspection system it is doubtful the average age of Japanese vehicles will ever rise to this level.

Again, in making forecasts of future domestic automobile demand, most Japanese analysts tend to assume that barring an oil embargo of the type that occurred in late 1973, increasingly sharp increases in oil prices and even minor temporary disruption in supply will have relatively little impact on Japanese automobile purchases. This is because relative to the U.S., in Japan only a small proportion of oil imports are used for gasoline. Moreover, Japanese demand for automobiles appears to be entirely insensitive to the price of gasoline.

## 9.2 JAPANESE DEMAND FOR AUTOMOBILE IMPORTS

There is an extremely wide range of estimates for Japanese automobile import demand in the mid-1980's. At one end the Nomura Research Institute projects that in 1985 Japan will import 120,000 vehicles. At the other end, Predicasts expects as many as half a million vehicles will be imported by the mid-1980's. In between, the Industrial Structure Council (Sangyō kōzō shingikai) of the Ministry of the International Trade and Industry predicted late last year that motor vehicle imports in 1985 would reach 250,000. Still closer towards the Nomura forecast, the Japan Economic Research Center predicted at least 150,000 vehicles by 1985.

However large the differences in the import estimates being variously made, all project large increases over the 50,000 vehicles imported in 1978. By what mechanism will these large increases occur. A number of the forecasts suggest that Japanese trade barriers have artificially held down Japanese imports of automobiles. Until 1978 there was a tariff on automobiles and until recently there was a commodity tax on automobiles which discriminated heavily against larger vehicles sizes where imports were concentrated. (The commodity tax remains but the differential tax rate for small and large cars is now negligible). Still in place is a road tax and a complex product approval mechanism the burden of both of which fall especially hard on imports. The road tax which is collected from



vehicle owners annually is extremely discontinuously progressive at engine sizes where imports are normally concentrated. Unlike the self-certification offered producers selling foreign cars in the U.S., each automobile brought into Japan must be inspected by Ministry of Transport officials prior to sale to insure conformity with Japanese safety and pollution abatement standards. American and other foreign government pressure and negotiation helped to remove the earlier tariff and to reduce the commodity tax differential. It is expected that this same process will act to simplify approval procedures and might even reduce road taxes.

With the easing of some of the above barriers it is expected that new opportunities for foreign automobiles in the Japanese market will increase. Of course, removal of trade barriers by themselves will have a relatively small impact. Increasingly, Japan automobile manufacturers are themselves producing high-quality, larger cars, adjusting their product mix to changing Japanese tastes. If foreign manufacturers are to increase their sales in Japan, they will have to have increased access to existing distribution networks. Present import agencies are on high margin, low volume in orientation and do not have marketing experience and wherewithal to promote large increases in sales.

### 9.3 FOREIGN DEMAND FOR JAPANESE AUTOMOBILES

As for domestic demand and demand for automobile imports, there are a wide range of opinions on the state of Japanese exports in 1985. Forecasts range from as low as four million vehicles to almost seven million vehicles. Four million vehicles export forecasts have long since been abandoned as either being heavily political or unduly influenced by 1973 oil shock aftermaths. A more reasonable range of forecasts is bounded on low end by a 5,700,000 vehicle export forecast made by the Japan Economic Research Center and a 6,800,000 vehicle forecast by Predicast. In between is the 6,350,000 export forecast by the Nomura Research Institute. The Predicast forecast implies a seven percent average annual rate of growth of exports. By contrast the Japan Economic Research Center average annual growth rate is 3.1 percent and the Nomura growth is 4.75 percent. Between 1970 and 1977 Japanese vehicle exports grew at an average annual rate of 20.7 percent.

Forecasts on Japanese automobile exports are typically built up out of a number of components. Developed area markets are separated from developing country markets and each of these major categories are further disaggregated. Within the developed area, U.S., Germany and the rest of Western Europe are further separated out and in developing areas, the Middle East and South-east Asia are separately treated.

It is generally felt that Japanese auto sales in the American market in common with Japanese sales domestically will grow

more slowly in the next few years than they have in the recent past. Most estimates are in the range of 2 - 4 percent average annual rate of growth. (These estimates assume an exchange rate of ¥ 200 - ¥ 220 to the dollar.) The size and speed of Japanese exports to the United States in the future are heavily dependent upon future Japanese automobile investments in the United States. If Japanese manufacturers set up production facilities in this country, vehicle exports will undoubtedly fall, even as parts exports might expand. As much discussed as Japanese automobile investments are in this country, in Japan there seems to be a wide range of opinion as to whether such investments will ever materialize. Japanese seem concerned about high American labor costs, their ability to manage workers who strike (VW in Pennsylvania has already had three strikes), the quality of American workmanship, the large risk in investing ¥ 200 to ¥ 300 billion, and finally (and probably most important), Japanese vehicle exports to the U.S. have yet to reach the break-even point of 20,000 vehicles a month for a single model.

Apart from further investment plans, Japanese manufacturers appear quite confident about their future ability to compete in the American market. There is a widespread belief that the down-sizing of the American fleet will not necessarily mean fewer imports into the U.S. but rather far more smaller-size vehicles being purchased by the American Public. The change in the American producers' product mix will necessitate higher margins on smaller cars than has hitherto been the case and this will help maintain Japanese price-quality competitiveness. The confidence seems independent of most contemplated exchange rate adjustments. In the future, Japanese exports to the U.S. will be more often front-wheel drive, more often be specialized and sportier, and will have greater fuel efficiency. Growth in exports of diesel powered vehicles and light weight trucks is also anticipated.

It is generally projected that Japanese exports to Europe will not grow even as rapidly as American exports with the one exception of the West German market. Japan vehicles are now felt to be price and quality competitive with German vehicles. It is expected that a significant increase in the still very low Japanese market share there will now take place. The German market is the one West European market where the political implications of an increase in Japanese market share are likely to be tolerable.

By contrast with the developed areas of the world, Japanese exports to developing areas are expected to grow at an annual rate of 7-9 percent during the years to 1985. The absence of a true Japanese "world car" is felt to be a major problem and it is expected that the Japanese will face more strenuous American competition in third markets than has been previously been true. On the other hand, Japanese are expecting very large increases in export of knock-down sets which can be basically assembled in many of the lesser developed countries. Japanese manufacturers, government officials, and analysts do not believe that there will be strenuous competition in third markets from Brazil, Mexico and Korea. Such competition is further down the road.

TABLE 9.1  
FORECASTS ON MOTOR VEHICLE USE

Volume of:	Forecaster	Release Date	'70	'71	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88	'89	1990	
Total passenger transports	Industrial Structure Council	A. 1974.12																						
		B. 1976.3																						
Unit: 100 million man x kms.	Ministry of Construction	1978.3																						
		Economic Planning Agency	1979.5																					
	Actual (White Paper on Transportation)		5822	6482	6228	6933	7104	7094	7108															
Passenger transports by automobiles	Industrial Structure Council	A. 1974.12																						
		B. 1976.3																						
Unit: 100 million man-kms.	Ministry of Construction	1978.3																						
		Economic Planning Agency	1979.5																					
	Actual (White Paper on Transportation)		2842	3285	3374	3442	3609	3631																
Passenger transports by passenger cars	Industrial Structure Council	A. 1974.12																						
		B. 1976.3																						
Unit: 100 million man-kms.	Ministry of Construction	1978.3																						
		Economic Planning Agency	1979.5																					
	Actual (White Paper on Transportation)		2842	3285	3374	3442	3609	3631																
Total cargo transports	Industrial Structure Council	A. 1974.12																						
		B. 1976.3																						
Unit: 100 million man-kms.	Ministry of Construction	1978.3																						
		Economic Planning Agency	1979.5																					
	Actual (White Paper on Transportation)		1029	1082	1117	1158	1101	987																
Cargo transports by trucks	Industrial Structure Council	A. 1974.12																						
		B. 1976.3																						
Unit: 100 million ton-kms.	Ministry of Construction	1978.3																						
		Economic Planning Agency	1979.5																					
	Actual (White Paper on Transportation)		3506	3891	4071	3758	3608	3734	3867															
Passenger transports by passenger cars	Industrial Structure Council	A. 1974.12																						
		B. 1976.3																						
Unit: 100 million man-kms.	Ministry of Construction	1978.3																						
		Economic Planning Agency	1979.5																					
	Actual (White Paper on Transportation)		1359	1536	1410	1308	1297	1326																

1. Figures in parentheses are the share of passenger transports by automobiles in total passenger transports.  
 2. Figures in parentheses are the share of passenger transports by passenger cars in total passenger transports.  
 3. Figures in parentheses are the share of passenger transports by passenger cars in total passenger transports.  
 4. Figures in parentheses are the share of cargo transports by automobiles (trucks) in total cargo transports.

Table 9.2

FORECASTS ON MOTOR VEHICLE REGISTRATION

Forecaster	Release Date																						
	1970	'71	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88	'89	1990		
Total Vehicle Registration Unit=10,000	Industrial Structure Council A. 1974.12		2309								3194				3712								
	" " B. 1976.3	1781		2486	2676						3380				3740								
	Nomura Research Institute A. 1976	2043									3500				4200								
	" " B. 1978	1892		2037	3007	3150	3250				3700				3900							4290	
	Ministry of Construction 1978.3			2213																			6311
	Predicasts 1978.5						2845								4568								
	EPA 1979.5																						4700-4600
	Actual (Ministry of Transport) 1979				2519	2671	2793	2909	3100	3415													
	Actual (Ministry of Transport) 1979.5																						
	Total Passenger Car Registration Unit=10,000	Industrial Structure Council A. 1974.12		1296								1902				2161							
" " B. 1976.3		910		1455	1604						2170				2440								
Nomura Research Institute B. 1978		910								1994	2115				2780								
Ministry of Construction 1978.3		709													2360-2500							2350-2810	
Predicasts 1978.5							1724								2060								4207
EPA 1979.5																							
Actual (Ministry of Transport) 8/1					1463	1585	1724	1848	1983	2128													
Actual (Ministry of Transport) 1979.5																							
No. of Trucks Registered Unit=10,000		Industrial Structure Council A. 1974.12		992								1172				1301							
		" " B. 1976.3	877		1026							1180				1260							
	Ministry of Construction 1978.3														1300								
	EPA 1979.5										1137				1500-1600								
	Industrial Structure Council A. 1974.12		21								40				50								
	" " B. 1976.3	19		21						30					40								
	Ministry of Construction 1978.3														30								
	EPA 1979.5																						42
	Industrial Structure Council A. 1974.12																						
	" " B. 1976.3	87		157						184					198								
Ministry of Construction 1990-2000														199-219									
Predicasts 1978.5						152.8								216								326.4	
Management Intelligence 1979.5										219				265								290	

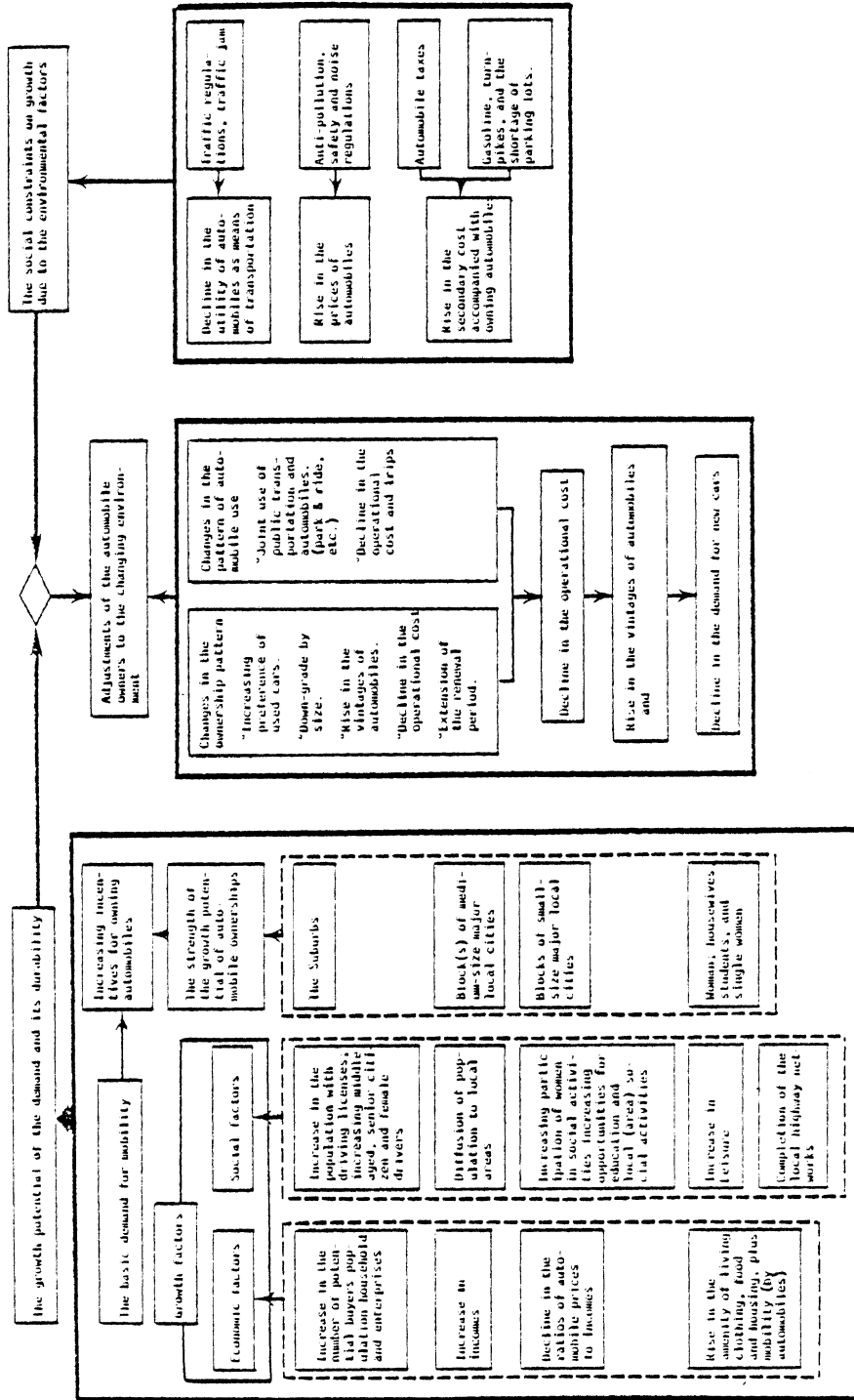
Table 9.3

## FORECASTS ON MOTOR VEHICLE DEMAND

	Forecaster	Release Date																					
		1970	'71	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88	'89	1990	
Exports Unit-10,000 (Including KD)	Industrial Structure A. Council I										328					432							
	B. Council II										336					404							
	Memura Research Institute																						
Imports Unit-10,000	Industrial Structure A. Council I																						
	B. Council II																						
	Memura Research Institute																						
Total Domestic Demand for Automobiles Unit-10,000	Industrial Structure A. Council I																						
	B. Council II																						
	Memura Research Institute																						
Production (Total) Unit-10,000	Industrial Structure A. Council I																						
	B. Council II																						
	Memura Research Institute																						
Passenger Car Production Unit-10,000	Industrial Structure A. Council I																						
	B. Council II																						
	Memura Research Institute																						

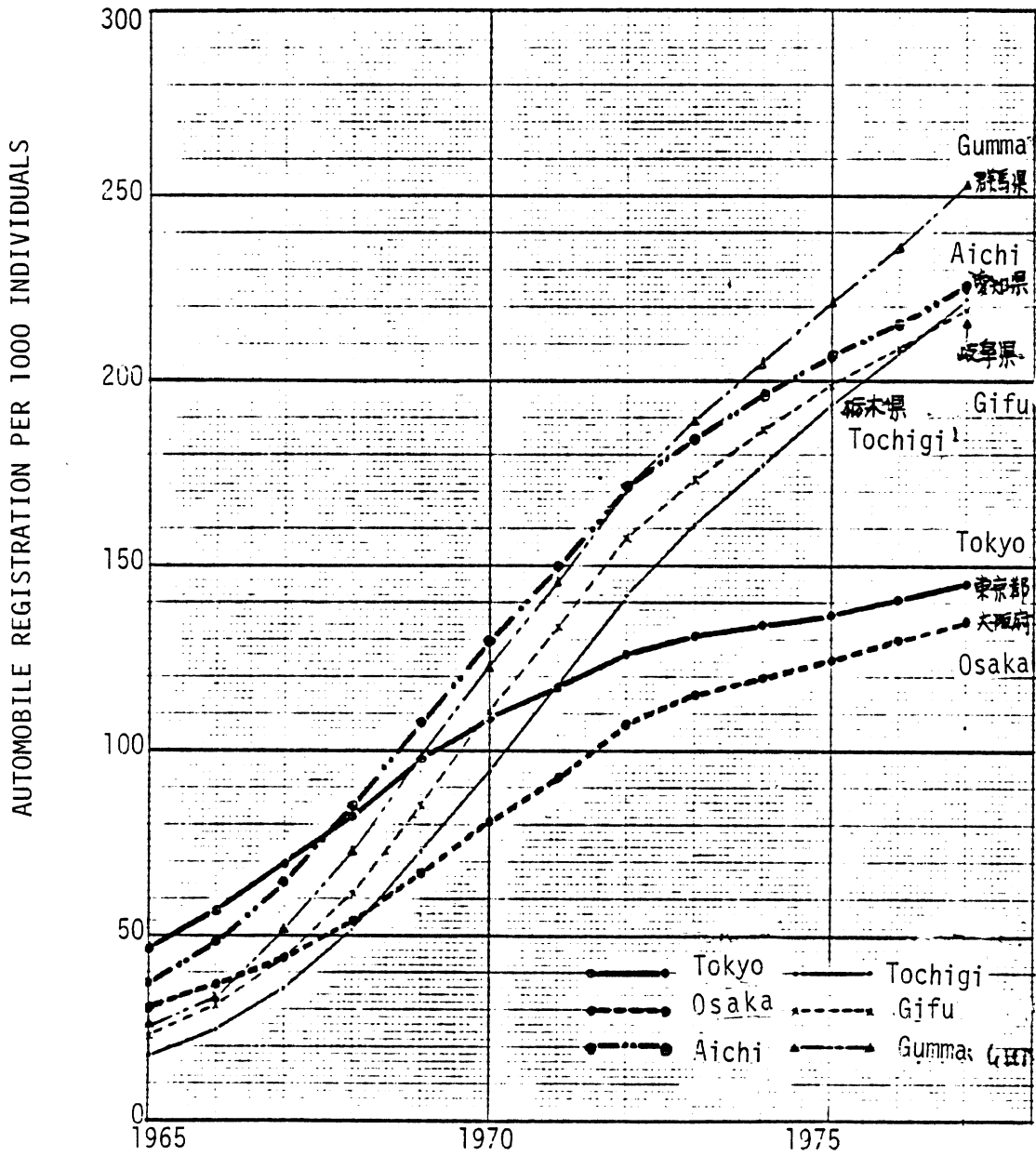
TABLE 9.4

CHANGES IN THE ENVIRONMENT OF PASSENGER CARS AND THE ADJUSTMENTS OF CONSUMERS



SOURCE: Management Intelligence

Table 9.5  
REGIONAL DIFFERENCES IN PER CAPITA AUTOMOBILE REGISTRATIONS



Source: Management Intelligence

## FOOTNOTES

<sup>1</sup>This section is adapted from Gyosei kanri chō (Administrative Services Agency), Tōkei seido to tokei chōsa (Statistical System and Statistical Research), 1977.

<sup>2</sup>These and other employment figures are for fiscal year 1976.

<sup>3</sup>The following discussion is adapted from Sōrifu (Prime Minister's Office), tōkei kyoku (Bureau of Statistics), kagaku gijutsu kenkyū chōsa hokoku (Report on the Survey of Research and Development), 1977, pp. 1-16.



## APPENDIX "A"

### TOPICAL INDEX FOR QUANTITATIVE INFORMATION ON THE JAPANESE AUTOMOBILE INDUSTRY

#### A. Production Data

##### 1. Assemblers

<u>Compiler</u>	<u>Publication</u>
Tsushōsangyōshō (MITI)	<u>Kikai tōkei geppō (Machinery Statistics Monthly)</u> <u>Kikai tōkei sokuhō (Preliminary Report on Machinery Statistics)</u> <u>Kikai tokei neppō (Yearbook of Machinery Statistics)</u> <u>Kōgyō tōkei hyo (Census of Manufacture)</u>
Nihon jidōsha kōgyō kai (JAMA)	<u>Nihon jidōsha tōkei geppō (Monthly Report on Automobile Statistics)</u> <u>Nihon jidōsha tōkei nenpō (Yearbook of Automobile Statistics)</u>
Nihon jidōsha kaigishō (JACC)	<u>Jidōsha nenkan (Automobile Yearbook)</u> <u>Chōsa geppō (Research Monthly)</u>
Okurashō (Ministry of Finance)	<u>Yūka shōken hokokushō sōran (Report on Negotiable Securities)</u>
Toyota hanbai (Toyota Motor Sales)	<u>Nihon no jidōsha sangyō (The Japanese Automobile Industry)</u>

##### 2. Parts Manufacturers

Tsushōsangyōshō (MITI)	<u>Kikai tōkei geppō (Machinery Statistics Monthly)</u> <u>Kikai tōkei nenpō (Yearbook of Machinery Statistics)</u> <u>Kōgyō tōkei hyo (Census of Manufactures)</u>
Okurashō (Ministry of Finance)	<u>Yūka shōken hokokushō sōran (Report on Negotiable Securities)</u>
Nihon jidōsha kaigishō (JACC)	<u>Jidōsha nenkan (Automobile Yearbook)</u>
Nihon jidōsha buhin kyokai (JAMA)	<u>Jidōsha buhin seisan dōkō chōsa (Survey on the Trends in Auto Parts Production)</u>

B. Investment Data

Tsūshosangyōshō (MITI)	<u>Shuyō sangyō no setsubi toshi keikaku (Equipment Investment Plans of Principal Manufacturing Industries)</u> <u>Kōgyō tōkei hyo (Census of Manufacturers)</u>
Okurashō (Ministry of Finance)	<u>Yūka shōken hokokushō sōran (Report on Negotiable Securities)</u>
Nihon kaihatsu ginkō (Japan Development Bank)	<u>Chōsa (Survey)</u>

C. Sales Data - Domestic

1. Assemblers

Tsūshosangyōshō (MITI)	<u>Kikai tōkei geppō (Machinery Statistics Monthly)</u> <u>Kikai tōkei sokuho (Preliminary Report on Machinery Statistics)</u> <u>Kikai tōkei nenpō (Yearbook of Machinery Statistics)</u> <u>Kōgyō tōkei hyo (Census of Manufacturers)</u>
Nihon jidōsha kōgyō kai (JAMA)	<u>Nihon jidōsha tōkei geppō (Monthly Report on Automobile Statistics)</u> <u>Nihon jidōsha tōkei nenpō (Yearbook of Automobile Statistics)</u> <u>Jidōsha hanbai jisseki (Automobile Sales)</u>
Nihon jidōsha kaigisho (JACC)	<u>Jidōsha nenkan (Automobile Yearbook)</u>
Okurashō (Ministry of Finance)	<u>Yūka shōken hokokushō sōran (Report on Negotiable Securities)</u>
Toyota hanbai (Toyota Motor Sales)	<u>Nihon no jidōsha sangyō (The Japanese Automobile Industry)</u>

2. Parts Manufacturers

Tsushōsangyōshō (MITI)	<u>Kikai tōkei geppō (Machinery Statistics Monthly)</u> <u>Kikai tōkei nenpō (Yearbook of Machinery Statistics)</u> <u>Kōgyō tōkei hyo (Census of Manufacturers)</u>
Nihon jidōsha kaigisho (JACC)	<u>Jidōsha nenkan (Automobile Yearbook)</u>
Okurashō (Ministry of Finance)	<u>Yūka shōken hokokushō sōran (Report on Negotiable Securities)</u>
Nihon jidōsha buhin kyokai (JAPIA)	<u>Jidōsha buhin seisan dōkō chōsa (Survey on the Trend in Auto Parts Production)</u>

D. Sales Data - Foreign

1. Assemblers

Tsushōsangyōshō (MITI)	<u>Kikai tōkei geppō (Machinery Statistics Monthly)</u> <u>Kikai tōkei nenpō (Yearbook of Machinery Statistics)</u>
Nihon jidōsha kōgyō kai (JAMA)	<u>Nihon jidōsha tōkei geppō (Monthly Report on Automobile Statistics)</u> <u>Nihon jidōsha tōkei nenpō (Yearbook of Automobile Statistics)</u>
Okurashō (Ministry of Finance)	<u>Gaikoku bōeki gaikyō (Summary Report on Foreign Trade)</u> <u>Nihon bōeki geppōhyo (Annual Report on Japan's Trade)</u>
Toyota hanbai (Toyota Motor Sales)	<u>Nihon no jidōsha sangyō (The Japanese Automobile Industry)</u>

2. Parts

Tsushōsangyōshō (MITI)	<u>Kikai tōkei geppō (Machinery Statistics Monthly)</u> <u>Kikai tōkei nenpō (Yearbook of Machinery Statistics)</u>
Nihon jidōsha kōgyō kai (JAMA)	<u>Nihon jidōsha tōkei geppō (Monthly Report on Automobile Statistics)</u> <u>Nihon jidōsha tōkei nenpō (Yearbook of Automobile Statistics)</u>
Okurashō (Ministry of Finance)	<u>Gaikoku bōeki gaikyō (Summary Report on Foreign Trade)</u> <u>Nihon bōeki geppōhyo (Annual Report on Japan's Foreign Trade)</u>
Nihon jidōsha buhin kyokai (JAPIA)	<u>Jidōsha buhin seisan dōkō chōsa (Survey on the Trend in Auto Parts Production)</u>
Toyota hanbai (Toyota Motor Sales)	<u>Nihon no jidōsha sangyō (The Japanese Automobile Industry)</u>

E. Purchase of Inputs for the Automobile Industry

Tsushōsangyōshō (MITI)	<u>Kikai tōkei geppō (Machinery Statistics Monthly)</u> <u>Kikai tōkei nenpō (Yearbook of Machinery Statistics)</u> <u>Kogyō tōkei hyo (Census of Manufacturers)</u>
Okurashō (Ministry of Finance)	<u>Yūka shōken hokokushō sōran (Report on Negotiable Securities)</u>

F. Financing

1. Assemblers

Tsushōsangyōshō (MITI)	<u>Shuyō sangyō no setsubi toshi keikaku (Equipment Investment Plans of Principal Manufacturing Industries)</u>
Okurashō (Ministry of Finance)	<u>Yūka shōken hokokushō sōran (Report on Negotiable Securities)</u>
Nihon kaihatsu ginkō (Japan Development Bank)	Chōsa (Survey)

2. Parts Manufacturers

Tsushōsangyōshō (MITI)	<u>Shuyō sangyō no setsubi toshi keikaku (Equipment Investment Plans of Principal Manufacturing Industries)</u>
Okurashō (Ministry of Finance)	<u>Yūka shōken hokokushō sōran (Report on Negotiable Securities)</u>
Nihon jidōsha buhin kyokai (JAPIA)	<u>Jidōsha buhin seisan dōkō chōsa (Survey on the Trend in Auto Parts Production)</u>
Nihon kaihatsu Ginkō (Japan Development Bank)	Chōsa (Survey)

G. Research and Development

Sōrifu (Prime Minister's Office)	<u>Kagaku gijutsu kenkyū chōsa hokoku (Report on the Survey of Research and Development)</u>
Kagaku gijutsu cho (Science and Technology Agency)	<u>Kagaku gijutsu hakushō (Science and Technology White Paper)</u>
	<u>Kagaku gijutsu yoran (Indicators of Science and Technology)</u>
	<u>Minkan kigyō no kenkyū katsudo ni kansuru chōsa (Report of the Survey on R&amp;D Activities of Private Enterprise)</u>
	<u>Kuni no shiken kenkyū gyōmu keikaku (National Research and Development Projects)</u>
Tsushōsangyōshō (MITI)	<u>Shuyo sangyo no setsubi toshi keikaku (Equipment Investment Plans of Principal Manufacturing Industries)</u>
Okurashō (Ministry of Finance)	<u>Yūka shōken hokokushō sōran (Report on Negotiable Securities)</u>

#### H. Subsidies and Grants

Okurashō (Ministry of Finance)	<u>Hojokin benran (Compendium of Grants &amp; Subsidies)</u>
Sōrifu (Prime Minister's Office)	<u>Kagaku gijutsu kenkyū chōsa hokoku (Report on the Survey of Research and Development)</u>
Kagaku gijutsu cho (Science and Technology Office)	<u>Kuni no shiken kenkyū gyōmu keikaku (National Research and Development Projects)</u> <u>Kagaku gijutsu yoran (Indicators of Science and Technology)</u>

#### I. Vehicle Use

Unyushō (Ministry of Transportation)	<u>Riku-un tōkei geppō (Monthly Statistics on Land Transport)</u> <u>Riku-un tōkei nenpō (Annual Statistics on Land Transport)</u> <u>Jidōsha tōkei hokokushō (Report on Automobile Statistics)</u> <u>Rōsen turokku hokokushō (Report on Line-Haul Truck Survey)</u> <u>Jidōsha hoyū sharyōsū geppō (Monthly Report on Number of Vehicles in Use)</u> <u>Jidōsha hoyū sharyōsū (Report on Number of Vehicles in Use, an Annual)</u> <u>Riku-un tōkei yoran (Summary of Land Transport Statistics)</u>
Kinsetsushō (Ministry of Construction)	<u>Dōrō tōkei nenpō (Highway Statistical Yearbook)</u>
Nihon jidōsha kōgyō kai (JAMA)	<u>Jidōsha tōkei geppō (Monthly Report on Automobile Statistics)</u> <u>Jidōsha tokei nenpō (Yearbook on Automobile Statistics)</u>
Nihon jidosha kaigishō (JACC)	<u>Jidōsha nenkan (Automobile Yearbook)</u> <u>Chosa geppō (Monthly survey)</u>
Toyota hanbai (Toyota Motor Sales)	<u>Nihon no jidōsha sangyō (The Japanese Automobile Industry)</u>

#### J. Accident Data

Keisatsuchō (National Police Agency)	<u>Kōtsū tōkei (Traffic Statistics)</u>
Unyushō (Ministry of Transportation)	<u>Riku-un tōkei yōran (Summary of Land Transport Statistics)</u>

K. Patents and Licenses

Nihon tokkyochō (National  
Patent Agency)

Okurashō (Ministry of Finance)

Sōrifu (Prime Minister's  
Office)

Kagaku gijutsu cho (Science  
and Technology Agency)

Tokkyochō nenpō (Patent Agency  
Yearbook)

Yūka shōken hokokushō sōran  
(Report on Negotiable Securities)

Kagaku gijutsu kenkyū chōsa  
hokoku (Report on the Survey  
of Research and Development)

Kagaku gijutsu yoran (Indicators  
of Science and Technology)

APPENDIX "B"

QUESTIONNAIRE FORMS - CENSUS OF MANUFACTURERS

CENSUS OF MANUFACTURES  
(For Firms with 20+ workers)

Municipal District Number	Census-Research Establishment Number	Census-Section Number	Form Number	Industry	Scale (size)	Basic Report - Section Number
1. Name & Address of Establishment: (Tel. )						
2. Name & Address of Head Office: (Tel. )						
3. Form of Ownership (Circle Type) 4. Total Capital on Paid-in Capital (for firms only) (Circle appropriate unlimited partner. Record Dec. 31 1973) 5. Existence of Other Branches (Circle appropriate) 1. One factory, head office at same location 2. One factory, head office at other location 3. Two/more factory						
6. Size of Labor Force (end of year)						
Regular Employees: Includes temporary labor employed for 30 days or more and temporary or daily labor employed for 18 days or more in Nov. & Dec.						
Self employed and family labor: Private owners and members of family working regularly without compensation						
Total						
7. Total of Monthly (end of month) regular labor force: record the sum total of production labor, clerical, supervisory and technical labor						
Total from Jan.-Dec.						
8. Total Cash Payments (Annual)						
Basic salary for regular staff, benefits & special disbursements (bonuses)						
Other Payments: such as retirement compensation and change of employment assistance for regular labor and wages of temporary and daily labor						
Total						
11. Stock value of manufactured products, raw materials and fuel; and value of semi-finished and unfinished goods. (1) Record relevant data applicable for the establishment only. (2) Includes sub-contracted production and do not include production and sale of goods produced under contract for others. (3) Calculate value according to book value						
12. Tangible Fixed Assets (1) Beginning of year present value, acquisition cost, scrap value or amortized value of tangible fixed assets utilized by establishment should be recorded according to book value (2) Acquisition cost should be recorded according to purchase construction, self-production, acquisition from another enterprise, expansion, transfer from outstanding construction account (3) Scrap value - disposal, removal, loss and transfer value (4) Amortized value - record according to deducted depreciation expenses from a tangible fixed asset account or calculations for a depreciation reserve fund.						
Start of Year Present Value, Acquisition Cost, Scrap Value or Amortized Value						
Buildings and Structures (includes related and construction facilities)						
Machinery & Equipment (includes related facilities)						
Ships, Vehicles, Trains, Equip., & Tools, Appliances, Fixtures with 1 year plus Durability						
Land						
Total						
Variation in Outstanding Construction Account						
Jan. 1 Present Value						
Acquisition Cost (Annual) New Assets						
Used Assets						
Scrap Value (Annual)						
Amortized Value (Annual)						
13. Total Shipments and Inventory of Manuf. a) Shipments by Product b) Inventory by Product						
1) Increases refer to increases in amount outstanding, decreases in amount transferred to another account						
2) Values are book values						
1) Manufactures are good produced with raw materials used by establishment, includes by-products and waste generated in product process						
2) Includes commissioned production and does not include resale without further processing of purchased						
3) Consult the product classification table for recording of product name, commissioned						
4) Include #1 shipments goods transferred to other branches						
5) Shipment value=ex-factory cost. Inventory value=book value.						
a) Shipments by Product						
Quantity Unit						
Value						
b) Goods Inventory by Product						
Quantity						
Value						

9. Total Consumption and Commission Production Cost of Raw Materials, Fuel and Electric Power		4) Total Goods Shipments		5) Total Goods Inventory	
(1) Record amounts actually consumed, including that transferred from other branches. Include that supplied to subcontractors and don't include that involved in production of goods supplied by other branches. (2) Value-purchase cost including transport expenses		Subcontract Production Revenue - Revenues received for or value of value added production with respect to goods and/or raw materials supplied by other firms		17. Primary Raw Materials (those purchased and transferred from other branches)	
Value	Value	Number	Commissioned Product	Value	Value
Raw Material Consumption	Primary Raw Materials, supplementary materials, purchased parts, tools, packing materials, factory maintenance materials, supplies				
Fuel Consumption Oil, gas, coal (including fuel for transportation)					those supplied by external sources
Electricity Consumption 1000 Kilowatt hours	Volume units-1000 Kilowatt hours				
(1) Include electric lighting	Volume				
(2) For those who generated their own electric power, include the volume and amount of the sale of any surplus energy in total goods shipments and do not include here	Value				
	XXXX				
	XXXX				
	XXXX				
Cost for Commission Production Value of raw materials directly and indirectly supplied (as inputs in goods supplied) to sub-contractors			Total Commission Revenue		
Total					
10. Value of (B + 9.)					
The following section 19 does not apply to establishments with 29 or less employees					
19. Industrial Land and Water Usage					
(1) For industrial site area record total area utilized by the establishment including rented land					
(2) For area of buildings, record the total area covered by the structures including on the establishment's site					
(3) Acquisition cost refers to total area of industrial land purchased by contractor in 1973					
(4) Acquisition cost - total cost of relevant acquired land at time of purchase by contractor					
(5) District of acquired site should refer to place of acquisition or site location. If site overlaps onto two or more districts, record district where largest portion of site is located.					
(6) Convert (5) to square meters (1.3 sq. m./1500), rounding to the nearest square meter.					
14. Total of (a) + (c) + (d) 15. Domestic Consumption Tax Total of commodity tax included in value of shipments, liquor tax, sugar consumption tax, gasoline tax, rural road tax 16. (14. - 15.)					
18. Production Processes (of goods shipped and in stock)					
Remarks					

(7) Industrial water - water utilized in industrial production (includes drinking and miscellaneous water usage by labor force; excludes water for hydraulic power generation)  
 (8) Daily water usage - 1973(1/1-12/31) total industrial water consumption divided by the number of working days. Round to the nearest cubic meter.  
 (9) When water usage is unknown, estimate according to water pump specifications, time in operation, outflow rate, etc.  
 (10) Section (c) item (8) [total fresh water (1-7)] should equal section (d), item (7) [total fresh water (1)]



a) Site Area and Building Area (sq. meters)	Type		Value	c) Daily Water Usage by Type (cubic meters)		d) Daily Water Consumption by Use (cubic meters)	
	Site Area Building Area Extended Building Area	Area		Type	Amount	Type of Use	Fresh Water
b) Acquisition of Land	1. Value and Area of Acquired Land by Land Type			1. Industrial Use		1. Boiler	
	2. Building Sites (included plants not operating)			2. Tap Water		2. Raw Material	
	3. Mountainous forest and Waste Land			3. Surface Water		3. Product Treatment and Cleansing	
	4. Reclaimed Land (include planned reclamation)			4. Riverbed (subsoil) Water		4. Refrigeration and Cooling	
	5. Other (salt fields, river beds, etc.)			5. Well Water		5. Heating	
	II. District of Establishment Site location			6. Other Water		6. Other (drinking and miscellaneous)	
				7. Recycled Water		7. Total	
				8. Total (1-7) Fresh Water			
				9. Sea Water			

The following Section 20 does not apply to establishments with less than 50 employees

20. Consumption and Stock of Raw Materials and Fuel by Item	a) Consumption and Stock of Raw Materials		b) Consumption and Stock of Fuel		c) Consumption and Stock of Fuel	
	Number	Raw Material Consumed	Number	Fuel Consumed	Units	Fuel Stock (12/31/73)
		Total Consumption Quantity		Coal		
		Total Consumption Value	301	Coke		
		Raw Material Stock (12/31/73)	302	Gasoline, Light		
			303	Fuel Oil		
			304	Gas Oil		
			305	Gas Oil (kerosene)		
				petroleum gas, coal gas, natural gas		
a)		Seal of Researcher				
b)		Official title of person to which inquires concerning census should be referred				

1) Please note instructions and notes on back page carefully when recording data. Values should be in 10,000 units, with lesser values rounded to the nearest 100,000.

2) Two copies of this census should be completed, with one sent to the appropriate prefectural office and the other to the M.I.T.I., where they will be kept strictly in trust.

3) Items will be completed by the researcher or municipal bureau; items by the prefectural office and items by M.I.T.I.

4) This census form will not be utilized for tax collection purposes.

5) This census report will be presented to M.I.T.I. through the following channels: Researcher to Municipality to Prefectural Office to M.I.T.I.

**NOTES:**

**General Items**

1. This survey is conducted for the purpose of constructing basic data sets for our nation's manufacturing industries.
2. For items where annual data is required record facts for the period 1/1-12/31. For establishments where monthly accounts are settled on a set date such as the 25th of the month for example, record data for the year starting with the first day after December's closing date; e.g., 12/26/72-12/25/73.
3. Please write clearly with blue or black ink on the census form. Carbon paper or typewritten copies are permissible.
4. Record numbers using Roman numerals
5. For categories where total values and quantities are zero, be certain to record it as 0.
6. Using additional space as necessary when there is insufficient space on the form. However, please note [attached sheet below] on the form and record the name of the establishment on the additional sheet. When totals are required please make sure and record the total on the basic census form where appropriate.

**Individual Items**

1. Name of Establishment 2. Name of Head Office  
Please record the official name used by the shop of office. When no definite name exists, record the name of the establishment's owner.
3. Form of Ownership  
Associations refer to associations that have corporate stocks. Anonymous association with corporate stocks should be recorded under Individual.
6. Size of Labor Force
  - (1) Regular workers fall under the following:
    - (a) those employed indefinitely or for more than 1 month
    - (b) daily workers and those who worked less than 1 month but who were employed for 18 days or more during November and December
    - (c) Directors and trustees who are regularly employed by and receive monthly salaries from the establishment.
    - (d) members of the owner's family who are regularly employed by and receive monthly salaries from the establishment
  - (2) Production workers refer to those who are employed at production labor, who record production, or who work in fields that are closely tied to the above.
  - (3) Supervisory, clerical and technical staff refers to those who are engaged in supervision, administration, management, personnel, public welfare, sanitation, research and so on (including simple tasks) and also includes directors and executive officers regularly employed.
  - (4) Individual owners and family should not include family members performing assisting tasks but not regularly engaged in the practice of the business.
7. Total of Monthly (end of month) Regular Labor Force  
This category is the sum of the end-of-month labor forces from January through December and should not match the total at the labor force classes in category 6 above.
8. Total Cash Payments
  - (1) Please record the tax-inclusive total that is prior to the deduction of income tax, insurance, union fees and so on.
  - (2) Basic salary and benefits for regular staff refers to compensation fixed by labor contract, collective agreement, wage laws and so on. For example, in addition to basic wages, included are family

allowances, overtime, transportation allowances, vacation allowances and so on. Please record payments actually made or that should have been made during 1973.

- (3) Special payments refers to payments of a temporary nature such as marriage allowances or term-end bonuses. Record payments actually made.
  - (4) Other payments refer to wages for temporary or daily labor and payments to regular labor other than that listed above. Record only payments actual made in 1973.
9. Consumption and Commission Production Cost of Raw Materials, Fuel, Electric Power
- (1) When raw materials were utilized for the production of intermediate goods which were these used as inputs in further production, only include the initial raw material cost and do not include the value of the intermediate good.
  - (2) Record according to estimated market value materials transferred from other branches within the enterprise and self-produced agricultural, forestry, marine and mining products
  - (3) Under Total Raw Material Consumption include all raw materials employed in production and processing including purchased water. Included under [materials and supplies for plant maintenance] are materials used for minor repair to the plant's buildings, equipment or machinery; parts, tools and machine oil with less than one year durability, and materials used for new construction or expansion of plant and equipment entered in the books as fixed assets should not be included.
  - (4) Fuels used as raw materials should be recorded under raw material consumption and not fuel consumption. For example, coal used in coke production and oil for rubber solvent production should be entered under raw material consumption.
  - (5) Coal and oil used by in-house steam power electricity generation plants that transmit electricity to two or more establishments within the enterprise should be entered as one lump figure under the establishment with the highest value of shipments of manufactures during 1973.
  - (6) Under Total Electricity Consumption, when purchases are made according to both a meter-rate and a fixed rate system, total costs under both systems should be recorded. The value of any surplus electric power sold to other by in-house generating plants that supply to two or more internally should be recorded as [13a] shipments of manufactures by product for the establishment with the highest 1973 value of shipments.
  - (7) Under [cost of commissioned products] do not include the cost of production subcontracted to others where no raw materials were supplied to them.
11. Stock Value of Manufactures, raw materials and fuel; and of semi- and unfinished goods.
- (1) Do not include raw materials and goods used and produced under subcontract conditions.
  - (2) Record according to book value. When not feasible, record according to beginning-of-year or end-of-year estimated market value.
  - (3) End-of-year stock of manufactures should match [13b] Inventory of Manufactures by product, [total].

NOTES (Continued)

12. Tangible Fixed Assets

- (1) Values should be entered as book values. When difficult please use estimated value (or purchase cost when applicable).
- (2) Start-of-Year Present Value  
When depreciation is calculated according to direct methods, record the asset's start-of-year book value; when indirect methods are employed deduct the total accumulated depreciation cost from time of purchase cost to calculate present value.
- (3) Acquisition Cost
  - (a) for purchases, transfers from another branch, or transfers from suspended construction accounts, record the book value at time of acquisition or appraised value at time of transfer. Assets imported from abroad (or purchased through trading firms) that are used should be regarded as new.
  - (b) Construction and in-house production should be recorded according to appraised value at time of acquisition.
  - (c) When expansion, reconstruction or improvement has increased the book value of assets, record the amount of increase.
  - (d) Do not record increases in asset value due to reappraisal.
- (4) Scrap Value
  - (a) When assets are removed from the establishment accounts due to sale, removal, transfer to another branch, or retirement, scrap value should be calculated according to start-of-year book value or purchase cost minus total accumulated depreciation depending on whether direct or indirect depreciation calculation methods were utilized.
  - (b) When assets are partially destroyed due to fire and so on, the amount of decline in book value should be recorded.
- (5) Amortized Value. For cases where depreciation was directly calculated, deductions from the tangible fixed asset account should be recorded, whereas in the case of indirect calculation additions to the depreciation reserve fund should be recorded.
- (6) Buildings and Structures
  - (a) Buildings include plant, offices, company housing and other operationally related buildings (including those detached from the main premises).
  - (b) Structures include dock facilities, bridges, wharfs, break waters, reservoirs, tunnels, chimneys and other fixed engineering facilities, structures, paved streets, and parking facilities (but limited to items which are considered for depreciation in the books). Please also include structures detached from the main premises.
- (7) Machinery and Equipment
  - (a) Please include power generation equipment, production processing machinery, conveyors, hoists, cranes (excepting those attached to buildings) and other such transporting machinery, and related equipment.
  - (b) Please include blast furnaces, brick kilns, fractional distilling towers and other fixed facilities capable of importing physical or chemical change to other objects or materials.
- (8) Ships, Vehicles, Transportation Equipment, Tools, Appliances
  - (a) Record under ships, ships and marine transportation equipment, and under vehicular transportation equipment record railway carriages, automobiles and other ground transportation equipment (including applicable horse and cattle).

- (b) Include containers under tools, appliances, and Fixtures, and record those with 1 year plus durability valued at ¥50,000 or above

(9) Land

Include under land, in addition to plant and office sites, company housing sites, athletic fields, farmland, and other land related to firm's operation (including that detached from the main premises).

(10) Outstanding Construction Account

The outstanding construction account covers tangible fixed assets in the process of construction, for example, a situation where a building has been completed but various additional expenses are incurred prior to the complete rearrangement of the fixed asset account, and is an account regulation technique set up to put things in order in such cases. For establishments where such an account has been set up, please record under increase any debits to the account incurred during 1973 and under Decrease the amount transferred over to other accounts during same period (value of relevant credits).

13a. Shipments of Manufacturers by Product

- (1) Record total 1973 shipments of the establishment recording to the product classification table distributed together with the original form.
- (2) Include goods shipped on a consignment basis but still unsold as of December 31. However, deduct goods shipped out in 1972 but returned unsold in 1973.

(3) The value of shipments for goods for which domestic consumption taxes were levied should be based on ex-factory shipment costs inclusive of the taxes, whereas for goods where there were price-reductions and discounts the value should be based on actual sales prices exclusive of such.

13b. Inventory of Manufactures by Product

- (1) Please record by product, the stock of manufactures owned by the establishment as of December 31, 1973.
- (2) Do not include goods covered by the semi-finished and unfinished goods accounts.

13c. Commission Production Revenue

For the purposes of this survey, commission is limited to production based on primary raw materials supplied by others, or value-addition to or repair of manufactures or semi-finished goods owned by others, on a fee basis. Accordingly, for establishments belonging to the manufacturing company, the processing of products and new materials owned by the establishment which yield manufactures of the establishment, which should be recorded under [13a] Shipments of Manufactures by Product.

13d. Repair Revenue

- (1) Under repair revenue, please record the amount received or receivable for repairs performed on products owned by others.
- (2) Do not treat ship repairs and the overhaul of aircraft or aircraft engines as repairs. Rather when repairs were done with raw materials owned by the establishment record as [13a Shipments of Manufactures by Product] and when performed with externally supplied materials as [13c Commission Production Revenues].

17. Primary Raw Materials

For example, in a case where raw cotton is purchased to make cotton yarn that is then woven to make textiles goods, the initial purchase of raw cotton is to be recorded and the cotton yarn is not to be recorded. Moreover, when machinery castings made at other plants are purchased or received and are then processed to produce machinery, record the machinery castings.

**NOTES (Continued)**

**18. Production Processes**

Please explain in stages, the production processes employed by the establishment for the major manufactured and value-added products recorded under [13 Shipments and Inventory of Manufactures].

**19a. Establishment Site and Building Area**

- (1) For site area, record total area of site utilized by the establishment (including rented land) as of December 31, 1973. However, when the sites of mining areas, residential housing, dormitories, and % other welfare facilities can be clearly separated from that of the production facilities (including warehouses) by streets (highways) fences, walls or some other method, such sites should not be included.
- (2) Planned expansion into land adjacent to the establishment should be included.
- (3) Under building area include the area of all buildings located on the establishment's site under (1) and (2) above, including in addition buildings under construction as of December 31, 1978 and listed on the books (under the outstanding construction account).
- (4) For extended building area, record the total floor space of every structure located on the establishment site. When the extended building area matches the building area, please record the same figure.

**19b. Value and Area of Acquired Land by Type**

- (1) As acquired area, record the total area of land whose purchase as industrial land was contracted for during January 1 through December 31, 1973.
- (2) For value of acquired land, if the land was purchases or the purchase contract was completed, include in the value expenses such as for ground leveling or filling, or compensation, needed for the industrial site. For bare purchases or contracts not included these expenses, estimate and include them in the cost of acquisition. Moreover, even if no payments were made, if a purchase contract was established, record the contracted area and value.
- (3) In the case where license for reclamation of public water (such as rivers, lakes, sea or swamp, belonging to the nation and at the disposal of the public) has been received, the approval will be treated as a purchase contract. In such a situation, licensed area will be acquired area (even if it is sea or other water surface at the time of approval), while reclamation and compensation expenses should be added the value of acquisition.
- (4) The land type classification [4 Reclaimed Land (including planned reclamation)] refers to reclamation of public and private rivers, lakes, sea and swamp.

**19c. Daily Water Usage by Type**

Record under public water industrial water services and tap water services received as supplied by the prefectural or municipal authorities.

- (1) Industrial water service refers to that which supplies water not fit for drinking
- (2) Tap water service refers to general service which supplies water fit for drinking
- (3) For surface water, record the quantity of water drawn from rivers, lakes or reservoirs.
- (4) Under river bed water, record the quantity of water drawn from buried water deposits of riverbeds and former riverbeds
- (5) Under well water, record the quantity of water drawn from shallow and deep wells and hot springs.

- (6) Under other water, record that which doesn't belong to the above nor fall under [collected water] below, such as that drawn from aqueducts for agricultural use, or that supplied by another plant establishment.
- (7) Under recycled water, record the quantity of water that was reused after being used once at the establishment already through recycling methods such as cooling towers, water collection sites, settling basins, and rotational devices.

**19d. Daily Water Consumption by Use**

- (1) Boiler use water refers to water used inside the boiler to generate steam.
  - (2) Raw material water refers to water employed as a raw material within the production process of a good, or water that is actually a raw material of the good itself.
  - (3) Water for product treatment and cleansing refers to water used for physical treatment such as submerging in special solutions raw materials, semi-finished goods, and manufactures. For example, water for the treatment of pulp in the pulp production process, or for the liquification and hying of natural soda in the viscose production process.
  - (4) Water for coding refers to water used to cool factory equipment or products
  - (5) Water for heating refers to water used to heat and adjust the temperature within the plant.
  - (6) Other water refers to that not covered by the above categories such as the employees' drinking and sanitary water in the plant.
- 20. Consumption and Stock of Raw Materials and Fuel by Item**
- (1) For supplementary materials, packing materials, and supplies other than direct raw materials for the production process, record them as well if they conform to items listed below in the raw materials classification table.
  - (2) If a fuel is used as a raw material, enter under raw material consumption rather than fuel consumption. For example, coal for coke production or coke for pig-iron or steel production.
  - (3) Do not include raw materials stored at the establishment, but supplied from another establishment for the purpose of subcontracted production.
  - (4) Calculate the value of raw material and fuel consumption according to the same methods utilized in recording the value of raw material consumption.
  - (5) Use additional sheets if space provided is insufficient.



CENSUS OF MANUFACTURES

(Establishments with 19 or less employees)

Municipal District No.	Census Research Establishment No.	Census Res. Section No.	Name and Address of Establishment: (Tel. )	Form Number	Industry	Basic Research Section No.
1. Name and Address of Establishment: (Tel. )			Name and Address of Head Office: (if same as 1. record as such (Tel. )			
3. Form of Ownership (circle appropriate type) 1. Firm (Inc., Ltd., limited partnership, unlimited partnership) 2. Association, other body corporates 3. Individual			4. Total Capital or Paid-in Capital (only for firms) Record total paid-in or invested capital as of 12/31/73	5. Existence of Other Branches (circle appropriately) 1. 1 Factory, head office at same location 2. 1 Factory, head office at another location 3. Two or more factories		
6. Size of Labor Force (end-of-year)				Male	Female	Total
Regular Workers - Including temporary workers employed for 30 days or more and daily or temporary workers employed for 18 days or more during November and December						
Self-employed and Family Labor - Private owner and family workers working regularly without wage compensation						
Total						
7. Total Cash Payments (annual)			Total Payments			
(1) Record basic wages, allowances, and special payments (such as term-end bonuses) to regular staff. Include retirement compensation and change of employment allowances						
(2) Include payments to temporary and daily labor						
8. Total Consumption and Commission Production Cost of Raw Materials, Fuel and Electric Power			Total Value			
(1) Include amount of raw materials, fuel and electric power actually consumed out of that purchased or transferred from other establishments (do not record value of total purchases)						
(2) Under commission production costs record paid-out or to be paid-out cost of production in the case of supplying of raw materials and/or products to other establishments for processing						
9. Shipments of Manufactures (1) Manufactures are goods produced with raw materials used by the establishment, and includes by-products and waste generated in the production process.						
a) Shipments of Manufactures by Product (annual)						
(2) Includes commissioned production and does not include resale without further processing of purchased goods.						
(3) Include as shipments goods turned over to other branches within the firm.						
(4) Consult the product classification table for recording of product name, commissioned product name, number, and quantity unit. Moreover, round up quantities of products.						
(5) Shipment value should be calculated according to ex-factory cost.						
Number	Product Name	Quantity Unit	Shipments by Product			
			Quantity	Value		

1. Read explanations under each section carefully when recording. Record values up until ¥10,000, rounding off less amounts to the nearest ¥10,000.
2. Two copies of this census should be completed, with one sent to the appropriate prefectural office and the other to M.I.T.I., where they will be kept strictly in trust.
3. Items to be completed by the researcher or municipal bureau; items by the prefectural office; items by M.I.T.I.
4. This census will not be utilized for tax collection or other aims affecting the interests of the filing party.
5. The census will be presented to M.I.T.I. through the following channels: Researcher to Municipality to Prefectural Office to M.I.T.I.

Total Shipments of Manufactures					
b) Revenue from Sub-contracted Production Revenue received or to be received from processing of raw materials and/or products supplied by other firms.					
Number	Value				
Subcontract Product Name					
Total Subcontract Production					
13. Primary Raw Materials and Simple Production Processes Purchased Materials      Supplied Materials	c) Total Revenue from Repairs (annual) 10. Total of a), b), c) 11. Total Domestic Consumption Tax Total of Commodity tax, liquor tax, etc. inc. in 9a Shipments of Manufact.				
Value of (10 - 11)					
Record on the production processes for items listed under Section 9.					
Section 14 below should not be completed by establishments with 9 or less workers					
14. TANGIBLE FIXED ASSETS (1) Tangible fixed assets (excluding land) such as buildings, structures, machinery, equipment, ships, vehicles, transportation equipment, and tools, appliances and fixtures with one year plus durability should be recorded according to book value. (2) Acquisition cost should be according to acquisition by purchase, construction, self-production, acquisition from another establishment, expansion, or transfer from the outstanding construction account. (3) Scrap value refers to value from disposal, removal, loss or transfer to another establishment. (4) Amortized value should be recorded according to depreciation deducted from a tangible fixed asset account or calculations for a depreciation on reserve fund.					
Type	January 1, 1973 Present Value	Acquisition Costs New Assets	Used Assets	Scrap Value (Annual)	Amortized Value (Annual)
Tangible Fixed Assets (exc. land)					
Land					
Remarks:					
			Seal of Researcher	Seal and Signature of Filing Party	





APPENDIX "C"

FISCAL 1977

REPORT OF THE SURVEY ON R&D  
ACTIVITIES OF PRIVATE ENTERPRISES

(Minkan Kigyō no Kenkyū Katsudō ni  
kansuru Chōsa Hōkoku)

March 1976

Planning Bureau,  
Science & Technology Agency

*(Responses from Automobile Companies are Shown in Italics)*

## FORMAT OF QUESTIONNAIRE

CONFIDENTIAL

Questionnaire of "Survey on Research & Development Activities  
of Private Enterprises" (on the Outline of an Enterprise)

Name of Enterprise:

Address of Enterprise' Headquarters:

The Amount of Capital:

Person who is responsible for (Post)  
filling out this questionnaire (Name)

Reference (Post)  
(Name)  
(Telephone Number)

(On the Contents or Classification of Business Activities)

Please identify the contents of your company's business activities with one of the classifications in the following table (below). Please write the appropriate code number in ( ).

If your company's business activities range over many classifications below, please choose only one classification which is considered to be the central business activity of your company from the point-of-view of research and development activities, and write the suitable code number in ( ).

<u>Code Number</u>	<u>Classification of Business Activity</u>
01	Agriculture, Forestry and Fishery
02	Mining
03	Construction
04	Food Processing
05	Textile
06	Pulp and Paper
07	Publishing, Printing
08	Synthetic Chemical Fiber
09	Oils and Fats, Paint
10	Pharmacy
11	Chemical Industries excluding those of Code 08 - 10
12	Petroleum and Coal Products

<u>Code Number</u>	<u>Classification of Business Activity</u>
13	Rubber Products
14	Ceramics
15	Steel and Iron
16	Nonferrous Metals
17	Metal Products
18	Machinery
19	Electric Appliance
20	Communication, Electronics and Electric Measuring Machines
21	Automobile
22	Transportation Machinery excluding Automobile (Code 21)
23	Exact Machine
24	Industries excluding those of Code 04 - 23
25	Transportation, Communication and Utilities

Please answer all the remaining questions of this questionnaire in the framework of the classification which you chose above.

(1) Prospect of Technology under the Stable Growth

Question 1. How is your company going to raise its technological level from now on? Please choose (an) appropriate answer(s) below and write the code number(s) of your answer(s) in [            ].

1. Our company develops all necessary technology by itself.  
(Complete self-reliance)  
*( 1 Automobile company chose this response )*
2. Primarily self-reliance, and where self-reliance efforts are insufficient they are supplemented by the introduction of technology from abroad.  
*( 8 Automobile companies selected this response )*
3. Primarily self-reliance, and where self-reliance efforts are insufficient they are supplemented by the introduction of technology from Japanese sources.  
*( 1 Automobile company chose this response )*
4. Primarily self-reliance, and where self-reliance efforts are insufficient they are supplemented by research contracts with outsiders.  
*( 2 Automobile companies chose this response )*
5. Primarily self-reliance, and where self-reliance efforts are insufficient they are supplemented by joint research (with somebody or with other companies or research institutions).  
*( 4 Automobile companies chose this response )*

6. Primarily our company relies on introducing technology from abroad, and where this is insufficient it is supplemented by our company's own research and development.

*( No Automobile responses under this heading )*

7. Primarily our company relies on introducing technology from Japanese sources, and where this is insufficient it is supplemented by our company's own research and development.

*( No Automobile responses under this heading )*

8. Primarily our company relies on research contracts with outsiders and where this is insufficient it is supplemented by our company's own research and development.

*( No Automobile responses under this heading )*

9. Primarily our company relies on joint research with others, and where this is insufficient it is supplemented by our company's own research and development.

*( No Automobile responses under this heading )*

10. Our company does not do any research and development activity at all.

*( No Automobile responses under this heading )*

11. Others (please explain concretely: \_\_\_\_\_).

*( No Automobile responses under this heading )*

Note: In case you choose code number 11, Question 1, please go to Question 17 directly without answering Questions 2 - 16.

Question 2. How high is the annual growth rate (nominal base) of your company's expenses for research and development (expenses for personels necessary for research and development activities, raw material costs, expenses for purchasing fixed assets, other expenses for research and development activities)? Please choose the most appropriate answer from below, and write the code number of your answer in [        ].

Actual growth rate in fiscal 1975 [        ]

A forecast of the growth rate in fiscal 1976 [        ]

A forecast of the average annual growth rate of the three years starting from 1977 [        ]

1. The annual growth rate is negative.

*( 5 Automobile companies in 1975; none in 1976 and 1977 )*

2. The annual growth rate of the year did not change as compared to that of the previous year.  
( 3 in 1975; 4 in 1976; 1 in 1977 )
3. The annual growth rate is 0 - 5 %.  
( 0 in 1975; 1 in 1976; 5 in 1977 )
4. The annual growth rate is 5 - 10 %.  
( 3 in 1975; 6 in 1976; 5 in 1977 )
5. The annual growth rate is 10 - 20 %.  
( 3 in 1975; 4 in 1976; 4 in 1977 )
6. The annual growth rate is more than 20 %.  
( 3 in 1975; 1 in 1976; 1 in 1977 )
7. We do not know.

Question 3. What is (are) the major determinant(s) of the size of your company's budget for research and development? Please choose the most appropriate answer(s) and write the code number(s) of your answer(s) in [            ]. (You can choose up to two answers).

Up to the Present    [            ] [            ]

Future    [            ] [            ]

1. The actual expenses for research and development in the previous year.  
( 3 Automobile companies said this was how it has been done up until the present; 6 said it will be done this way in the future )
2. The results (outcomes) of the research and development activities in the previous year.  
( 1 said done this way up until present; 1 said will continue this way in the future )
3. The nature of research to be done in the current year.  
( 13 said done this way up until the present; 12 said will continue this way in the future )
4. Sales or business profits in the previous year.  
( 1 said done this way until present; no surveyed company expected it would be done this way in future )
5. Expected sales or business profits in the current year.  
( 3 companies said it had been done this way up until now; 5 expected it would be done this way in future )
6. Outlook of the economy in general (domestic and international)  
( No responses by Automobile companies under this heading )

7. Our company's policy on research and development.

*( 6 companies said it had been done this way until now; 9 expected it would be done this way )*

8. Others (Please explain concretely: \_\_\_\_\_ ).

Question 4. It is anticipated that the downward trend of the economic growth rate will have some effects on the future trend of expenses for research and development activities. Does your company have any measures for this situation? Please choose the most appropriate answer(s) from below, and write the code number(s) of your answers in [ \_\_\_\_\_ ].

[ \_\_\_\_\_ ] [ \_\_\_\_\_ ]

1. Qualitative improvements such as strengthening the management of research and development activities, and securing excellent talent, etc.

*( 12 Automobile companies gave this answer )*

2. Utilizing other companies and institutes (joint research, research contract).

*( 2 gave this answer )*

3. More emphasis on applied research and development research (our company will pay more attention to the research results of basic research done by other companies).

*( 13 gave this answer )*

4. Introducing more technology from outside sources.

*( 2 gave this answer )*

5. Others. (Please explain concretely.)

Question 5. Please choose your company's major partners in joint research or research contract from below. Please choose three (3) major partners (the biggest partner first) of joint researches and research contracts respectively. If your company has no joint research or research contract partner, you need not answer this question.

Joint Research [ \_\_\_\_\_ ] [ \_\_\_\_\_ ] [ \_\_\_\_\_ ]

Research Contract [ \_\_\_\_\_ ] [ \_\_\_\_\_ ] [ \_\_\_\_\_ ]

1. University (including university-attached research institutes)

*( 4 Automobile companies gave this answer for cooperation research; 5 gave it for contract research )*

2. National Research Institutes  
( 1 gave this answer for cooperative research )
3. Domestic enterprise in the same industry as your company  
( 4 gave this answer for cooperation research )
4. Domestic enterprise in a different industry from your company.  
( 10 gave this answer for cooperative research; 4 gave this answer for contract research )
5. Domestic think-tank, special juridicial person research institutes  
( 1 gave this answer for cooperation research; 2 gave this answer for contract research )
6. Foreign enterprise in the same industry with your company  
( 1 gave this answer for cooperative research )
7. Foreign enterprise in a different industry from your company  
( 2 gave this answer for cooperative research; 1 gave this answer for contract research )
8. Foreign think-tank, special juridicial person research institutes  
( 1 gave this answer for cooperative research; 5 gave this answer for contract research )
9. Others (please explain concretely).  
( None chose this alternative for cooperative research; 1 chose this answer for contract research )

If your company does not import foreign technology, please skip to Question 11.

Question 6. This is a question of the recent general outline of your company's introduction of foreign technologies. Please answer the following five questions by "Yes" or "No" or "Indeterminate", and write the appropriate number of your answer in [            ].

1. Yes (I think so)
2. No ( I do not think so )
3. Indeterminate (Neither Yes nor No)

Question 1. Is the introduction of foreign technology increasing?

( Automobile company responses: Yes - 2, No - 6, Indeterminate - 6 )

Question 2. Is the introduction of technology from foreign enterprises increasing more rapidly than the introduction of technology from domestic enterprises?

( Yes - 1, No - 7, Indeterminate - 5 )

Question 3. Are the new technologies you are adopting increasingly being developed in industries other than your own?

( Yes - 1; No - 2; Indeterminate - 3 )

Question 4. Is the amount of technology which your company wants to introduce from abroad decreasing?

( Yes - 3; No - 5; Indeterminate - 5 )

Question 5. Are the conditions attached to the introduction of technologies from abroad (price of technologies, restrictions on export markets, etc.) becoming more severe?

( Yes - 5; No - 5; Indeterminate - 4 )

How about prospects five years from now?

( Yes - 7; No - 2; Indeterminate - 5 )

Question 6. Please list concrete examples of specific technological fields where the attached conditions of introducing technologies from abroad are becoming more severe, or are expected to become severe, if any.

Example 1. ( )  
2. ( )  
3. ( )

Question 7. Although the liberalization of capital and commodities is said to make it difficult (for domestic enterprises) to introduce technologies from abroad, the number of technologies introduced from abroad is increasing. What do you think about the difficulties associated with introducing technologies from abroad at present and five years from now. Choose the appropriate code number of your answer from below and write it in [ ].

Type of Partner

Foreign enterprise which export commodities to Japan, or which have direct investments in Japan or have intentions to invest in Japan

Character of Technology

Core Technology:

At Present -(8 Automobile companies say it is increasingly difficult to import technology; 1 says it is the same as before; 3 say it is indeterminate)

In Five Years -(9 say it will be more difficult; 1 says it will stay the same; 3 say it's indeterminate.)



Peripheral Technology:

At Present - (4 say it is increasingly difficult; 7 say it is the same; 2 say it's indeterminate)

In Five Years -(5 say it will be more difficult; 3 say it will stay the same; 5 say it's indeterminate)

Other Foreign Enterprises

Core Technology:

At Present -(3 say it is increasingly difficult; 7 say it is the same; 4 say it's indeterminate)

In Five Years-(5 say it will be more difficult; 4 say it will remain the same; 5 say it is indeterminate)

Peripheral Technology:

At Present -(2 say it is increasingly difficult; 7 say it's the same; 5 say it is indeterminate)

In Five Years -(4 say it will be more difficult; 3 say it will be the same; 7 say it's indeterminate)

Question 8. How are outside technologies introduced into your company, incorporated into the business activities of your company? Please choose an appropriate answer for the present and the future respectively and write the code number of your answer in [            ].

Up to the Present [            ]

Future                    [            ]

1. Outside technologies introduced are completely digested and transformed into new technologies (i.e., new patents are obtained).

*(Up to the Present: 1 Automobile company chose this response  
Future: 7 Automobile companies chose this response)*

2. Outside technologies are modified to the forms that are suitable for your company.

*(Up to the Present: 12 Automobile companies chose this response  
Future: 6 Automobile companies chose this response)*

3. Outside technologies are incorporated into your company without any modification.

*(Up to the Present: 1 Automobile company chose this response  
Future: 1 Automobile company chose this response)*

4. Others (Please explain concretely).

Question 9. Who are the major partners from which your company introduces technologies? Please choose the two major partners at present and the future respectively and write the code numbers or you answers in [            ].

Up to the Present    [            ]

Future                    [            ]

1. Domestic enterprise in the same industry as your company.

*(Up to the Present: 3 Automobile companies made this response  
Future: 3 Automobile companies made this response)*

2. Domestic enterprises in a different industry from your company.

*(Up to the Present: 2 made this response  
Future: 3 made this response)*

3. Foreign enterprises in the same industry as your company.

*(Up to the Present: 9 made this response  
Future: 9 made this response)*

4. Foreign enterprises in a different industry from your company.

*(Up to the Present: 7 made this response  
Future: 3 made this response)*

5. Others (Please explain concretely).

Question 10. This question is on the recent general outline of your company's research and development (including joint research and research contract). For each question, choose an appropriate answer from below and write the code number of your answer in [            ].

Question 1. Is your company strengthening efforts for intramural R&D on Core Technologies and Peripheral Technologies?

*Core Technologies: (12 Automobile companies said yes;  
2 said it was indeterminate)*

*Peripheral Technologies: (12 Automobile companies  
said yes)*

Question 2. In your company, is the weight of self-generated R&D to technologies introduced from abroad increasing?

*(9 said yes; 1 said no; 3 said indeterminate)*

Question 11. What kind of technology assessment is your company making, or does your company plan to make for promoting further intramural R&D efforts? Choose an appropriate answer from below and write the code number of your answer in [            ].

[            ]

1. Our company is making extensive technological assessments.  
*( 2 Automobile companies chose this response)*
2. Our company is making technological assessments only on important topics.  
*( 5 Automobile companies chose this response)*
3. Our company makes technological assessments only on an experimental basis.
4. Our company is studying or has studied the implementation of technological assessment.  
*( 6 Automobile companies chose this response)*
5. Our company plans to study the implementation of technological assessments.  
*( 1 Automobile company chose this response)*
6. Our company has never studied the implementation of technological assessments, and does not plan so, either.

Question 12. How do you evaluate your company's technological level by international standards with respect to various elements of technology? Please answer only questions appropriate for your company and write the appropriate code number of your answer in [            ].

1. The level of production technology for good quality and inexpensive products
  - a. The technological level of our company is ahead of the international level.  
*At Present - 2 Automobile companies said this is so*  
*In Five Years - 7 Automobile companies said this will be so*
  - b. The technological level of our company is the same as the international level.  
*An Present - 14 Automobile companies gave this response*  
*In Five Years - 9 Automobile companies gave this response*

- c. The technological level of our company is below the international level.

*At Present - No Automobile companies gave this response*

*In Five Years - No Automobile companies gave this response*

- d. Indeterminate

2. The level of energy and resource-saving technology

- a. The technological level of our company is ahead of the international level.

*At Present - 1 Automobile company said yes*

*In Five Years - 5 Automobile companies said they expect this*

- b. The technological level of our company is the same as the international level.

*At Present - 9 Automobile companies said this is so*

*In Five Years - 7 Automobile companies said they expect this*

- c. The technological level of our company is below the international level.

*At Present - 2 Automobile companies said this is so*

*In Five Years - No Automobile companies expect this*

- d. The situation is Indeterminate

*At Present - 2 Automobile companies said this is so*

*In Five Years - 2 Automobile companies said they expect this*

3. The level of labor saving technology

- a. The technological level of our company is ahead of the international level.

*At Present - 2 Automobile companies said this is so*

*In Five Years - 2 Automobile companies said they expect this*

- b. The technological level of our company is the same as the international level.

*At Present - 9 Automobile companies said this is so*

*In Five Years - 11 Automobile companies said they expect this*

- c. The technological level of our company is below the international level.

*At Present - 3 Automobile companies said this is so*

*In Five Years - 1 Automobile company expects this*

- d. The situation is indeterminate.

*At Present - 1 Automobile company thought so*

*In Five Years - 1 Automobile company expects this*

4. The level of occupational safety and health related technology

- a. The technological level of our company is ahead of the international level.

*At Present - 1 Automobile company said this is so*

*In Five Years - 3 Automobile companies expect this*

- b. The technological level of our company is the same as the international level.

*At Present - 11 Automobile companies said this is so*

*In Five Years - 10 Automobile companies expect this*

- c. The technological level of our company is below the international level.

*At Present - 2 Automobile companies said this is so*

*In Five Years - 1 Automobile company expects this*

- d. The situation is indeterminate.

5. The level of environmental protection technology

- a. The technological level of our company is ahead of the international level.

*At Present - 5 Automobile companies said this is so*

*In Five Years - 5 Automobile companies said they expect this*

- b. The technological level of our company is the same as the international level.

*At Present - 8 Automobile companies said this is so*

*In Five Years - 8 Automobile companies expect this*

- c. The technological level of our company is below the international level.

*At Present - 1 Automobile company said this is so*

*In Five Years - 1 Automobile company said they expect this*

- d. The situation is indeterminate.

*At Present - 2 Automobile companies said this is so*

*In Five Years - 2 Automobile companies said they expect this*

6. The level of research and development capability for new products and technologies

- a. The technological level of our company is ahead of the international level

*At Present - No Automobile company said this is so*

*In Five Years - 4 Automobile companies expect this*

b. The technological level of our company is the same as the international level.

At Present - 9 Automobile companies said this is so

In Five Years - 9 Automobile companies expect this

c. The technological level of our company is below the international level.

At Present - 6 Automobile companies said this is so

In Five Years - 2 Automobile companies expect this

d. The situation is indeterminate.

At Present - 1 Automobile company said this is so

In Five Years - 1 Automobile company expects this

Question 13. If your company owns technologies which are ranked as first-rate by international standards, or if company technologies are behind the international levels but your company feels it necessary to improve them, please list them below. Also please identify the types of those technologies according to the classification 1-5 of Question 12.

(Internationally first-rate technologies)

	Examples	Type
1.	( )	( )
2.	( )	( )
3.	( )	( )
4.	( )	( )
5.	( )	( )

(Internationally backward technologies which our company feels it necessary to improve.)

	Examples	Type
1.	( )	( )
2.	( )	( )
3.	( )	( )
4.	( )	( )
5.	( )	( )

### Types of Technologies

1. Production technology for good-quality and inexpensive products
2. Energy and resources-saving technology
3. Labor-saving technology
4. Safety-measure-related technology (e.g., for the prevention of accidents at production facilities, etc.)
5. Environmental preservation (environmental protection) technology
6. Others

Question 14. How do you characterize the purposes of those technologies which your company is developing, or plans to develop, from the socio-economic point of view or from the functional point of view? List only one example.

(Example)

Representative technology [desk calculator]

The socio-economic point of view [ 2 ]

The functional point of view [ 9, 10 ]

1. Representative technology [ ]
2. The socio-economic point of view [ ]
3. The functional point of view [ ]

Choose your answer from below

The socio-economic point of view

1. Safety (*6 Automobile companies gave this response*)
2. Convenience (*1 gave this response*)
3. Comfort
4. Environment protection (*2 gave this response*)
5. Labor-saving (*2 gave this response*)
6. Resource-saving (*2 gave this response*)
7. Mass-production (*2 gave this response*)
8. Others (explain concretely)

The functional point of view

9. For size reduction (*3 Automobile companies gave this response*)
10. For weight reduction (*5 gave this response*)
11. Automation (*2 gave this response*)
12. For simplification





7. Others (explain concretely)

Question 16. Further promotion of R&D for science and technology is essential in order to raise the qualitative standards of people's life further. This question is on the bottlenecks of R&D for science and technology related to people's life, and on requests to the government. Please choose the three most important bottlenecks and the three most important requests to the government respectively from below and write the code number of your answers for each field (A - V) in the answer sheet below. Please answer only those questions that are related to your company.

FIELDS	
Food	A R&D for new food resources (micro-organism, protein, etc.)
	B R&D for technologies related to processing, wholesales and retails of good (quality maintenance, more efficiency in the food circulation process)
	C Technology for food stocks (food stocks, etc.)
	D Securing the safety of food (safe use of food preservatives etc.)
Housing	E R&D for housing construction materials (structure materials interior materials, etc.)
	F R&D for technology related to housing production and assembly (labor-saving, automatization)
	G R&D for technology related to housing comfort and safety (air-conditioning, heating, fireproof, etc.)
Environment Preservation (Protection)	H R&D for environmental pollution measurized monitoring technology.
	I R&D for anti-pollution technology (The prevention of air pollution, water pollution, etc.)
	J R&D for waste processing technology
	K R&D for waste re-cycling technology
Accident & Disaster Prevention	L R&D for sewerage processing technology
	M R&D for technology related to the prevention of natural disasters
	N R&D for technology related to the prevention of industrial disasters
	O R&D for fire-prevention technology R&D for traffic-accident-prevention technology
Medical Treatments	Q R&D for medical equipment (diagnostic equipment, medical treatment equipment, artificial internal organs, etc.)
	R R&D for the medical treatment system (emergency treatment system, synthetic medical treatment system, etc.)
Welfare	S Securing the safety of medicine (the prevention of secondary effects of medicine, etc.)
	T R&D for equipment for the handicapped (wheel-chairs, artificial arms, artificial limbs, rehabilitation equipments, nursing equipment)
Family Life	U Securing the safety of household equipment (the safety of electric appliances, gas appliances, textile products, etc.)
Education	V R&D for educational equipment

ANSWERS					
Bottlenecks			Requests to the government		
Priority			Priority		
1	2	3	1	2	3

(Bottlenecks)

1. Because it is difficult to predict demand R&D targets are hard to set.
2. The rate of return from R&D investment is low because of the limited markets and small scale production of many kinds of products, etc.
3. It is difficult for single company to handle high-level and complicated R&Ds.
4. New technologies are not smoothly adopted by society.
5. R&D experience is not sufficient.
6. It is difficult to introduce technology from abroad.
7. R&D funds are not sufficient.
8. Man-power (research staffs, abilities, etc.) are not sufficient.
9. Others.

(Requests to the Government)

1. Long-term prediction by the government, and R&D targets setting based on these predictions.
2. The expansion of demands through further improvements of social policies, and through strengthening anti-pollution regulations, etc.
3. Further (governmental) aids for R&D activities of private enterprises such as subsidies, etc.
4. Further (governmental) aids for R&D activities of private enterprise through tax, financial measures, etc.
5. Training and education of research talent at national research institutes and universities (re-education of researchers and education of new talents).
6. Strengthening the joint-cooperative research system among industries, governmental institutes, and universities.
7. Further strengthening R&D activities in national research institutes and establishing the diffusion system of those research results to private organizations.
8. Improvement of the scientific and technological information circulation system.
9. Establishing the system for promoting exchanges of technological information with foreign countries.
10. Establishing the system for promoting exchanges of technological information among domestic enterprises.
11. Others.

Question 17. If your company has opinions or requests to the government with regards to R&D, please write them below.

(R&D, Development of self-made technology)

(Technological exchanges such as the introduction of technology, technology offer, etc.)

(whatever else)

(the end)

