TAIWAN'S WOODWORKING AND FURNITURE INDUSTRY AND ITS UTILIZATION OF WOOD PRODUCTS

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ABSTRACT

TAIWAN'S WOODWORKING AND FURNITURE INDUSTRY
AND ITS UTILIZATION OF WOOD PRODUCTS

By

Der-chuen Wang

This paper describes and analyzes Taiwan's wood-working and furniture manufacturing industry. Of principal concern is the industry's (1) post-war development trend; (2) characteristics of organization, investments, production costs, market behavior, and reaction to economic recession; (3) wood supply and consumption patterns; and (4) development potential and likely future use of domestic vs imported wood. Consideration is given to factors limiting development of the industry, and some recommendations for improvement and further development are provided.

This study is primarily based on the data collected during a 1974 land-wide survey of 180 wood-working manufacturing factories, a 1972 survey of 157 furniture-making shops conducted by the Taiwan Forestry Bureau, and other secondary information sources such as a 1969 Survey on Wood Furniture Industry in Taiwan by the China Credit Information Service.

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By

Der-chuen, Wang

A DISSERTATION

Submitted to
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I am indebted to Dr. Robert S. Manthy, professor of natural resource economics and policy of the Department of Forestry, Michigan State University, who has served as major professor and chairman of my dissertation committee, and who has rendered assistance and encouragement during my study at Michigan State University and in the preparation of this manuscript. The final draft has benefited from his wide forestry knowledge. I am also highly grateful to Dr. Henry A. Huber of the same department. His generous assistance inspired me continuously from the choice of a research topic to the preparation of the survey and final report.

Special thanks are due also to National Science Council of the Republic of China, which supported my studies through a fellowship grant. The Joint Commission on Rural Reconstruction of the Republic of China financially supported my research project. Many people of JCRR Forestry Division, Taiwan Forestry Bureau, Taiwan Forestry Research Institute, Taiwan Woodworking Manufacturers' Association and National Taiwan University also gave help and supports for which I am very grateful.

Finally, I would like to express my lasting appreciation to my family. Yuan-fa Cherng, my wife, has worked hard to support and care for our children during my long period of study abroad.

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CHAPTER I

INTRODUCTION

The woodworking and furniture industry is the most important secondary wood-using industry in Taiwan. The Taiwan Forestry Bureau census report estimated that in 1971 manufacturers of wooden furniture alone used 120,240 cubic meters of timber, with a total value of production of NT$ 411 million (US$1=NT$38). The value of furniture exports has recently amounted to more than NT$ 10 billion.

Woodworking and furniture manufacturing shops or factories are distributed all over the island. They operate both in the city suburbs and in the rural areas, providing considerable job opportunities for rural people. A great variety of products are produced ranging from kitchen cabinets and bedroom wardrobes to picture frames, from office desk-seat combinations to bench or corner tea-tables, and from shutter or carved panel doors to gun shelves and chop-boards.

In Taiwan woodworking and furniture manufacturing used to be a "family-run handicraft industry." The industry consisted of many small furniture shops each with very little investment and operating on a very limited scale. Shop owners and the workers were all trained in a position of apprenticeship. The style, design, and manufacture of furniture were very simple. Markets were usually localized.

During the past 10 years remarkable changes have occurred in this industry. New factories were established and old ones expanded. Simultaneously as the demand for wood materials grew, the sources of wood supply changed greatly.

In spite of this growth most of Taiwan's woodworking and furniture manufacturing factories are very small and not professionally managed. Capital investment is some times as little as NT$ 100,000 (US $2,630). According to Mr. C. P. Pan of the Joint Commission on Rural Reconstruction (JCRR), only 150 of Taiwan's 2,400 woodworking and furniture manufacturing factories use machinery; the rest use mainly hand tools. Furthermore, only 20 of the mechanized factories export their products.

Professional personnel are also in short supply. Limited knowledge exists about the properties of wood, opportunities for new products, marketing, shop management and procurement and marketing.

Because the number of factories has increased greatly in the last several years, there is strong competition for skilled workers and markets. Firms often solicit each other's skilled workers by paying higher wages, and attract each other's customers by cutting price. As a result, the small firms tend to manufacture only low quality, cheap products (1)*.

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*Numbers in parentheses refer to references listed in the Literature Cited section of this report.

For some time many of the concerned government agencies have recognized an urgent need to provide development assistance for Taiwan's woodworking and furniture manufacturing industry. However, there has been very little factual information available to guide assistance efforts. Because of this, government agencies did not understand the woodworking manufacturer's problems and needs. They did not know what, where, in what form, or how to extend help to the many small sized manufacturing factories and shops.

At present, only the following limited information and data are available:

1. "Survey on Wooden Furniture Industry in Taiwan" conducted by the China Credit Information Service in 1969 (2);
2. "Suggestions for the furniture-making industry in Taiwan" made by a Danish advisor, Professor Borge Jensen in 1968 (3);
3. "Report on the survey of furniture-making industry in Taiwan" by the City Bank of Taipei (4);

4. Limited references published in magazines or newspapers (5, 6, 7, and 8).

As a whole, these information sources were inadequate as a basis for action by government agencies.

Realizing the industry's urgent need for government help and assistance, the National Science Council (NSC) and the Joint Commission on Rural Reconstruction (JCRR) jointly appropriated in 1973 NT$ 1.2 million (US $31,579) for the Taiwan Forestry Research Institute (TFRI) to conduct a study entitled "Research on Technical Improvement of Utilization and Processing of the Wood and Bamboo." The basic objective of this research was improvement of product quality through the development of improved processing techniques and compilation of technical and marketing information.

Even after the completion of the TFRI study, information about the characteristics, types of organization, scale of operation, wood utilization, development potential, and the markets of the woodworking and furniture manufacturing industry are still lacking. Also lacking is information about the importance of

different wood raw materials and its supply, the role of domestic vs. imported wood in industry development, the impacts of economic recession on the industry, the stability of the wood products market and so on. These facts indicated the need for a separate research project to provide the information necessary for designing an integrated research and development project to render government assistance for the promotion of Taiwan's woodworking and furniture manufacturing industry.

Such a study was instituted in 1974 by the National Taiwan University Department of Forestry in cooperation with the Forestry Division, JCRR. Its title was "Survey on Wood-Utilization and the Economic Potentials of Woodworking and Furniture Manufacturing Industries." This paper is primarily based on the data collected during that study, an island-wide survey of 180 woodworking manufacturing factories. Secondary data sources were also employed. These include reports on studies such as the wood-utilization survey of 157 furniture-makers conducted by the Taiwan Forestry Bureau in 1972, and a survey of 63 furniture-making factories conducted by the China Credit Information Service in 1969.

OBJECTIVES

This study has four objectives:

1. To investigate the types, form and source of wood materials used in woodworking and furniture manufacturing, with emphasis on the relative importance of Taiwan wood vs. imported wood.
2. To examine conditions governing industry selection of different wood materials, the flow of these materials, and the stability of the market for wood products.
3. To determine the characteristics of the woodworking and furniture manufacturing industry including: organizational form of firms, scale of operation, costs, market conduct and the problems encountered by this industry.
4. To examine the impacts of economic recession on the industry, and to observe the potentials for industry development in nonrecession periods.

Finally, secondary data and information from government agencies, trade associations and previ ous publications was collected. After a preliminary study of the available materials on hand, a work plan for conducting an island-wide survey was prepared.

After a pretest of the survey form, a revised survey questionnaire was prepared and mailed to a number of factories or workshops. Then, personal interviews with representatives, owners or managers of more than 200 factories was conducted. Interviews occurred between June and October in 1974. A total of more than 200 factories or workshops were mailed questionnaires and interviewed. Only 180 of the filled out questionnaires were considered complete enough for detailed analysis.

Analysis of the survey data were made to meet the objectives described above. The following report of this study deals primarily with the findings and analysis of the survey.

CHAPTER II

POSTWAR HISTORY AND DEVELOPMENT TRENDS

Before 1950, the wood-working and furniture-manufacturing industry in Taiwan was operated under either family management or partnership. The workers were skillful in using only hand tools such as adze, had saw, wooden planes, drills, files, and measuring rules and so on. Their products were hand-crafted furnitures. During the 1950's, housing, schools and government agencies expanded rapidly. Demand for furniture was increased many fold. To cope with the heavy demand for raw materials, the Taiwan Forest Administration (name changed to Taiwan Forestry Bureau in 1960) speeded up timber harvesting. Thus, with sufficient wood supply and increasing demand for furniture, the wood-working industry flourished. The development of wood-working industry in Taiwan for the past two to three decades could be briefly described in five stage as follows (2,5).

DORMANT STAGE 1947-1955

In this stage the country was just recovering from WWII. Most of the furniture-making shops were in rural areas. The shop-owners and workers had limited education. They learned their trade by apprenticeship and produced cheap furnitures and miscellaneous wooden tools or other products. The Central Government moved to Taiwan from the China mainland in 1949 and the situation became stabilized. Demand for furniture

increased with the population growth. According to the First Industrial and Commercial Census of Taiwan in 1954, there were more than 1,900 furniture manufacturers but none were bigger than a family-supported wood-working shop. The style was typical southeastern China style. Although the finish was poor, the material was of the finest quality. For example, crypress, mechelia, camphor tree, and zelkova were used exclusively.

DOMESTIC CONSUMPTION STAGE: 1955-1961

Since the start of the first four-year economic development plan for Taiwan in 1953, an island-wide forest resources survey had been conducted and completed between 1954 and 1956. A new and expanded reforestation project and accelerated harvesting of over-matured cypress and fir natural forests were undertaken to meet the requirement of economic growth for the forestry and forest industry sectors of the economic development plan. The four-year development plan had been carried out effectively. In the same time, government agencies, public facilities, and a number of schools and business firms were increased and expanded rapidly. Because of the rapid population growth, more stabilized societal living condition, and an increasing GNP, demand for furnitures increased very greatly.

During this period, wood materials for woodworking and furniture manufacturing were still mainly first and second

grade Taiwan conifers (cypress, spruce and fir) and some valuable hardwoods. However, the style and design of furniture and the processing technology began to change toward economical and practical furniture. Only small amounts of timber was imported for use in furniture making. Furniture export was negligible. Based on the report of the 1961 Industrial and Commercial Census of Taiwan the number of wooden furniture manufacturing shops had increased to 3,500 and they employed more than 11,000 workers in production.

INITIAL EXPORTATION STAGE: 1961-1966

The total value of exportation of wooden furniture in 1962 was only NT$ 1.2 million (US $30,000), increasing to about NT$ 14 million (US $350,000) in 1966. The majority of the furniture making still remained in family supported firms and was hand crafted. However, the number of modern factories with independent operation capability, continuous production process and specialization in marketing products began to increase and flourish. Some of these modern factories were equipped to produce mainly folding or knock-down type furniture or component parts, primarily for export.

The 1966 Industrial and Commercial Census of Taiwan reported data only for firms that actually operated their own factories to manufacture. Firms engaged only in furniture repair, assembly, or display were excluded from the census. Consequently the number of enterprises reported for 1966 was

only 338, of which one fifth were organized as a company (corporation). However, these company-organized firms had very limited capital, and most were actually owned by one family or by a few relatives or partners. Further, about one tenth of the total number of workers were the owners or the owners' relatives. In real sense, they were the unpaid employees of the factories.

PEAK EXPORTATION STAGE: 1966-1973

According to B. T. Chang (5), the foreign market exploitation by woodworking and furniture manufacturing firms was benefited, encouraged, and supported by Taiwan's plywood industry. In the very beginning, the plywood companies searched for economical ways to utilize cores lefted in the process of making veneer from logs. They developed a method to use the core parts to manufacture lumber core plywood, then from lumber core plywood they produced panel doors, windows, or furniture component parts, and tried to sell these products in foreign markets.

Because of the economic incentives and the stimulations from successful exportation, the number of woodworking and furniture manufacturing factories increased rapidly between 1967 and 1968. Their size of operation was also expanded. During this period of time, new modern, large scale factories were established. These include the Woodworking Plant of the VACRS (Vocational Assistance Committee for Retired Service men)

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in Tao-yuan with a capital investment of NT$ 120 million (US $3 million), Hong Kong Teak Wood Co. in Kaoshiung Export Processing Zone with a capital investment of NT$ 70 million (US $1.75 million), Kai-Nan Lumber and Wood Manufacturing Co., Cy-Ma Lumber and Wood Manufacturing Co., and Chau-Young Lumber and Wood Manufacturing Co. and so on. All of these companies owned modern factories equipped with modern woodworking machinery, manufacturing knock-down type furniture, furniture component parts, louvered and folding doors, and carved panel doors for export. By 1973 the number of enterprises of wooden furniture and fixture totalled 1,172 with a worth of production of more than NT$ 1.49 billion (US $37.3 million) and a census va;ue added of NT$ 620 million (US $15.5 million) (9). The four-year average rate of increase in value of wooden furniture exportation from 1969 to 1972 was estimated at 94%. In 1972, exported furniture was worth more than NT$ 527 million (US $13.2 million), jumping to NT$ 1.35 billion (US $35.5 million) (US $1 = NT$ 38) in 1973. The major importers were U.S.A., Japan Ryuku Islands, Australia, U. S. Pacific Territories, and Canada.

During this period, government assistance to the small and medium size woodworking and furniture manufacturers was very beneficial to the development of this industry. For instance, the Service Department for the Small and Medium Business of the Council for International Economic Cooperation

and Development (CIECD), Cabinet Executive Yuan, often provided positive and technical or economical assistance to the woodworking and furniture manufacturing industry. In 1968, the Service Department invited a Danish adviser Professor Borge Jensen to Taiwan to help the woodworking and furniture manufacturers improving their shop management and acquire new knowledge for making better quality products. In the same time, training sessions on woodworking and furniture-making techniques were held frequently.

Government agencies also provided opportunities for the technical personnel of the industry to attend training classes abroad or for them to take observation trips to foreign countries. Exhibits and furniture shows were set up in many places. Government agencies also invited marketing expert Mr. Rosen Haggin to Taiwan to held the woodworking and furniture manufacturers promote and strengthen foreign marketing of their products. As early as in 1967 the Service Department for the Small and Medium Business of CIECD had planned a new industrial zone in Shu-lin near Taipei for the woodworking and furniture manufacturing industry. At that time, Ricardo Lynn and Company and other 22 companies jointly invested in the opening of the industrial zone. By 1973, the industrial zone had a total area of more than 27 hectares (67 acres). Some 38 woodworking and furniture making factories were established or located there (10). For all of these reasons, the industry enjoyed a rapid development and peak exportation.

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RECESSION STAGE: 1974-1975

On January 26, 1974 the Central Government announced new economic measures (e.g. price adjustments for petroleum products, electricity, and transportation services; a revision of the ceiling prices for wheat flour and soybean oil, etc.) in response to the world wide economic recession triggered by the "oil crisis". As a result commodity prices in Taiwan nearly doubled. These increases affected Taiwan's woodworking and furniture manufacturing industry very greatly. In the preceding years the furniture industry enjoyed a booming market. After commodity prices jumped, the industry had no orders for their products from foreign countries. At the same time, their domestic market had already reached the saturation point. With "stag-flation" and no market, the inventory of the manufacturing firms greatly accumulated. The woodworking and furniture industry experienced a very difficult time. Many factories were idle, some of them shut down completely. Although a few manufacturers were able to maintain a limited production, workers in most of the factories were laid-off. Some plants turned to the manufacture of other kinds of products than furniture. Construction of new plants was halted. The roofs were falling in for the woodworking and furniture making industry, and most of the manufacturers asked for government financing or relief. Their requests included low interest loans, abolishment or reduction of import duties on log and other raw materials, and government assistance for opening up foreign markets and other economic measures.

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Government agencies responded and announced a series of relief programs. For example, in May 1974, the United Service Center was set up under the Ministry of Economic Affairs in order to provide technical and economical assistance to help the small and medium enterprises. At the same time, a credit guarantee program for financing the small and medium enterprises was adopted by the Ministry of Finance. Many state-owned and commercial banks set up a special division to handle special loans and financial support to the industry. The United Service Center, later on transferred to the sixth Division of the Industrial Development Bureau of Ministry of Economic Affairs, rendered collective assistance and guidance to help the industry. Assistance was offered to open up industrial zones for woodworking and furniture making firms locate factories in the industrial zones institute large scale collective buying of wood materials from Southeast Asian Countries and collective selling in foreign markets, and improve production techniques, packaging skills, and management systems.

In the field of woodworking and furniture research and development, programs had been carried out mostly by governmental agencies and public education organization. Generally and mostly, the Forestry Division of the Joint Commission on Rural Reconstruction (JCRR) and the National Science Council (NSC) of Executive Yuan provided research funds to finance the research projects conducted by the Taiwan Forestry Research Institute or College professors. The Taiwan Forestry Bureau

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occasionally provided funds to support research projects. The Assistance Department for small and medium enterprises of the late Council for International Economic Cooperation and Development provided funds to the China Credit Information Service, Ltd., to conduct a wood furniture survey. Privately financed furniture research projects are very few, or are not known yet to the public. In the whole, research projects regarding woodworking and furniture areas have only a few examples.

In order to provide technical assistance to local woodworking and furniture manufacturers to make better quality products for export, the Wood Utilization Department of TFRI intended to serve as a technical service center to the industry. Information collected and accumulated in TFRI will be compiled and disseminated to industries as needed.

For the effective performance of that project, JCRR had invited Professor Dr. Henry A. Huber of Michigan State University to Taiwan as a technical consultant to render technical services on furniture design, manufacturing and marketing of products. Dr. Huber collected lots of information, publications, films, slides and many others on his observation trip in the U.S.A., England, Denmark, Japan and other countries for Taiwan's woodworking and furniture industry. Dr. Huber gave a series of lectures, showing moving pictures and slides, and presented a number of seminars on furniture design, shop management and product marketing. His nine

points of recommendation for development of Taiwan's woodworking and furniture manufacturing industry were highly beneficial (13).

ACHIEVEMENTS OF DEVELOPMENT

Since 1954, the year after the promulgation and execution of the first four-year economic development plan, the Industrial and Commercial Census of Taiwan (ICCT) had been carried out three times (1953, 1961 and 1966) focusing on the collection of basic statistical data. To improve the availability of economic statistical data the "Statistical System Research Committee" of Cabinet Executive Yuan proposed to the Ministry of Economic Affairs (MOEA) the establishment of an "Industrial and Commercial Sampling Census Committee". Since 1968, the Sampling Census Committee has undertaken a "one census each year" to collect basic statistical data on industry and commerce.

Before the 1961 industrial and commercial census of Taiwan the government did not have a standard industry classification. It was in January 1967 the Executive Yuan promulgated "The Standard Definition and Classification of Industry of the Republic of China" and ordered the whole nation to use the system on a trial basis for three years. However, this system could not be carried out entirely because the contents of some industries in the classification were different from the structure of industry and commerce at that time. Therefore, during the third census the Commission of

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ICCT revised the national standard classification. In the first and second censuses (1953 and 1961) all operators of manufacture, processing and repair, large or small scales, were considered as manufacturing. The third census confined manufacturing to those manufacturers that have registered or have minor industry registration. Other minor shops for processing or repair not registered as manufacturers or minor industry are combined with service or commerce. Because of this the number of enterprises was reduced suddenly as compared with those reported in the first two censuses. This will be demonstrated later with reference to Table 10 in the next chapter.

The nomenclature of the classification that is concerned with the wood-based manufacturing industry is listed below for reference:

Code	Category of Industry
25	Manufacture of lumber, bamboo, cane and cork products
251	Sawmills and planing mills
252	Plywood mills
253	Wood preserving
254	Wooden, bamboo and cane containers
259	Miscellaneous lumber, bamboo, cane and cork products

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26		Manufacture of furniture and fixture
	261	Manufacture of wooden furniture and fixture
	262	Manufacture of metal furniture
	263	Manufacture of bamboo and cane furniture and fixture
	269	Miscellaneous furniture and fixture

Later on, the industrial and commercial surveys undertaken by the Industrial and Commercial Sampling Census Committee of the Ministry of Economic Affairs adopted the same classification as shown above.

In this chapter the previous discussion of the so-called development and growth status of the industry refers mainly to the category 261, Manufacture of wooden furniture and fixture. Actually, many kinds of articles or products classified under the category of industry 261 are manufactured by other industries such as lumbering mills or woodworking shops, or plywood factories. In the 1972 survey report the code number of category 261 was changed to 3320.

From what was said above, we know that Taiwan's industrial classification had not yet been as clearly defined as the U. S. Bureau of the Census's Standard Industrial Classification. Nevertheless the following three tables (Tables 1 - 3) which are based on the data collected by the MOEA industrial and commercial surveys (9) do provide useful historical indicators of changing industry size.

Table I

Year	
1967	
1968	
1969	
1970	
1972	
1973	

Source

*In 1

Table 1. Measures of size of the Taiwan wooden furniture and fixture industry, 1967-1973

Year	No. of enter-prises	Value of production* (NT$ 1,000)	Value of Material, Fuel and Power Consumed (NT$ 1,000)	Census Value-added (NT$ 1,000)
1967	282	366,631	200,832	145,492
1968	298	302,488	186,784	95,342
1969	516	397,402	278,517	116,422
1970	589	802,171	425,064	291,593
1972	1,028	1,113,412	685,946	378,094
1973	1,172	1,491,389	851,730	620,607

Source: Ministry of Economic Affairs (1967-73): The Republic of China, Report on Industrial and Commercial Surveys, Nos. 1-6.

*In 1967-72, US$1 = NT$40; in 1973, US$1 = NT$38.

Table 2. Number of employees in the wooden furniture and fixture industry, 1967-1973

Year	Total	Staff			Productive Workers			Other Workers
		Subtotal	Technical Personnel	Management Personnel	Subtotal	Skilled	Unskilled	
1967	9,051	205			8,698	8,085	613	148
1968	5,109	834	193	641	4,160	882	3,278	115
1969	8,326	1,150	243	907	6,695	1,374	5,321	481
1970	15,340	495			13,658			1,187
1972*	4,677	878			3,799			
1973*	7,192	1,106			6,176			

Source: Directorate-General of Budget, Accounting & Statistics, Executive Yuen: Monthly Bulletin of Labor Statistics, R.O.C. In compliance with the mandate of the Executive Yuan on the savings with reference to publications, information concerning personnel and production which have been published in the Monthly Bulletin of Labor Statistics, or in the Taiwan Industrial Production Statistics Monthly, were dispensed with the MOEA Report of Industrial and Commercial Surveys since 1972.

Table

Year
1967
1968
1969
1970
1972
1973

Source:

Table 3. Annual salaries and wages paid by wooden furniture and fixture manufacturers, 1967-1973.

Year	Total	Salaries of staff and wages of labor			Annual owner Disbursement
		Subtotal	Cash	Other allowances and benefits	
			(Million NT$)		
1967	112	108	105	4	4
1968	44	40	39	1	4
1969	89	84	83	2	5
1970	696	150			
1972	1,052	154			
1973	1,382	180			

Source: Same as Table 1.

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Besides the data shown in these tables other information can also be cited to show the growth and development of the wooden furniture industry. For instance, some of the statistics of 1964-1973 value of production and export of wooden furniture published in the Industry of Free China are quoted in Table 4.

Table

Year
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1965
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Table 4. Value of production and export of wooden furniture, 1964-1973

Year	Value of production*		Value of export		Export in Percent of production
	Million NT$	Index	Million NT$	Index	
1964	51.6	100	4.7	100	9
1965	81.5	158	10.0	210	12
1966	142.5	276	13.4	287	9
1967	160.6	311	22.7	488	14
1968	225.9	438	37.9	813	17
1969	408.4	792	68.8	1,477	17
1970	616.1	1,195	124.7	2,676	20
1971	909.3	1,763	284.9	6,113	31
1972	1,255.0	2,434	685.4	14,706	55
1973	1,613.8	3,129	1,351.1	28,989	84

Source: Industry of Free China. Vol. 41, No. 6, 1974.

*Value of production listed in Table 4 comes from various official sources. Statistics in Table 1 come from MOEA Report on Industrial and Commercial Surveys conducted once a year by MOEA since 1967.

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CHAPTER III

CHARACTERISTICS AND STATUS OF THE INDUSTRY

This study is based primarily on the data collected from personnel interviews with representatives or owners or managers of 180 furniture and woodworking manufacturing firms between June and October 1974. During that time, this industry was just under the serious impacts of economic recession. Therefore, the so-called present status of the industry here is mainly referring to the situations of the industry in 1974, although other information from the TFB wood-utilization survey in 1972 and information from the China Credit Information Service (CCIS) report on its 1969 furniture industry survey were also used for analysis and comparison.

CHARACTERISTICS

Most of Taiwan's woodworking and furniture manufacturing factories are small or medium size in scale in 1974 and were set up during the previous six or seven years. For an industrial classification of this industry, it was difficult to draw a line between one manufacturing firm and the firms of other industries because each manufactured a great variety of products, and the same article or product was also manufactured by different industries. Therefore, woodworking and furniture firms or enterprises is not known exactly. In general, it varied greatly if different sources of information or different statistics from different agencies were based.

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For instance, Chang (5) states that there were only 103 wooden furniture manufacturing factories in Taiwan with moderate scale of production in 1972. Chang's figure is based on Department of Reconstruction of Taiwan Provincial Government records. The MOEA report on industrial and commercial surveys showed that there were 1,028 manufacturing factories of wooden furniture and fixtures in 1972 (see Table 1).

It can be seen that different sources of information give different results, and the number of manufacturing factories or firms varied widely. The great variety of manufactured products and no clearcut industrial classification depicted just one aspect of the characteristics of Taiwan's wooden furniture manufacturing industry. Chang (5) indicated that there is no way to draw a definite line between the industry of sawmills and planning mills, woodworking industry, and the wooden furniture industry, because the sawmilling and woodworking industries both manufacture wooden furniture products. Moreover, some woodworking and furniture-making workshops still register as sawmills. Thus in Taiwan today it is difficult to draw a clear boundary between woodworking factories and the furniture-making factories since they manufacture the same kind and a great variety of products. Therefore, woodworking manufacturing firms and furniture-making firms in Taiwan are generally combined as one and the same industry for purposes of analysis.

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The 180 woodworking and furniture manufacturing firms surveyed for the present study manufactured very many kinds of wooden products. For example, included in the living-room furniture groups are rattan-wood sofas, back-rest chairs, folding screens, show-cases, cellarets, chess tables, and tea-tables or chests. The bedroom furniture group includes beds, toilet tables, chest of drawers, and coat and hat stands or clothing lockers. The kitchen and dining room furniture group includes dining table and chair combinations, round tables, folding tables or chairs, cupboards, cabinets, and kitchen tools. The office and school furniture group includes desks, filing and print cabinets, book cases, chairs and tables, stools, sofas, and wall shelves.

In addition to the furniture groups noted above, surveyed firms manufactured other items such as stands for various uses, chair legs or arms, wood frames, racks, radio and television cabinets, baby and juvenile furniture, sewing machine cabinets, outdoor furniture and other accessories or cases. In short, these firms manufactured a great variety of products in a wide range of size.

Classification of Manufacturing Firms

Generally speaking, each of the manufacturing factories or workshops manufactured several or ten to twenty different products at the same time. And the kinds of products or furnitures manufactured changes from time to time. Usually,

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they manufactured their products according to customer orders or they adjusted their production according to the changes in market conditions. For example, a factory usually manufacturing tables and chairs as its main product may turn to manufacturing cabinet or cases or radio and television cabinets. It was therefore difficult to classify precisely the 180 interviewed factories or workshops according to the products manufactured. Woodworking plants were particularly hard to classify. They produced many kinds of goods of great variety. Their products ranged from wooden frames to wooden containers, from wooden bowls or trays to wooden violin cases, from wooden tools, handles, or shoe lasts to gun shelves, or from wooden sashes and wooden door frames to carved panel doors or carved folding screens.

Though it was difficult to classify surveyed firms precisely into definite groups six major categories are identified for purposes of comparison and analysis. The following six major categories were based primarily on the main products as well as its proportion in total production that a factory had manufactured:

1. factories making household furniture such as tables and chairs.
2. factories making beds, chest of drawers, wardrobes, cabinets and clothing lockers, etc. for home use.
3. factories making office, school and publicbbuilding and related furniture.

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4. Factories making sofas and upholstery furniture.
5. Factories making louver shutters, carved panel doors, carved folding screen and carved half-louver doors.
6. Factories making other miscellaneous products such as sewing machine cabinets, rockers, radio and television cabinets, baby and juvenile furniture, Coffer-dams, gun shelves, bowls, and other wooden articles.

According to this classification, the main products and their proportions in total production for the interviewed 180 factories can be summarized in Table 5.

Product Design

The types and design of manufactured products directly relate to the utilization of various wood materials and the sale as well as the price of these products. Most of the interviewed firms stated that their products were of modern types with clear designs, and only a small part of their products were of ancient Chinese style, French style or earlier American colonial style solid furniture. They manufactured ancient style solid furniture with the best wood materials and with hand labor, and they produced light, modern furniture with automatic equipment and with imported hardwood such as lauan and ramin. Regarding wood utilization, lumber of various dimensions and other wood products such as plywood, veneer, particle-board and lumber-core plywood were commonly used.

Table 5. Main product groups manufactured by interviewed factories in 1973-74

Item	Major product group

Table 5. Main product groups manufactured by interviewed factories in 1973-74

Item	Major product group						
	1	2	3	4	5	6	All[1]
Number of firms	43	33	12	17	18	53	176
Percent of product							
Household tables & chairs	67.9%	15.5%	20.4%	12.1%	1.9%	1.9%	22.8%
Cabinets, drawer chests, wardrobes	12.4	56.5	10.8	9.4	0.6	1.9	15.9
Beds, wall shelves, cupboards, and racks	0.9	15.0		1.8			3.2
Office furniture	5.1	5.0	34.2	1.5			4.7
School and public building furniture	3.4	5.5	31.7				4.0
Sofas and davenports	3.7	2.5	0.8	31.2			4.5
Upholstered furniture	1.5		1.3	41.8			4.7
Louver shutters, carved panel doors						17.7	
Wooden frames, shelves and casegoods					2.2	3.6	1.1
Radio, TV and Phono. cabinets						11.9	3.6
Sewing machine cabinets & boards				1.2		3.8	1.4
Billiard & card tables & cue sticks						13.2	4.0
Handles, toys & sporting goods						25.3	7.9
Misc.	3.3		0.8		2.8		1.3
Total	100.	100.	100.	100.	100.	100.	100.

[1]Only 176 of the 180 interviewed firms responded to questions about products.

Most of the manufacturers realized the fact that function is the most important factor in product design. Furniture design is similar to the design in modern architecture, its form follows function. The principle or the basic consideration in their product design is to satisfy consumer's modern life style in respect to the requirements of simplicity, comfort, convenience,practice and economy. According to the survey of the wooden furniture industry undertaken by C.C.I.S. in 1969, the firms' experience showed that the most commonly selected and purchased furniture were modern style furniture because its structure is simple, it is economical and practical, and furthermore it does not occupy much floor space. Sales of furniture manufacturers by furniture type is summarized in Table 6.

In the present study, the survey questionnaire included several questions regarding the changes in the design of furniture, the major trends in furniture design and its influence on the use of wood materials, as well as the anticipation of future possible changes. Responses to these questions are summarized in Table 7.

Bases for Manufacturing Decisions

Woodworking and furniture-making plants manufactured not only a great variety of products, but also they produced their products without definite specification. The main reason for

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Table 6. Style of wooden furniture most widely sold by interviewed furniture manufacturing firms

Style	Number of firms	Percent
Ancient style	27	43
Contemporary style	28	44
Combined Chinese-western style	2	3
Others	6	10
No response	8	13
Total	63	100

Source: CCIS, Survey of Wood Furniture Industry in Taiwan

Table 7. Percentage distribution of firms' views regarding changes in furniture design, by group of factory, 1974

Group of Factory*	Changes in furniture design in Taiwan within past 5 years			Changes in furniture design of firm's own factory within past 5 years			Anticipation of future changes in furniture design		
	Changed over time	No change	Don't know	Changed over time	No Change	Don't know	Changed over time	No change	Don't know
1	62	19	19	43	47	10	43	8	49
2	62	35	3	45	48	7	24	10	66
3	62	31	7	39	38	23	23	15	62
4	50	17	33	25	58	17	25	17	58
5	22	72	6	17	72	11	6	44	50
6	17	62	21	13	82	5	10	7	83
All factories	42	42	16	29	61	10	22	13	65

*For definitions, see page

this is that they often manufactured their products according to the requirements of customers' specifications. Consequently, the base for manufacturing decision, ranging from wood material use to the style and design, and from the size to the finishing and packaging, is in accordance with the statements and terms specified by the customers. From the information collected in interview of manufacturers, two-thirds of the firms stated that they manufactured their products according to orders, and in most cases the customers provided their own design and specifications as well as wood materials to be used. Only one-third of the interviewed firms manufactured their products of common type or prevailing style, and very few producers manufactured their products of their own design. Generally speaking, the bases for manufacturing are similar but also different between categories of factory. The result of the interview with manufacturers can be summarized as in Table 8.

ORGANIZATION AND SCALE OF PRODUCTION

Information regarding the types of organization of the firms and scale of production varied greatly between each of the three surveys of furniture manufacturing industry. The result of the 180 firm surveys for this study was quite different from the surveys conducted in 1969 and 1972 (63 wood furniture-making firms and 157 wood furniture-manufacturing

Table 8. Percent distribution of firms' bases for manufacturing decision, by group of factory

Group of factory*	Manufactured to order		Producer's own design and making	Total
	Buyer's design and specification	Style on catalog		
1	29	18	53	100
2	20	17	63	100
3	21	18	61	100
4	43	13	44	100
5	85	15	--	100
6	83	11	6	100
All factories	51	15	34	100

*For definition, see page 29.

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workshops or factories interviewed respectively). These indicated the general situations that, in Taiwan, the types of organization and the scale of production of furniture-making factories have changed very much in the past several years. The reasons for these differences are many. For instance, for each of the sample surveys, the interviewers interviewed with different firms and in different numbers. Time of survey was different. And in particular, the industry and its many firms were under continued rapid development during the time of the survey. Most of the 157 furniture-making workshops or factories interviewed in the 1972 TFB survey employed less than 10 workers. However in the present study, most of the factories were medium size, well equipped, modern factories employing 30 or more workers. Firms sampled in the 1972 and 1974 surveys also manufactured different products with different wood materials, and their methods of production, utilization of wood materials and their markets were all different.

Types of Organization and Capital Investment

Of the 180 firms interviewed in 1974, 58% were operated as corporation and 39% as sole proprietorship, 1% as partnership and 2% as other types of organization. Thus most of the interviewed firms were registered as small or medium size corporation enterprises.

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If classified according to their registered capital investment, 55% of the firms fell in the category of half million NT$ or less (US $12,500 or less). Only 12% of the firms had capital investments of more than NT$ 5 million (US $125,000 or more). Firms with different types of organization and capital investment are classified in Table 9.

From Table 9 we know that most of the interviewed firms were medium or small scale enterprises. (Firms with a registered capital investment less than NT$ 5 million (i.e. US $125,000), are classified in Taiwan as small-medium enterprises). Only 22 of the 180 interviewed firms registered capital investment of NT$ 5 million or more. Firms with assets in operation of less than NT$ 100 thousand were mostly small traditional workshops. Most of the owners of these shops succeeded their elder generation to manage their business. These workshops manufactured products primarily for local market, or produced component parts or did some limited processing work for larger factories. Firms with assets in operation of NT$ 5 million or more were mostly large sized well-equipped modern factories. They manufactured products mainly for foreign markets. Firms with assets in operation of NT$ 1 to 5 million originally produced their products primarily for foreign markets but during the economic recession in 1974 shifted part of their manufacturing to products for domestic markets.

Table 9. Types of organization and assets in operation of interviewed firms

Assets in Operation (NT$1,000)	Organization				Firms	
	Corporation	Sold proprietorship	Partnership	Other	No.	%
100 & less (US$2,500 & Less)	3	56	2	-	61	34
100 - 499 (US$2,500-12,500)	26	12	-	-	38	21
500 - 999 (US$12,500-25,000)	18	2	-	-	20	11
1000 - 4999 (US$25000-125000)	35	-	-	4	39	22
5000 - 9999 (US$125000-250000)	15	-	-	-	15	8
10000 & less (US$250000 & over)	7	-	-	-	7	4
No. of firms	104	70	2	4	180	
%	58	39	1	2	-	100

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Those firms with an asset of NT$ 100 thousand to 1 million consisted of two groups of workshops or factories: woodworking factories manufacturing wood products for foreign markets, and furniture-making shops producing primarily for the domestic market. Only those large firms with assets of NT$ 10 million or more operated their large scale modern factories to manufacture products for international markets such as carved panel doors and louver shutter or carved half-louver doors.

As stated earlier most of the firms in the earlier period of the furniture-making industry in Taiwan were traditional family-owned small workshops. The situation of progression of the industry developed slowly until 1961. The report of the second industrial and commercial census showed that in 1961, only 0.2% of the enterprises manufacturing wooden furniture and fixtures were organized as corporation. By 1966, more than 20% of the enterprises organized as corporation. Table 10 shows the types of organization of this industry for the three selected years of the census.

According to the 1969 CCIS survey the result of the analysis of 63 wood furniture-making firms, 32% of the firms registered capital investment of less than NT$ 100 thousands, 43% of the firms had capital investment of NT$ 100 thousands to 1 million, and only 22% of the 63 firms operated with assets of NT$ 1 million or more. The result of that survey are shown in Table 11.

Table 10. Number of enterprises manufacturing wooden furniture and fixtures in census years, by types of organization and kind of operation.*

Census year	No. of enter-prises	Types of organization				Kind of operation		
		Corpor-ation	Propriet-orship	Partner-ship	Other	Manu-fact-uring	Process-ing	Repair-ing
1954	1,983	-	-	-	-	1,603	320	60
%	100.0	-	-	-	-	80.84	16.13	3.03
1961	3,489	7	3,448	32	-	2,771	577	141
%	100.0	0.20	98.82	0.92	0.06	79.42	16.54	4.04
1966	338	68	265	4	1	278	56	4
%	100.0	20.12	78.40	1.18	0.30	82.25	16.57	1.18

Source: The Commission of I.C.C.T. (1956, 1963, 1968: General Report on the Industrial & Commercial Census of Taiwan.

*For the third census in 1966, the industrial classification was different from the classification applied by the first and second censuses. The manufacturing scope for the third census was limited to the manufacturers who actually operated their furniture-making factories. However, those operators of processing and repair shops need not register as manufactures or minor industry when combined with service or commerce. After this kind of readjustment, the number of enterprises were only 338, owned by 323 firms.

Table 1

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Table 11. Registered capital investment of 63 firms surveyed in 1969

Registered capital investment (NT$1,000)	No. of firms	Percent
Less than 20 (US$5,000)	8	12.70
20 - 99 (US$5,000-25,000)	12	19.05
100-999 (US$25,000-250,000)	27	42.86
1,000 and over (US$250,000 over)	14	22.22
No response	2	3.17
Total	63	100.00

Source: C.C.I.S. (1969): Survey on Wood Furniture Industry in Taiwan, Market Research Report No. 690100.

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Obviously, most of the furniture-making factories were of small scale of production in 1969. However, the information from the analysis of 180 interviewed firms made in 1974 indicated that many of the factories were operated in medium scale, and 12% of the firms operated with assets in operation of more than NT$ 5 million (i.e. US $125,000). Compared with the situation in 1969 the number of medium to large sized and well equipped modern factories has increased rapidly.

Number of Employees

The number of employees in an average month of business in the year can also be used to give an indication of the scale of production of the manufacturing firms and the actual condition of management. An analysis of 174 of 180 interviewed firms in the 1974 survey indicated that most of the firms employed less than 30 persons (staff and workers). Table 12 showed the distribution of firms in different classes of capital investment and number of employees in operation.

Information in Table 12 shows that 29% of the interviewed firms employed less than 10 persons in the average month of operation in 1974, and only 11% of the firms employed more than 100 persons. Almost one half of the interviewed firms employed 10-60 persons in operation. In the same time, Table 12 indicates that of those firms employing less than 10 persons 80% were operated with a capital investment less than NT$ 100

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Table 12. Distribution of firms interviewed in 1974 survey, by assets in operation and number of employees.

Asset in operation	Number of employees						Total
	10	10-29	30-59	60-99	100-149	150+	
(NT$1,000)	(Number of firms)						
Less than 100	40	14	4	-	-	-	58
100-499	6	21	8	2	1	-	38
500-999	2	8	8	1	1	-	20
1000-4999	2	9	10	10	2	4	37
5000-9999	-	1	1	6	1	5	14
10,000 & over	-	-	-	2	2	3	7
Total No.	50	53	31	21	7	12	174*
Total %	29	30	18	12	4	7	100%

*This analysis was based on information of 174 firms; because six firms didn't respond to the question on number of employees.

thousands (US $2,500) and those firms employing more than 100 persons in operated invested at least NT$ 1 million in business.

The results of the 1974 survey were different in many aspects from the result of the 1972 TFB survey. As stated before, both of the surveys selected different firms as samples. Because of this, wood utilization in furniture manufacturing and average consumption of wood materials per firm were also different. In the 1974 survey for the present study, the sampled firms were mostly small-medium enterprises with well equipped modern factories. On the contrary, TFB survey in 1972 sampled those firms mostly employing less than 5 persons and operated as a small workshop. In order to give a clear picture of this industry, analysis of the 155 interviewed firms in TFB 1972 survey gave a different status, as shown in Table 13.

Table 13 indicated that in the 1972 sample survey most of the furniture-making factories (66% of the 155 firms) employed less than 5 persons per firm. Number of firms employing less than 10 persons accounted for 84% of the total. Compared with the result of the 1974 survey for this study, in which 29% of the interviewed firms employed less than 10 persons per firm it was obvious that in the 1972 TFB survey, most of the sampled firms were small and family-operated furniture-making shops. In respect to the types of organization, the 1972 TFB survey showed that only 6% of the sampled firms were operated as a corporation, the rest of the sampled firms were operated

Table 13. Distribution of firms in TFB 1972 survey, by types of organization and number of employees

Number of employees (persons)	Organizational form				Total of firms	
	Corporation	Sole Proprietorship	Partnership	Others	No.	Percent
5	-	103	-	-	103	66
5-9	1	27	-	-	28	18
10-29	1	13	-	-	14	9
30-59	2	1	-	-	3	2
60-99	1	-	-	-	1	1
100-149	3	-	-	-	3	2
150+	2	-	-	1*	3	2
Total	10	144	-	1	155	100

*This only non-corporation firm employing more than 150 employees is a government operated largest modern wood-working factory in Taiwan.

under sole proprietorship except for one government operated largest modern woodworking plant.

Furthermore, from the analysis of data of 1974 survey, we can also understand the differences of scale of operation between each group of the woodworking and furniture manufacturing factories. On the basis of number of employees per firm the distributions of firms for each group of factories can be shown in Table 14.

The information in Table 14 shows that 36% of the factories of Group 1 manufacturing household furniture like tables and chairs, employed less than 10 persons in operation per interviewed factory, or these factories employing less than 30 persons totaled 65% of the factories of Group 1. However, it was not uncommon in cases that some factories in Group 1 employed more than 100 employees in operation. In comparison, most of the firms of Group 2 (factories manufacturing beds, chest of drawers, wardrobes, cabinets, and clothing lockers for home use) and Group 4 (factories making sofas and upholstery furniture) employed more of less than 10 persons only. However, about two-thirds of the firms of Group 5 (factories manufacturing louver shutters, carved panel doors, carved folding screens and carved half-louver doors) employed at least 60 persons in operation per interviewed factory, and some of those large factories employed more than 150 persons in operation. Generally speaking, if

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Table 14. Distribution of firms interviewed by Group of factories and number of employees, 1974

Group of factory*	10	10-29	30-59	60-99	100-149	150+	Total
Group 1	15	12	5	4	1	5	42
Group 2	14	11	5	1	1	1	33
Group 3	2	6	2	1	1	-	12
Group 4	9	3	2	3	-	-	17
Group 5	-	4	2	5	3	3	17
Group 6	10	17	15	7	1	3	53
Total	50	53	31	21	7	12	174

* For definition, see page 29.

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measured in terms of number of employees, those firms of Group 5 were mostly operated in large scale as compared with other groups of factories.

Number of Establishments and Integration

In the questionnaire for the 1974 survey, questions concerning the situations of the firm's multiple-product management and the accessory plants, or the factory's relation with its mother plant, were included. The situation was that some woodworking or furniture-making factories in Taiwan were accessory plants of the plywood factories, or some of the interviewed woodworking or furniture-making factories operated other similar factories, or had their own lumbering mills or wood seasoning plants, or installed kiln drying or sawmilling units within factories at the same location. The purpose of doing so in the survey was to understand the situation of industrial integration within or between firms as well as the scale of operation, wood utilization, or the flow of lumber. The result of 1974 survey is in Table 15.

From the information in Table 15 it is clear that many interviewed firms operate two factories with a similar nature, or it was not uncommon that some firms operate several wood-using plants or that one establishment installed several wood-using or wood treatment units at the same location. Commonly, many of the interviewed firms installed their own sawmill or

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Table 15. Proportion of interviewed firms with and without accessory plants, 1974

Group of factory*	Without accessory plant	Factories with the following accessory plants					Total
		Sawmill	Kiln or chamber	Furniture plant	Woodworking plant	Plywood plant	
		(Percent of firms)					
Group 1	31	18	25	18	8	-	100
Group 2	57	4	14	18	7	-	100
Group 3	60	7	20	7	6	-	100
Group 4	66	-	17	17	-	-	100
Group 5	2	29	33	24	12	-	100
Group 6	47	12	32	7	1	1	100
All factories	38	15	26	14	6	1	100

*For definition, see page 29

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lumbering unit and kiln. Evidently, most of the woodworking and furniture manufacturing firms took wood seasoning as an important process in their production and wood utilization. It is a much pleasing phenomena for the woodworking and furniture-making industry to have industrial integration whether it is horizontal or vertical. Above all, it is beneficial in regard to wood utilization or to the scale of operation. Obviously, the type of organization of the interviewed firms and their scale of operation has been much improved. For factories of Group 5, most of the interviewed firms operated several different wood-using plants other than woodworking factory per se. These many factories of Group 5 operated in large scale, well equipped with modern machinery and managed by professional personnel with scientific management. These factories could be the best models to be followed by those many small family-owned workshops operated under inefficient manner of management.

BUSINESS LIFE OF FIRMS

From the life in business of the woodworking and furniture manufacturing firms, we can learn about the situations of the changes and development trend, growth, entry into or the drop from, turn over, and the competitive structure of this industry. In Taiwan, the woodworking and furniture industry faced a free competitive market. Many of the manufacturing firms,

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large or small, are free to enter into business without any barriers, or the firms in business could drop out of this industry as the owners see it necessary. In the same time, by examining the increase or decrease in number of establishments and the life in business of the firms, we can also learn the situations about whether the firms' investment had been too concentrated in this industry, or whether the number of firms was too many and scattered too widely over the entire island, or whether a consolidation or mergence between firms or a change in structure of this industry was necessary. And furthermore we could learn about how were the uses of various wood materials, or the changes in wood utilization, the substitutions of wood products, and finally and importantly, the stability of Taiwan's wood market.

According to the CCIS Report "Survey on Wood Furniture Industry in Taiwan" before 1966, about 20% of the furniture-making firms, on the average, operated their business shorter than one year. The same analysis showed that 60% of the firms operated their business with a duration of 5 years or less, and firms with an operational duration less than 10 years accounting for about 80%. Only a small percentage of the furniture-making firms, before 1966, operated their business longer than 10 years. This fact indicated, obviously, that the changes in situation of the furniture and fixture industry were very rapid. The CCIS report stated that between 1961-1966, the number of new firms entering into this industry

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increased every year, and no cases of firms to drop out off this industry could be commonly found.

The result of the CCIS analysis is cited in Table 16 for reference. The result of analysis of the CCIS 1969 survey, in which 63 wooden furniture factories were interviewed, are also cited here in Table 17 to give a general picture of the furniture-making firms as well as the situation of prosperity of this industry.

On the other hand, the 1974 survey showed situations of rapid development and prosperous prospects of the woodworking and furniture manufacturing industry. Before the 1974 spring soaring-prices shock and great inflation, Taiwan's economy had experienced a long period of fast and steady growth. For instance, in the 10 years period of 1963-1972, Taiwan's rate of economic growth averaged as high as 10.4%. It ranked first in comparison with other developing countries such as South Korea, the Philippines, Thailand, India, Brazil and Mexico (12). During this period of economic prosperity, and particularly in the three years of 1971-1973, the development of the woodworking and furniture-making industry was very rapid.

The fact was that old workshops expanded, new and modern factories increased, and in particular the plants of small or medium size operations were established and mushroomed everywhere on the island. Information from the 1974 interviewed firms gave evidence that most of new factories were established within the last few years. (Table 18).

Table

Census year	
1961	
	%
1966	
	%

Source

Table 16. Number of establishments by life in business

Census year	Number	Years in business					
		<1	1-5	5-10	10-15	15-20	>20
1961	3,489	780	1,298	582	451	155	223
%	100	22.36	37.20	16.68	12.93	4.44	6.39
1966	338	62	153	80	18	6	19
%	100	18.34	45.27	23.67	5.33	1.78	5.61

Source: China Credit Information Service (1969)
Survey on Wood Furniture Industry in Taiwan

Table

No. o firm	
63	
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Table 17. Number of furniture-making factories by life in business, 1969

No. of firms	Years in business						
	<1	1-5	5-10	10-15	15-20	>20	No response
63	5	16	15	11	3	6	7
100%	7.94	25.40	23.81	17.46	4.76	9.52	11.11

Source: China Credit Information Service (1969). Survey on Wood Industry in Taiwan.

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Table 18. Number of woodworking and furniture-making firms by life in business and registered capital investment, 1974

Asset in Operation	Life in business			
	2	2-5	5-10	10
(NT$ 1,000)		(Number of firms)		
100	17	18	10	14
100 -499	13	8	10	6
500 -999	10	4	6	-
1000-4999	19	7	6	3
5000-9999	9	-	4	1
10000	5	-	1	1
Total No.	73	33	37	25
Total %	43	20	22	15

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By examining the information in Table 18, we learned that of the interviewed firms in 1974 survey, 63% of the factories were established after 1969, because the operational duration of these factories was shorter than 5 years. Seventy three, or 43 percent, began to operate their business within the last three years (1971-1973). Most of these newly established factories were of modern type. Those with an operational duration of more than 10 years were mostly small workshops, and a small number of them were developed and expanded gradually and successively from the initial stage of a small workshop to a small plant with a few pieces of equipment, and finally to a modern factory with a large scale of operation. Once again the above information evidenced that the woodworking and furniture-making industry in Taiwan developed very rapidly in recent years. Generally speaking, it changed gradually from family-owned small workshops to large-scaled modern factories operated by professional managers under the direction of an organized corporation.

SOURCES OF INVESTMENT FUNDS, LABOR INPUT, AND RECENT EXPANSION OF PRODUCTIVE CAPACITY

Most or almost all of the investment fund of the woodworking and furniture-making industry came from the owners themselves, and overseas investment in this industry were very few in cases. Of the 180 interviewed firms the only

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one factory was operated with an investment fund provided by overseas Chinese, and only two factories operated with funds from foreign investors. In the past there had been a government operated large woodworking factory with technical cooperation from foreign companies, but in 1974 it was no longer in existence.

Although most of the firms were nominally organized as corporations, no firm had ever acquired capital from the public by openly issuing company stock in transactions in the Taiwan stock market. All the needed capital of the woodworking and furniture-making firms was usually provided by a few of the partners. Capital provided by a sole proprietor or one family or by several relatives or friends was most common. In Taiwan, the amount needed for the initial investment in a woodworking and furniture-making workshop was small. In general, several hundred thousand NT dollars of capital and two or three or several hundred square meters of plant site were enough for the establishment of a small workshop. Techniques needed for wodworking and furniture manufacturing were relatively very simple, the workers at the time of the 1974 survey were easy to be employed at a relatively low wage rate, the supply of wood materials was relatively abundant, and most of the woodworking and furniture-making machinery was made by Taiwan iron workshops.

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In other words, many of the needed, although not necessarily all and sufficient, conditions for operation of a general woodworking and furniture-making factory were there already. Under these advantageous situations, many interested persons with some amount of funds in hand were, no doubt, fond of investment in this industry if they thought that there were markets, in domestic or in foreign countries, to sell their manufactured products. Therefore, it was so common that we could find small woodworking and furniture-making workshops or factories mushroomed everywheree along the main N-S railway and highway, particularly in the southern part of Taiwan. In fact, these many small factories were mostly established in the last few years (before 1974).

In Taiwan today, there are also other sources of capital woodworking and furniture-making firms that could be obtained. For instance, there are opportunities to get a short term revolving fund from government banks or government-private jointly operated banks or loan associations. Perhaps, in general, the woodworking and furniture-making firms interviewed did not consider they were in urgent need for these kind of short term capital, or they did not know the procedures to get government financing. It could also be that the interviewed firms considered the many stated conditions or terms were not suitable to their wants or they thought that the interest on the loan was too high or the procedures were

very tedious and so forth. Consequently, no interviewed firm applied for those kinds of short term loans from government banks or loan associations, although most interviewed firms emphasized their urgent need for government financing in one way or the other.

According to the handbook of government financing edited and published by the Industrial Development Bureau, Ministry of Economic Affairs, there were listed 13 different categories of industrial loans, besides the most familiar exporting financing etc., for the small and medium business of woodworking and furniture-making industry. For instance, the first kind of those industrial loans provided and supported by Sino-American Development Fund for the purposes of financing small scale private enterprises, stipulated that loans to the furniture-making industry should be placed in the first priority. Another example was the tenth kind of loans, provided and supported by Taiwan Provincial Cooperative Bank for the purposes of financing handcraft manufacturing firms, also stipulated that the woodworking and furniture-making industry should be the principal to get this kind of loan. In addition to these examples, Youngman Creative Enterprise Assistance Loan, administered by the Youngman Assistance Commission of Cabinet Executive Yuan, listed the furniture and fixture manufacturing industry as one of the principal industries to get this kind of assistance.

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All of these indicated that, evidently there was some opportunities for the woodworking and furniture-making industry to get government financing or short term loans. The key point was that how to get the manufacturers to know about these many kinds of loans and how to finance the firms in some effective ways. In view of the situations mentioned above, it seems necessary that further efforts be made to get government financing in effect for the benefit of the woodworking and furniture-making manufacturers.

With respect to the increase in capital equipment, it was very common for the interviewed firms to have their plant size and productive capacity expanded in 1973. During the survey, we found that many of the firms were newly established, so that 100% of these firms' productive capacity were taken to be newly increased. The result of the 1974 survey showed that, in 1973 about 31% of the interviewed firms had made new investments in equipment and machinery. In terms of percentage increase in productive capacity, all of the firms that expanded their plant capacity in 1973, had added a total new productive capacity equivalent to about 15% of the total productive capacity available in 1972. The result of analysis is given in Table 19.

The information in Table 19 shows that besides the investment in capital assets of the new factories (100% increase), one-fourth of the remaining interviewed firms had made new additions to plant capacity (firms that increased

Table

Adde produ tive capac in % origi plan capac	New (100%	70-10	40-6	10-3	With new vest (%)

Table 19. Proportion of firms making new investment in capital equipment and productive capacity in 1973

Added productive capacity in % of original plant capacity	Plants producing furniture mainly for export	Plants producing furniture mainly for market domestic	Plants producing louver shutter & carved panel doors	Plants producing miscellaneous products	All factories
			(Percent of firms)		
New plant (100%)	11	1	5	9	6
70-100%	8	2	5	2	4
40-69%	3	3	11	3	4
10-39%	27	5	16	28	17
Without new investment (%)	51	89	63	58	69
	Total increase in productive capacity as a percent original plant capacity				
	25	6	18	19	15

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their plant capacity less than 10% of the original capacity were treated as if there were no increase in capacity). Table 13 also indicated that those furniture-making factories manufacturing products mainly for export, expanded their original capacity. In contrast, those furniture-making factories manufacturing products mainly for domestic market expanded their plant capacity least, only increased about 6% of the original capacity. Both of the factories of Group 5 and Group 6 had made new investments in equipment and machinery up to 18% and 19% of their original plant capacity respectively. For all factories, the total expanded plant capacity in 1973 was equivalent to about 15% of the original.

According to the information collected in 1974 survey, many of the interviewed firms claimed that in the period before 1973, the number of workers employed increased every year corresponding to the increase in number of new factories as well as the plant expansion and increase in production and sale. In general, if the firms could acquire sufficient number of orders or obtain consignment from other larger factories, in other words once they had work to do with, they could easily increase the number of workers and enlarge their production without difficulty. The questionnaire for the 1974 survey investigated the average number of employees in operation in 1969 and the years between 1969 to 1973. The results are shown in Table 20.

*Table 20. Average number of employees per plant in 1969 and 1973 by category of firms and registered capital investment**

Table 20. Average number of employees per plant in 1969 and 1973 by category of firms and registered capital investment*

Asset in Operation (NT$=1000)	Year	Furniture-making			Woodworking			All firms		
		Staff	Worker	Total	Staff	Worker	Total	Staff	Worker	Total
<100	1969*	0.9	7.6	8.5	1.4	13.8	15.2	0.9	8.4	9.3
	1973	1.0	12.1	13.1	1.5	11.4	12.9	1.1	11.9	13.0
100-499	1969*	1.8	20.4	22.2	3.6	30.4	34.0	2.6	24.8	27.4
	1973	3.2	30.1	33.3	4.8	53.2	58.0	3.9	40.3	44.2
500-999	1969*	3.3	33.6	36.9	3.7	35.5	39.2	3.5	34.5	38.0
	1973	4.3	41.1	45.4	13.1	50.7	63.8	7.6	44.6	52.2
1000-4999	1969*	11.3	88.1	99.4	3.5	30.0	33.5	7.2	57.7	64.9
	1973	14.5	134.1	148.6	5.9	65.2	71.1	9.7	95.6	105.3
5000-9999	1969*	5.0	69.0	74.0	13.0	136.5	149.5	8.2	96.0	104.2
	1973	11.8	266.8	278.6	14.3	142.3	156.6	13.2	204.6	217.8
10,000 and over	1969*	15.0	165.7	180.7	12.8	121.0	133.8	13.7	140.1	153.8
	1973	20.0	152.4	172.4	11.4	128.4	140.0	14.6	137.5	152.1
Total	1969*	3.5	33.3	36.8	4.7	43.7	48.4	3.9	37.0	40.9
	1973	5.0	55.2	60.3	6.9	63.5	70.4	5.7	58.4	64.1

*The survey questionnaire asked what was the average number of employees in operation in 1969. If the firm had not been established in 1969 it was asked what was the average number of employees in year of starting the business. Therefore, the figures corresponding to the 1969 row were not the actual average number of employees in 1969.

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PRODUCTS PRODUCED AND MARKETS

In the previous paragraphs, it stated that the woodworking and furniture-making firms generally manufactured a great variety of products. For instance, in the analysis of data of the 1974 survey, the interviewed firms in each group of factories produced the individual firm's own primary products and many other secondary or miscellaneous items in a year. The proportions of the main products manufactured by each of the interviewed firms had been analyzed and tabulated as in Table 5. Regarding the product design and changes in style as well as the firm's decision about production schedule and so on, it was already analyzed and discussed in the previous paragraphs. By examining the results of those analyses, obviously we could learn that the interviewed firms not only produced a great variety of products, but also manufactured many kinds of products of flexible and often changing specifications, and in particular the situations were distinct in the cases of those products manufactured for sale in the domestic market. According to the C.C.I.S. survey conducted in 1969, more than 95% of the 63 interviewed firms decided their production schedule based upon the customer's orders they received. The specification of products varied greatly in line with the received orders, and there were very few in number of the firms having their own special design and style. In other words, the manufacturers made their products on decision solely based on the statements stated in customers' orders.

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Increments in Value of Production

In the past decade, the value of production of the wooden furniture industry increased very rapidly. Measured in terms of value of production, the growth rate of the wooden furniture industry ranked higher than the furniture industry as a whole, and topped the other wood-based industries. According to the Taiwan Economic Statistics published in the Industry of Free China, the index numbers of industrial production of the wooden furniture industry increased faster than those of other wood-based industries. Those related statistics are cited in Tables 21 and 22 for comparison.

Table 21. Output and production value of furniture and selected wood products, 1963-1974.

	Wooden furniture	Bamboo, cane & rattan furniture	Other wood products

Table 21. Output and production value of furniture and selected wood products, 1963-1974.

Year	Furniture	Wooden Furniture	Bamboo, Cane & Cork Furniture	Other wood products			Pulp
	(NT $1,000,000)			Lumber (1,000 M^3)	Plywood (1,000 M^3)	Treated Lumber (1,000 M^3)	(1,000 m.t.)
1963	69	53	16	636	31	27	31
1964	73	51	21	636	67	25	36
1965	114	81	33	619	79	14	38
1966	193	142	51	556	94	22	38
1967	243	161	82	584	105	22	44
1968	375	226	149	636	133	20	48
1969	638	408	230	712	156	34	65
1970	910	616	294	826	206	31	91
1971	1,264	909	355	1,089	316	33	123
1972	1,558	1,255	303	1,025	360	35	123
1973	1,836	1,614	223	986	445	29	131
1974	1,494	1,333	144	749	278	18	131

Source: Industry of Free China, Vol. 43, No. 5, 1975

Table 22. Indexes of production of furniture and selected wood products (1971 = 100).

Table 22. Indexes of production of furniture and selected wood products (1971 = 100).

Year	Furniture	Wooden furniture	Wood and wood products				Pulp	Paper & paper board
			Group index	Timber	Plywood	Timber preservation		
1961	2.2		19.8	52.4	5.9	25.9	18.1	23.2
1962	4.0		21.1	50.1	8.3	36.2	20.7	25.8
1963	5.4	5.8	25.9	58.4	9.8	82.9	26.0	25.2
1964	5.8	5.7	33.4	58.4	21.1	77.7	29.5	30.7
1965	9.1	9.0	34.5	56.8	24.8	42.8	30.7	33.2
1966	15.3	15.7	34.8	51.0	29.5	66.7	30.7	44.0
1967	19.3	17.7	40.1	53.6	33.2	67.3	36.2	49.4
1968	30.1	24.8	47.2	58.4	41.9	61.0	39.0	59.7
1969	51.0	44.9	55.6	65.4	49.4	103.1	53.0	69.9
1970	72.4	67.8	69.1	75.9	45.1	93.9	74.1	82.3
1971	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1972	129.4	138.0	108.0	94.2	113.9	105.9	100.2	113.9
1973	141.7	177.5	125.7	90.5	129.2	87.4	99.2	126.3
1974	114.0	146.6	81.7	68.8	88.3	53.9	106.7	122.7

Source: Industry of Free China, Vol. 43, No. 5, 1975.

Percentage Distribution of Manufactured Products

Information in Tables 21 and 22 show the increase in quantity and value of production of furniture industry in the past decade as compared with those of other wood-based industries. As far as the manufactured products of the interviewed firms were concerned, Table 5 in the beginning of this chapter gave us a general picture about the production situations in 1973-1974. It indicated that of the 176 interviewed firms in the 1974 survey, most of their manufactured products were household furniture like tables or chairs.

Markets

The markets for Taiwan's furniture products were commonly local in nature, some were regional or national, and still some others were international such as those of the markets in North America, in Asia, in U.S. Pacific, in Australia, in Europe and recently in Middle East. However, the markets for most parts of Taiwan's woodworking products were international.

The markets for the products of the so many widely-scattered small scaled and family-owned workshops were principally local. They manufactured only a few kinds of products in very small quantity such as tables or chairs or cabinets or wardrobes. They usually placed their products in their own small store and waited for the local customers to come to buy. On the other hand, the markets for the

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products of those larger family-owned workshops were also local, or sometimes regional in some cases extended within or outside the nearby county boundary. However, they didn't display their products either and usually they sold their products in lot or they accepted orders of small purchase or shared the large orders with other factories and then manufactured their products accordingly. Still further, the markets for the products of the gradually developed small factories were principally regional or their markets extending widely over the entire island. Examples of dinning tables and chairs as well as beds, or some counters or cabinets are cases in point. Of these small factories, some specialized in production for both domestic and foreign markets as well. Or they manufactured some kinds of exporting products for those other large factories. Finally and very commonly, most of the small to medium and large sized woodworking and furniture-making factories with modern equipment and professional personnel manufactured their products for the sole purpose of exportation or consigned their orders to some other smaller factories to manufacture products for them to fill their orders received in the world markets.

In regards to the marketing channels both in domestic and foreign markets, this paper will give due consideration in next sections. Here, the results of analyses of the 1974 survey concerning the firms' markets and distributions of

their sale of products are firstly given as in Table 23 to show the general situations of the product markets.

The information in Table 23 indicated that of the interviewed firms in 1974 survey, whether they were small or large scale woodworking and furniture-making factories with modern equipment or whether they were only small family-owned workshops or furniture stores, those small firms usually sold most parts or over 90% of their products in the domestic markets, and those small to medium sized firms often sold their products in both domestic and foreign markets. However, those large or medium scale modern factories were different from the small ones. They principally sold their products to foreign buyers directly or exported their products to the world markets, and only some of them sold also parts of their products in domestic markets. In fact, situations between each firm of the group of factories were different from one and the others. But, generally speaking, about one-fourth of those firms of groups 1, 2, 3, and 4 exported all their products to foreign countries. On the other hand, three-fourths of those firms of groups 5 and 6 sold all of their products in world markets or to sell their products directly to foreign buyers in Taiwan.

With respects to the exporting markets for Taiwan's furniture products and the distributions of sale in the past decade, the information published by Chinese Maritimes Customs gave us a whole picture of that situation. Therefore, those statistics relating to the principal foreign

Table 23. Proportion of firms selling products in domestic and foreign markets by percentage of sales.

Table 23. Proportion of firms selling products in domestic and foreign markets by percentage of sales.

Group	Domestic market						Foreign market						Total
	>50	50∿59	60∿69	70∿79	80∿89	90∿100	50	50∿59	60∿69	70∿79	80∿89	90∿100	
	(Percent of sales)												
Group 1	5	4	0	7	-	47	8	4	-	-	2	23	100
Group 2	-	-	-	3	-	68	5	-	-	-	-	24	100
Group 3	-	-	-	17	-	58	17	-	-	-	-	8	100
Group 4	-	-	-	12	-	41	12	-	-	-	-	35	100
Group 5	11	-	-	6	-	-	6	-	-	6	-	71	100
Group 6	5	-	3	2	-	5	5	-	-	3	2	75	100
All factories	4	1	1	5	-	34	7	1	-	2	1	44	100

markets as well as the value of export in the past were cited here as shown in Table 24 in order to show the fact of Taiwan's furniture exportation.

COST STRUCTURE OF THE WOODWORKING AND FURNITURE-MAKING FIRMS

The woodworking and furniture manufacturing costs varied greatly with the kinds of product produced, the status of the business management of the firms as well as the scale of production and so on. The manufacturing costs also varied greatly even among the same group of factories. On the average of each group of factories interviewed in the 1974 sample survey, in a normal and a general situation of the woodworking and furniture-making firms, the cost of wood raw materials constituted 35-50% of the total cost. Direct cost of labors took about 20-30% of the total cost, and other costs of materials such as lacquer, metal parts and sand papers and so on took about 10-20%. With respects to the business administration and marketing, cost of maintenance took about 3-7%, administration 3-5%, packaging 2-4%, transportation 2-5%, and tax 2-4%. As far as profit was concerned, generally speaking, the rate of profit for those interviewed firms that produced their products mainly for or specialized in domestic market was about 10-20%, while the rate of profit for those firms producing mainly for exportation was 15-20%.

Table 24. Value of furniture export to 10 principal countries 1964-1973.

1)

Table 24. Value of furniture export to 10 principal countries 1964-1973.

Year	Sales in NT $ million	Percent of total sales to 10 major importing countries[1]									
		1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
1964	4.7	40.1	15.3	11.7	7.0	5.8	4.9	2.5	2.4	1.3	1.3
1965	9.8	44.6	34.1	6.8	2.6	2.3	1.9	1.9	1.2	.8	.7
1966	13.4	42.8	21.9	12.7	7.0	6.0	2.0	1.4	1.3	1.1	.8
1967	22.7	51.5	12.0	7.9	6.0	5.9	4.2	2.9	1.9	1.9	1.7
1968	37.9	64.0	6.8	5.4	5.1	3.4	3.0	2.9	1.3	1.3	.9
1969	68.8	75.3	4.9	4.0	3.4	2.8	2.3	1.1	1.0	.4	.4
1970	124.7	67.2	7.6	5.6	4.2	3.7	3.0	2.7	1.8	1.1	.9
1971	284.9	63.1	8.4	6.3	6.2	3.0	2.6	1.8	1.8	1.8	1.3
1972	136.7	57.2	13.0	7.4	5.3	2.8	2.5	2.1	2.0	1.8	1.4
1973	296.9	65.8	14.0	5.0	4.3	3.6	1.1	1.1	9.7	5.9	5.2

1) The 10 most important importing countries by year were:

1964: USA, Ryukyu Islands, Japan, Italy, U.S. Pacific, Australia, Malaysai, France, Hawaii, Hong Kong.

1965: USA, U.S. Pacific, Ryukyu Islands, Hawaii, Netherlands, Hong King, Canada, Japan, Belgium, Singapore.

1966: USA, U.S. Pacific, Thailand, Ryukyu Islands, Malaysia, Japan, Canada, Australia, Hong Kong, Hawaii.

1967: USA, U.S. Pacific, Ryukyu Islands, Japan, Vietnam, Congo, Canada, Australia, Hong Kong, Central America.

1968: USA, Ryukyu Islands, Japan, U.S. Pacific, Canada, Vietnam, Australia, Hawaii, Indonesia, Central America.

1969: USA, Japan, Vietnam, Ryukyu Islands, Australia, Canada, Hong Kong, U.S. Pacific, Finland, Netherlands.

1970: USA, Ryukyu Islands, Japan, U.S. Pacific, Hawaii, Vietnam, Canada, Australia, Hong Kong, Central America.

1971: USA, Japan, U.S. Pacific, Ryukyu Islands, Australia, Vietnam, Canada, Hong Kong, Hawaii, Central America.

1972: USA, Japan, Hawaii, Canada, Australia, Puerto Rico, West Germany, U.S. Pacific, Hong Kong, United Kingdom.

1973: USA, Japan, Australia, West Germany, Canada, United Kingdom, Netherlands, Hawaii, Ryukyu Islands, U.S. Pacific.

In reality, according to the information collected in the 1974 sample survey, the various costs and their respective percentages in the total cost varied greatly among different firms of each group of factories that manufactured different kinds of products. For instance, those interviewed woodworking factories specialized in manufacturing cue sticks spent the least cost for wood materials-about 20% of the total cost. On the other hand, those firms specialized in producing louvered windows or shutters, carved panel doors and household furniture such as tables or chairs, spent the highest cost for wood materials, up to a high of about more than 70% of the total cost.

Only 6% of the interviewed firms manufactured their products with a cost of wood raw materials less than 30% of their total cost; and 16% of the interviewed firms with their cost of wood material greater than 60% of the total cost. The remaining 78% of the interviewed firms claimed that their costs of wood raw materials in production ranged from 30 to 59% of their total cost. In other words, three-fourths of the interviewed firms claimed that the cost of wood raw materials constituted over 40% of the total cost. Because of this high cost of wood material, most or almost all of the interviewed firms, therefore, claimed that the imported wood materials for woodworking and furniture manufacturing should be duty free in order to reduce their costs in production and to strengthen their competitive power in foreign markets.

As far as the direct cost of labor was concerned, there was also a great variation. The results of analyses showed that about 23% of the interviewed firms manufactured their products with a cost of direct labor less than 19% of the total cost. However, about 5% of the interviewed firms claimed that the direct labor cost took more than 40% of the total cost. There were 72% of the interviewed firms that claimed their cost of direct labor ranged from 20 to 39% of the total cost. Therefore, all of the manufacturers claimed that the increases in wage rate during recent years had great effects on the development of the woodworking and furniture-making industry in many respects. Because the low labor cost of the industry experienced in the past was no longer available, and even worse than this, most of the young workers from rural area employed in recent years were lacking technical training and had low productivity, there has been an adverse effect on the industry in regards to the competitive power in world markets. The cost structure of the woodworking and furniture-making industry is summarized in Table 25.

The cost structure of the interviewed woodworking and furniture-making firms fluctuated not only with the different kinds of their products manufactured, but also it changed much with the quality of the products. Generally speaking, the labor cost was high for those products with high quality. Variation of each cost item in the cost

structure between individual firms was very high. Cost averages for each cost item in the cost structure for each group of factories is given in Table 26.

Table 25. Percentage distribution of firms incurring different levels of manufacturing costs, 1974.

Percent of total costs	Types of costs			
	Wood	Other materials	Direct labor	Indirect costs
	(Percent of firms)			
0 - 9	-	19	1	3
10 - 19	-	48	22	40
20 - 29	6	28	47	41
30 - 39	26	3	25	14
40 - 49	31	2	3	2
50 - 59	21	-	2	-
60 - 69	15	-	-	-
70+	1	-	-	-
Total	100	100	100	100

Table 26 indicates that the cost for wood materials in the case of sofa and decorative-type furniture-making firms (Group 4) was low as compared with other groups of factories. However, the factories in group 4 spent more money for other materials than other groups of factories. In the woodworking manufacturing groups, group 5, (specilizing in louvered windows and carved panel doors) firms spent more than 50% of

Table 26. Cost structure of woodworking and furniture manufacturing by type of costs and group of factories, 1974.

Group of factory	Wood	Other materials	Direct labor	Maintenance, water, electricity, etc.	Overhead	Packaging	Transportation	Tax
				(Percent)				
Group 1	40.8	16.3	24.1	5.3	4.6	2.9	2.9	3.2
Group 2	39.6	17.9	22.5	5.9	4.7	3.1	3.0	3.3
Group 3	39.3	15.6	25.0	5.5	4.8	3.4	3.5	3.3
Group 4	37.0	20.6	22.8	4.9	4.9	4.6	3.5	3.5
Group 5	53.0	7.9	19.8	6.1	4.6	3.9	2.9	1.9
Group 6	39.9	14.6	21.8	6.4	5.8	4.0	3.9	3.7
All Factories	41.4	15.4	22.6	5.7	4.9	3.6	3.3	3.1

their total cost for wood raw materials. However, they spent the least money for other materials -- less than 8% of their total cost was spent for materials other than wood.

On the average, the interviewed woodworking and furniture-making firms spent about 35-50% of their total cost on wood raw materials. This was much higher than the figures released by the Forest and Forest Industry Development Project in 1968. In the 1974 survey, it was found that direct labor cost took only 20-28% of total cost, far less than the figures released by the Forest and Forest Industry Development Project. Table 27 is cited here from Mr. Young's (6) paper for the purpose of comparison.

Table 27. Comparison of Taiwan furniture-making firms' cost structure with firms in USA and Denmark.

Country	Wood	Direct labor	Other mfy costs	Adm. Selling, and profit	Total
			(Percent)		
Taiwan	35	40	10	15	100
U S A	39	14	14	23	100
Denmark	28	36	15	21	100

Source: Forest and Forest Industry Development Project, ROC-FAO Project, 1968.

According to Young's statistical information (which cited also the statistics published in the Report on Industrial and Mining survey of Taiwan), the cost of wood materials

took as high as 63% of the total cost, while the cost for direct labor took only 16%. The information showed that in Taiwan, the cost of wood materials of the wooden furniture industry was much higher than the manufacturers in Denmark (Denmark imported 70% of their wood materials, similiar to the situation in Taiwan). This problem of very high cost of wood materials in Taiwan's case, no doubt, needs further attention in the development of this industry.

MARKET CONDUCT

According to the analyses conducted by CCIS in its 1969 survey, consumer purchasing habits for furniture products had significant effects on the distribution and promotion strategy of the manufacturing firms and middlemen. Usually furniture manufacturers did not need to have many retail stores. However, in order to take advantage of their market shares, they exhibit their furniture products in the show room of certain stores or they display their products in some stores, whether of their own or not, next doors of the others' stores on the same street. In doing this they attracted their customers by providing opportunities for the furniture consumers to compare and to select goods. Therefore, the marketing system of the furniture-making industry is usually different from that of other manufacturing industries by distributing their furniture products through wholesalers or mostly and directly to some retail stores.

Domestic Markets

The elasticity of demand for wooden furniture on the domestic market is low, because consumers often select and purchase only limited pieces of furniture and use it as a durable good. This is quite different from other kinds of consumer's goods where the demand fluctuates greatly with fluctuations in prices. By lowering price the furniture-making firms can not stimulate consumers very much to change purchasing habits for furniture products. Hence, big sales or auction markets for furniture products have never been seen in Taiwan. On the supply side, because of the limitations imposed by the consumer's demand for furniture and the great numbers of so many small scaled furniture-making firms in Taiwan, the principal way of marketing products is by selling directly to the consumer. Marketing furniture products through retail stores was said by interviewed firms to be the secondary way. In other words, the furniture-making firms faced a perfect competitive market for their products. Therefore, the amounts of production and the price adjustments on the part of the manufacturers often had little effect on the equilibrium of supply and demand.

Under this condition of low elasticity of demand for furniture products in domestic markets, some of the interviewed large scaled furniture-making firms made great efforts to increase their sale volumes by either improving furniture design or raising prices of new type products to stimulate market demand in the hope of increased sales revenue.

According to the analyses of the 1974 survey, on the average, about 66% of the interviewed firms of Groups 1, 2, 3, and 4 (specialized in household furniture, office and public building furniture as well as upholstery furniture) were involved in doing business in domestic markets. Some 83% claimed that 100% of their sales were made with customers in Taiwan. Usually, most of those furniture-making firms involved either in selling all or parts of their total business in domestic markets had their own retail department to exhibit their furniture products, and acquired orders directly from the consumers. This kind of marketing system or channel of distribution (from the manufacturers directly to the consumers) was much appraised and commonly adapted by many furniture-making firms, because the firms learned that each of the customers had their own subjective points of view either on the furniture design or on the specification of the furniture products which the consumers might consider to buy. The 1974 survey showed that 55% of the interviewed firms adapted this approach of direct sale to consumers (including those firms that did parts of their business in processing and repairing).

Another marketing channel of the furniture-making industry in Taiwan is that from the manufacturers through retailers to consumers. About 32% of the interviewed furniture-making firms adapted this approach in distributing their products. The reason is that it was taken to be suitable for these manufacturers to sell their products

directly to consumers because of their locational limitations. These manufacturers usually consigned the sale of their products to some retail stores or supplied the retailers with their products on a contract basis, thus making the sale of their products to consumers through retailers.

Still another marketing channel is from the manufacturers via wholesalers, retailers and then to the consumers eventually. The results of the 1974 survey indicated that only about 13% of the interviewed furniture-making firms took this approach to distribute their products. This was because some of the small firms had no professional personnel to conduct the marketing of their products by themselves or they had no experience to do so, or they had no such abilities as to establish their own retail stores or to do trade with retailers directly. For all of these, they must take advantages of the function of the wholesalers to buy their products in lot, or rely on the wholesalers and retail stores for the calling of their products to consumers.

Practically speaking, most of the interviewed manufacturing firms often adapted the above mentioned three marketing channels to distribute their products at the same time. They seldom took only one of these approaches for a long time. They usually followed one distribution channel only when they considered it favorable to their own particular situation.

If we divided the domestic markets into four regions such as North, Central, South and East and analysed on regional basis, then we find that almost all of the small scale manufacturers sold their products within the region in which they were located, and only those medium to large sized firms sold their products out of their own regions. According to the information collected in 1974 survey, only 15% of the interviewed firms marketed their products out of the region they located, and in fact the products manufactured and marketed by these medium to large scaled firms were mostly of high valued household and office furniture.

As far as the woodworking factories were concerned (Groups 5 and 6) only some of the interviewed firms were involved in selling products in domestic markets. About 16% of the firms in Groups 5 and 6 did their trade in the domestic market, and actually their business in domestic markets constituted only a small fraction of their total sales. Therefore no further analysis of them is made.

Foreign Markets

The results of analysis of the woodworking and furniture-making industry in Taiwan indicated that the sale of products was highly dependent on the foreign markets. According to the statistics of production and value of export, the value of exportation by this industry took over more than 70% of the total sale of the industry,

and furthermore its sales were overly concentrated in the markets in North America (see Table 24). For example, one newspaper article reported that about 2% of the total value of U.S. importation of furniture products and furniture parts in 1970 was accounted for by Taiwan's furniture products (including metal furniture). Unfortunately most of these furniture products were again of low or at best medium grade as compared with other furniture products from other supplying countries.

In viewing of this fact, it appears that these Taiwan-made furniture products had no real position in the U.S. furniture import markets. The capacity of U.S. furniture import markets was great. The U.S. furniture importation had many sources of supply, and still further the markets were under drastic competition. Therefore, on the demand side, the elasticity of demand for Taiwan-made furniture products was high. On the other hand, the woodworking and furniture-making industry in Taiwan depend too heavily on the U.S. import markets, therefore the elasticity of supply of Taiwan-made furniture products was extremely low. It had no flexibility. Consequently, whenever there was a slight change of demand for Taiwan products in the foreign markets, it had a great effect on the woodworking and furniture-making industry in Taiwan.

For instance, under the impact of the worldwide economic recession in 1974, there was a great reduction of demand for Taiwan products in the U.S. import markets and, because no

orders from foreign buyers come again, manufacturers in Taiwan accumulated their inventory stock and the pile up over-produced products overloaded warehouses. As a result, the great numbers of manufacturing firms, small and large alike, tried hard to adapt various measures to compete with each other, such as price wars among the small or large workshops and factories. Under this keen competition, some firms closed their factories and turned their exportation business to domestic markets and this made the situation much worse for the industry as a whole. And it seemed that they jumped out of the frying pan into the fire, eventually if affected the equilibrium of domestic markets very drastically.

The elasticity of supply of Taiwan-made woodworking and furniture products was low because of many obvious reasons. Generally speaking, this was directly related to the firms themselves. For instance, the numbers of the small firms were many. Their scale of production was too small. Their organization was poor. They competed between each other only for the individual firm's own benefit. In other words, the coordination among the various firms was very poor. In addition, most of the woodworking and furniture-making firms that undertook exportation business usually manufactured their products solely on the basis of the statements listed on foreign buyers' orders. They seldom manufactured their products of their own design and specifications. In other words, most of the firms did not

have their self-design ready-made products for export. Very commonly each of the firms could only directly contact and do their business with a very few foreign buyers. On the contrary, one foreign buyer staying in a hotel could invite a lot of manufacturers or small experters to submit their quotation under heavy competition. In short, there was a complete buyer's market in Taiwan.

According to the results of 1974 survey, there were more woodworking and furniture-making firms engaged in trade in foreign markets than in domestic markets (exporting firms constituted 55% of the total number of firms interviewed in the 1974 survey). The ratio between the number of exporting firms and that of the firms undertaking business in domestic market was 1.25 to 1. If analysed on the basis of sale value, the proportion of export was much higher. In terms of value of sales, 85% of the interviewed firms involved in the export business, and particularly those firms in Group 6 of factories (miscellaneous products such as sewing machine cabinet, radio and television cabinet, baby and juvenile furniture and other wooden articles).

In the interview with various firms in 1974, it was learned that there were five different approaches in the marketing of products to foreign countries:

(1) The first marketing channel sales in foreign markets via overseas sale agents to foreign middlemen. Less than 7% of the interviewed firms distributed their products in foreign

markets by this approach. The firms in this category were always those with abundant capital or asset in operation, large scale of production, and with self-design ready-made products. Because these firms were often easily accessible to the world markets, they had sufficient knowledge as to the information about supply and demand, and they were familiar with the tastes of the foreign consumers. Therefore, these firms had good coordination with their production and sale. Hence this was taken as the best distribution channel for those large scaled and best organized modern firms.

(2) The second marketing channel is that the manufacturing firms exported their products by trading with foreign importers' own purchasing personnel or agents stationed in Taiwan. Only 6% of the interviewed firms adapted this approach to distribute their products to foreign importers. The characteristics of this marketing channel is that the foreign importers' Taiwan-based purchasing agents could invite the manufacturing firms everywhere in Taiwan to submit quotation at anytime and could check the prices of products, supervise the production and control the delivery of products. By following this approach to sell products to foreign countries, usually the

manufacturing firms were unreasonably exploited during the time of economic recession or depression.

(3) The third marketing channel is that the manufacturing firms sold their products directly to the importers of foreign countries, then the foreign importers distributed their products to retailers or via processing plants or assembly plants then to retail stores. About 20% of the interviewed firms were in this category. This way of marketing products was under the situation of perfect competitive markets. Due to the heavy dependence of the concerned manufacturing firms on a very few importers of foreign countries these manufacturing firms always traded with no flexibility. On the contrary, on the demand side, the few foreign importers, with their large and well organized purchasing system and professional personnel, did their trade business with great flexibility. And in particular, during the time of economic recession or depression, or under the situation of institutional changes like the change of import duty or the devaluation of currency or the increase in shipping cost and so on, all these seriously caused adverse effects on the manufacturing firms with respect to their quantity of exportation, products prices, and above all, their competitive power in world markets.

(4) The most common approach was that manufacturing firms consigned their sale of products to exporters. Then the exporters traded with foreign importers in Taiwan or abroad, and finally the foreign importers distributed the products to retailers. Of those manufacturing firms that engaged in exportation, about 62% adapted this channel of distribution, especially those small to medium sized manufacturing firms. Under this type of marketing channel exporters were in a controlling position by contacting with importers in foreign countries and having many manufacturing firms under their control at home. In other words, the exporters were at the oligoposony position. Generally speaking, the exporting country might be in a better and active position in term of trade, however, due to the great number but very small scale of the most trading firms in Taiwan. Very commonly, they were operated by one family with only one telephone and two or three persons. Their trading areas were very limited and too concentrated and they had very little foreign market information on hand. These kinds of shortcoming and bottle necks in the development of the woodworking and furniture-making industry and the exploitation of foreign market must be overcome by the joint effort of both the manufacturers and the trading firms in order

to build up an efficient distribution system and to expand the export business.

(5) The fifth channel is that the manufacturing firms established their own exhibition room or consigned to retailers in some special locations in Taiwan. By this way the manufacturers sold their products directly to some resident aliens and overseas chinese or other tourists during their staying or visit to Taiwan. This was quite a special feature of the marketing system in Taiwan. According to the China Credit Information Service, about 3% of firms followed this distribution channel in the marketing of their products. Notably in this aspect, the members of American Armed Forces or other resident aliens, or the overseas chinese or some tourists as well, upon their returns to their home countries, wanted to take some pieces or sets of woodworking and furniture products with them. In doing it this way, they were not only free of tax but also saved shipping cost.

Besides the analyses and discussions on the marketing channels and the number of firms in each category, the analyses of the 1974 middlemen with whom the manufacturing firms usually contacted. Table 28 showed the results of the analysis.

Table 28. Proportion of firms conducting trade practices with different numbers of buyers, 1974.

Group of factory	Exporter buyers			Foreign importer buyers			Wholesaler buyers		Retailer buyers	Consumer buyers		Total
	1	2	3+	1	2	3+	1-2	3+	3+	1-6	7+	
	(Percent)											
Group 1		3	14			26	1	1	33		22	100
Group 2			5					6	33		55	100
Group 3						1		17	17		66	100
Group 4		28				32			20		20	100
Group 5	1	6	56	10	5	22						100
Group 6	21	12	47		6	7				3	4	100
All Factories	5	6	26	2	2	16	-	2	19	-	22	100

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IMPACTS OF ECONOMIC RECESSION

Ever since the great inflation and the economic crisis resulting from the oil embargo of the Organization of Petroleum Exporting Countries (OPEC) in the beginning of 1974, the woodworking and furniture-making industry encountered a very bad year in both the foreign markets and the domestic markets. As a result of economic recession, the manufacturing firms had no way to obtain orders from foreign buyers. Consequently, some plants shut down completely, many others curtailed their production scale and discontinued the employment of many staff members and workers. On the average, each interviewed factory employed about one-fourth less employees in production in 1974 than in 1973. In 1973 each firm employed 64 staff and workers while in 1974 the average dropped to 47 persons. That meant a reduction of 25% of employees because of the impact of economic recession, and this was only the case for the factories still in operation. If analyzed on the basis of a broad classification of the interviewed firms, in other words, if factories of Groups 1 to 4 were combined as furniture-making firms and factories and Groups 5 and 6 combined as woodworking firm, then the number of employees per firm in time of operation in 1973 and 1974 can be tabulated as in Table 29 to show the impacts of 1974 economic recession.

In 1973, the average firms employed a staff of 6 persons and 58 workers, for a total of 64 persons in operation.

Table 29. Average number of employees per firm in 1973 and 1974

Table 29. Average number of employees per firm in 1973 and 1974.

Assets in operation (NT $1000)	Year	Number of employees								
		Furniture-making			Woodworking			All factories		
		Staff	Labor	Total	Staff	Labor	Total	Staff	Labor	Total
< 100	1973	1.0	12.1	13.1	1.5	11.4	12.9	1.1	11.9	13.0
	1974	1.1	8.0	9.1	1.5	8.3	9.8	1.2	8.1	9.3
100 - 499	1973	3.2	30.1	33.3	4.8	53.3	58.0	3.9	40.3	44.2
	1974	3.1	25.6	28.7	4.5	24.3	28.8	3.7	25.1	28.8
500 - 999	1973	4.3	41.1	45.4	13.1	50.1	63.8	7.6	44.6	52.2
	1974	3.9	28.3	32.2	4.3	34.6	38.9	4.0	32.2	36.2
1,000 - 4,999	1973	14.5	134.1	148.6	5.9	65.2	71.1	9.7	95.6	105.3
	1974	13.1	94.5	107.6	4.7	49.7	54.4	8.3	69.1	77.4
5,000 - 9,999	1973	11.8	266.8	278.6	14.3	142.3	156.6	13.2	204.6	217.8
	1974	12.9	136.0	148.9	12.7	119.1	131.8	12.8	128.7	141.5
10,000+	1973	20.0	152.4	172.4	11.4	128.6	140.0	14.6	137.5	152.1
	1974	22.3	153.0	175.3	11.6	126.2	137.8	14.6	136.2	151.8
Average	1973	5.0	55.3	60.3	6.9	65.3	70.4	5.7	58.4	64.1
	1974	4.9	39.2	44.1	5.4	47.1	52.5	5.1	42.2	47.3

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But in 1974, due to the great inflation and economic recession, the average numbers of employees per firm dropped to 47, or only about 74% of the employment of 1973. Actually, the impacts of economic recession were far more serious than the situation of employment mentioned above, because these data do not include the figures for those factories shut down completely because of economic recession.

The 1974 economic recession had the greatest impact on firms engaged in exportation of their products, especially those woodworking factories with small amount of capital and medium or small scale production. As far as the very small old-type and family-run workshops or furniture-making stores were concerned, the economic recession had least impact on them. Their products were produced solely for the domestic market. On the other hand, the economic recession had various degrees of impact on those firms with large capital investment, large scale of production, and modern equipment and professional management. Generally speaking, all of them were affected by the impact of economic recession in some degree, however, comparatively they encountered less difficulties than the medium or small scaled poorly-organized factories. And not surprisingly, some exceptional cases could also be found. For example, a few modern factories with sufficient capital, professional personnel and scientific management had good performance during the time of economic recession. They claimed that they could stand in better position to shire qualified employees and skillful

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craftsman than before the economic recession. This was because the large scale firms with professional personnel in charge of each department in production and marketing, abundant capital and modern equipments, could take the economic recession impact to some high degree. If the period of economic recession last not too long, they could still manage their business freely under some difficulties caused by economic recession.

Small to medium sized firms obviously could not take such impact of economic recession. During the 1974 survey, it was often found that those small or some medium sized factories were usually owned by three or four or several partners and managed by themselves and their relatives or friends. In fact, these owners and managers were commonly former workers or foremen of some other large firms. These former foremen wanted to be a boss or president themselves and wanted to establish their own factories without consideration about their qualification and personal ability. During the period of economic boom and harvest year of export for the woodworking and furniture-making industry they did well. Thenceforth, they expanded their factory blindly by buying more plant sites and woodworking machinery, and by hiring more labors for their factory. But practically and really, they had no way to manage the expended and much complicated firms consisting of several departments and more workers and staff members than before. At least, they could not stand up still and take the impact of

economic recession easily. Truly speaking, if the period of economic recession lasts long, and if they did not thoroughly improve their organization and management for modernization, most probably they could not escape from the way of bankruptcy.

The above analysis was only on the basis of changes in employment before and under the impact of economic recession. In fact, it is possible to analyze the impact of economic recession on the woodworking and furniture-making industry from another angle. For instance, from the analysis of the degree of the use of productive capacity in various plants one can also measure the impact of economic recession on this industry. If, for our convenience, we reclassified the firms into four broad groups according to markets served (exporting firms were taken to be those producing more than 70% of their products for export) and if we analyzed the impact of economic recession on the degree of use of productive capacity in 1973 and 1974 accordingly, then, the results of analysis could be tabulated as in Table 30.

In 1973, over 80% of the productive capacity was used at various plants, while in 1974 the various factories used their plant productive capacity less than or at most up to 40-60%. This indicated that a 25% drop in the plant productive capacity being used in 1974 versus in 1973. The reduction in the use of productive capacity was most serious in the case of "other" woodworking factories (Group 6), the

Table 30. Number of firms using their productive capacity in 1973 and under economic

Table 30. Number of firms using their productive capacity in 1973 and under economic recession impact in 1974*.

Percentage of capacity of use	Groups 1, 2, 3 and 4				Group 5		Group 6	
	Producing mainly for export		Producing mainly for market					
	1973	1974	1973	1974	1973	1974	1973	1974
100%	7	1	16	10	5	4	9	4
80-99	9	1	8	1	3	1	11	2
60-79	10	8	13	4	4	4	14	7
40-59	1	8	5	12	4	4	2	4
20-39	1	8	2	11	-	2	2	10
20%	-	2	-	6	-	1	-	
No use	-	-	-	-	-	-	-	6
Average	82%	50%	80%	54%	78%	65%	80%	43%

*In this table, the analysis was based on information supplied by only 126 firms; the rest of the interviewed firms didn't response to the question about capacity in use.

same situation was true with the firms manufacturing their products for export. On the contrary, those firms of Group 5 (producing louver shutters, carved panel doors, etc.) were least affected. This was probably because these firms were usually large in size, better-organized, and managed by professional personnel.

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CHAPTER IV

UTILIZATION OF WOOD MATERIALS

In the previous chapter it was noted that the average cost of wood materials for interviewed firms lay between 35-50% of all costs. This indicates that the woodworking and furniture manufacturing firms certainly spent a lot of their working capital for wood materials every year. In this chapter, attempts will be made to find out what types of wood materials were usually used in production, what species were being selected and in what form they were purchased, where materials were obtained, what factors influenced decisions in the choice of wood materials, how stable was the wood supply market, and how was the utilization of plant residues and so on. All of these related problems will be discussed and analyzed separately in the following paragraphs.

WOOD CONSUMPTION

Island-wide wood consumption surveys had been carried in Taiwan for the years 1956, 1962 and 1967. Quantity and species of wood consumed by woodworking and furniture manufacturing firms and other wood-using industries like construction of mining could be found in those unpublished survey reports. Wood consumption in terms of cubic meters of log volume are summarized, based upon the original data of each of the survey in Table 31.

Table 31. Total wood consumption by the woodworking and furniture-making industry in selected years (Unit: log volume in cubic meters).

Year	Wood-working*	Furniture	Total	Remarks
1956	79,220	97,317	176,537	TFB 1956 survey, involving 353 furniture-making workshops
1962	46,668	92,153	138,821	TFB 1962 survey, involving 441 furniture-making workshops, 160 woodworking plants
1967	69,479	134,404	203,883	TFB 1968 survey, involving 300 furniture-making workshops

*Wood consumption by various woodworking plants includes wood used in manufacturing wooden slippers, shuttles, coffin, wood crafts, sport goods, wooden toys, musical instruments, and many other wooden tools and products.

In the 1972 survey on wood utilization and wood market conducted by TFB, 157 furniture-making workshops or factories were interviewed. The TFB analysis showed that on the average, wood consumption in terms of log volume per firm was about 235 cubic meters. Results of that survey are shown in Table 32.

According to the Report on Industrial and Commercial Surveys No. 5 published by Ministry of Economic Affairs,

Table 32. Wood consumption by 157 furniture-making firms interviewed in the 1972 TFB survey.

Region	No. of firms	Number of employees		Wood consumption of log volume in M^3				
		Total	Ave.	Conifer I	Conifer II	Plan-tation timber	Hardwood	Total
North	21	1,313	67	381	14,850	--	11,064	26,296
Central	41	274	7	500	438	--	1,353	2,290
South	89	518	6	2,040	295	67	5,592	7,994
East	6	39	6	84	141	--	48	274
Total	157	2,144	14	3,006	15,723	67	18,057	36,854

Source: Taiwan Forestry Bureau (1973): Survey on Wood Utilization and Market in Taiwan. JCRR-TFB Project.

there were 1,028 manufacturers of wooden furniture and fixture in 1972 (see Table 1). If we multiply the TFB survey result of an average wood consumption of 235 cubic meters per firm by 1,028 firms, the estimated total wood consumption of the furniture-making industry is 241,310 cubic meters. This is much higher than the TFB estimation based only upon the rate of growth of Taiwan population (an estimation of 124,926 cubic meters consumed by furniture-making industry in 1972). In fact, total wood consumption by manufacturing of wooden furniture in 1972 should be higher than the above two estimates. By referring to Table 13 in Chapter 3, it is evident that the TFB 1972 survey sampled most of the small furniture-making workshops. A total of 84% of the sampled furniture-making firms in TFB 1972 survey employed 9 or less workers in operation. Obviously, those furniture-making workshops chosen as samples in TFB 1972 survey were mostly very small in size of operation. Therefore, it can reasonably be believed that the average per firm wood consumption of 235 cubic meters per year computed from Table 32 is a very conservative or low figure. No other more actual estimate of wood consumption could be found for this study. The above estimate of 241,310 cubic meters was shown here for general purpose of reference only.

With a view to understand further the situation of the size of firms in respect to its consumption of wood materials, the original data of TFB 1972 survey was re-reviewed,

recomputed and re-analyzed. The final result of this analysis was tabulated as in Table 33.

Table 33. Average wood consumption per interviewed firm in 1972 TFB survey.

No. of employee (persons)	No. of firms	Total wood consumption	Average wood consumption per firm (log volume in m^3)
10	126	4,797	38
10 - 29	7	1,140	163
30 - 59	1	333	333
60 - 99	1	400	400
100 -149	2	5,300	2,650
150+	3+	24,700	8,233
Total	140	36,670	262

*One of these largest firms is a government operated woodworking factory. It employed 65 persons on staff and 670 workers, and it consumed 16,500 cubic meters of log annually.

In the 1974 survey, only 72 of the interviewed firms responsed to the questions about wood materials consumption. Based upon the information collected from the 72 forms, analysis was made to show the situations of wood consumption in respect to different factory sizes. The results are tabulated in Table 34. Medium to large sized factories of the 72 interviewed firms consumed, on the

average, more than three thousand cubic meters of various wood materials (log volume) per firm in a year. And in particular, some of the large-sized modern types of factories, such as those factories of Group 5, consumed several ten thousand cubic meters or more of various wood materials annually. Even those small-sized factories with a labor force of less than ten workers in operation also had an annual average amount of wood consumption of 130 cubic meters per firm. These data indicated that factories established in recent years were mostly of modern type with a number of pieces of machinery, and these firms usually consumed much more wood materials annually than those old types and family-owned small workshops as interviewed in the 1972 TFB survey.

Table 34. Average wood consumption per interviewed firm.

No. of employee (persons)	No. of firms	Total wood consumption	Average wood consumption per firm (log volume in m^3)
10	9	1,167	130
10 - 29	23	9,216	401
30 - 59	18	11,745	653
60 - 99	10	9,032	903
100 -149	3	25,372	8,457
+150	9	172,686	19,187
Total	72*	229,218	3,184

*This analysis was based on 72 firms only, because other interviewed firms didn't response.

UTILIZATION OF WOOD MATERIALS

Wood materials utilized by woodworking and furniture manufacturers consisted of a variety of wood products. Some of the wood materials were in the form of log, others in the form of lumber of various dimensions or in the form of rough lumber of different species. And further, some of the wood materials were in the form of veneer, plywood (large-sized plywood for construction and many uses, and small sized plywood for furniture-making and musical instruments manufacturing), particleboard, or lumber core plywood (core board). The interviewed firms that purchased wood materials in the form of log usually consigned to the seller or other lumber mills the job of sawing the logs into lumber of various dimensions based on the firm's need. It was also common that the interviewed firms purchased wood in the form of log and sawed in their own sawmill. However, most of the firms preferred to buy lumber of the needed dimensions.

Due to changes in style and product design in furniture manufacturing, because of the supply of wood products and the development of the industry in the past decade, the selected forms of wood products used in manufacturing in recent years were different from that in the past. Notably, plywood, being easily to use in processing and manufacturing, not expensive in price, and nice in appearance and so on, was very much welcomed by manufacturers recently. And the trend was that the use of plywood is still increasing. In

particular, lumber core plywood has been were widely used by many manufacturers lately.

Table 5 in chapter 3 showed that, of the products manufactured by those 176 firms interviewed in the 1974 survey, tables and chairs for household use constituted the highest proportion (22.8% of the total products produced in the year of 1973-1974. In contrast, cabinets, chest of drawers and wardrobes also for household use ranked second in proportion (15.9%). By examining the percentage distribution of the main products, it was possible to learn, generally speaking, about how much of the various wood materials were utilized to produce what kind and quantity of those products. The following paragraphs analyze what wood materials were often used by manufacturers, how much of the various kinds of wood products had been selected and used and in what percentage and of what species, and how were the differences in the selection of wood products between each group of factory. Results of analyses of the 1974 survey are tabulated in Table 35.

Information in Table 35 indicates that the wood materials principally used by Taiwan's woodworking and furniture-making industry are not Taiwan's native timber products. On the contrart, most part of the wood materials in use in manufacturing were imported from several Southeast Asian countries, such as lauan and lamin from the Philippines, Indonesia and Malaysia, or teak from Thailand. Lumber of various timber species, imported wood and native timber

Table 35. Proportion of wood products consumed in woodworking and furniture manufacturing, 1974.

Group of factory	Lumber					Hardwood plywood	Other wood materials [2]	Total
	Taiwan conifer	Taiwan hardwood	Imported lauan [1]	Imported ramin	Teak			
	(Percent)							
Group 1	5.8	16.1	17.1	22.6	13.6	17.2	7.1	100
Group 2	6.8	12.0	14.1	24.3	10.7	23.0	11.8	100
Group 3	6.2	15.4	11.9	10.6	20.0	23.7	12.3	100
Group 4	4.3	17.5	16.4	24.4	6.7	21.9	8.8	100
Group 5	4.3	8.2	48.0	29.5	4.2	5.8	----	100
Group 6	5.1	12.7	24.0	22.8	1.5	31.2	2.7	100
All factories	5.4	13.8	19.5	22.4	9.6	21.7	7.6	100

1) Includes lumber core plywood.
2) Includes various rough lumber.

taken together, always accounted for more than two-thirds of consumption. Plywood, made of imported hardwood, was also widely used in large scale. On the other hand, lumber made from native hardwood and conifer accounted for only less than 20%. Evidently, the situation of principal use of native timber in furniture-making as was prevalent in the past had changed completely. In recent years, imported timber had taken the place of native wood of the past and became the dominant and most basic wood materials for the development of Taiwan's woodworking and furniture-making industry. In the same time, use of lumber of various dimensions in furniture-making in the past was also commonly substituted partly by new types of wood products such as plywood, lumber core plywood (or core board) and other wood materials including veneer, particleboard and so on.

Domestic Versus Imported Timber in Use

The results of the 1974 survey indicated that the utilization of various wood materials in the manufacturing of woodworking and furniture products was different from the results of wood consumption surveys conducted by TFB in 1963 and 1968. It was also different from the situation of wood use in the furniture-making firms interviewed in TFB 1972 survey on Wood Utilization and Market Condition. In order to be able to have a deeper understanding about the relative importance of domestic timber versus imported wood

in the development of Taiwan's woodworking and furniture-making industry, and for the purpose of investigating the utilization of various wood materials used in the making of woodworking and furniture products as well as the changes of wood utilization in this industry of the past, an analysis was made on the basis of the information reported in 1963 and 1968 surveys, and the original data of 157 furniture-making firms involved in TFB 1973 investigation. The results of analysis is given in Table 36.

In 1962, domestic timber played an absolutely dominant role (95% of consumption) in woodworking and furniture manufacturing. The situation of wood utilization changed not much until 1967 (91%). Since after, as the new type and medium to large sized modern factories were established, lauan and other wood materials imported from southeast Asian countries were used extensively and increasingly. In the wood utilization and market survey conducted by TFB in 1972, there was a large government operated woodworking factory involved in the sample, and furthermore, this large factory consumed the most quantity of wood annually (16,500 cubic meters, mainly of Taiwan conifer class II). On the other hand, those other firms included in the 1972 samples were mostly small, family-run furniture workshops. As a result, the figure of the 1972 sample investigation indicated that native timber seemed to play a dominant role in wood-working and furniture manufacturing (61% as compared with 39% for imported lauan). But truly speaking, this would not

Table 36. Domestic and imported timber used in woodworking and furniture manufacturing in selected years.

	1962[1)]	1967[1)]	1972[2)]
Woodworking			
Taiwan conifer			
cubic meters		13,057	5,683
percentage		28	8
Taiwan hardwood			
cubic meters		31,041	63,274
percentage		67	91
Lauan			
cubic meters		2,570	522
percentage		5	1
Furniture-making			
Taiwan conifer			
cubic meters	49,828	48,191	18,671
percentage	54	36	50
Taiwan hardwood			
cubic meters	38,613	69,051	3,997
percentage	42	51	11
Lauan			
cubic meters	3,712	17,162	14,647
percentage	4	13	39
Total			
Taiwan conifer			
cubic meters	62,885	53,874	18,671
percentage	45	26	50
Taiwan hardwood			
cubic meters	69,654	132,325	3,997
percentage	50	65	11
Lauan			
cubic meters	6,282	17,684	14,647
percentage	5	9	39

1) Figures in 1962 and 1967 are total timber volumes consumed by woodworking and furniture-making industry (log volume in m^3).
2) Figure in 1972 is timber volume consumed by the sampled 157 furniture-making firms. One of the firms is a government operated factory consuming 16,500 cubic meters of timber annually (in which 90% or 14,850 m^3 is conifer II).

be the real situation. On the contrary, the relative importance of domestic versus imported timber might have a reverse order if the large government operated factory was excluded from the sample.

As we learned from Table 35, the result of the 1974 survey showed a quite different picture. Because the interviewed firms in the 1974 survey were mostly recently established medium or small sized modern factories, and relatively the largest factories and the smallest sized family-run workshops were less in number in the sample, so the result of this investigation showed that imported timber constituted the principal part of wood materials consumed in manufacturing, and this indicated also the fact of high dependence on imported timber in the development of this industry. Particularly, those factories in Groups 5 and 6 (factories manufacturing louvered shutters, carved panel doors, radio and TV cabinets, sewing machine cabinets, billiard tables, gun shelf and kitchen wooden tools, etc.) used mostly, even though not exclusively, the wood materials imported from southeast Asian countries.

Use of Wood in Furniture Manufacturing

In the last sections, analyses and discussions emphasized the proportions of domestic versus imported timber consumed by woodworking and furniture-making industry, and the relative quantity of lumber, plywood and rough lumber.

However, nothing was yet mentioned about the popularity of various wood products used by different groups of factories. For the purpose of understanding the generality and relative weight of each kind of wood products in use, a further and detailed analysis was again made on the basis of data collected in the 1974 survey. The results of analyses for each of the 6 Groups of factories are shown separately as in Tables 37-42.

Tree Species Utilized

This analysis of the wood materials of different tree species utilized in woodworking and furniture-making was directed at domestic timber only because tree species of imported timber was several in number, mainly lauan, lamin and teak. Species of native timber commonly used for woodworking and furniture-making were at least several ten in number, although the quantity of some species was very limited. According to the information collected in 1962, 1967 and 1974 surveys, the percentage distribution of various species groups were recorded as in Table 43.

Forms of Wood Materials

If the firms purchased wood materials in the form of log, and if they did not have their own lumber mill or lumbering department and did not have their own drying facilities, usually they consigned to the sellers the job of sawing

Table 37. Number of factory of Group 1 using various wood products in manufacturing, 1974.

Percentage of wood products consumed	Lumber					Hardwood plywood	Other wood materials 2)
	Taiwan conifer	Taiwan hardwood	Imported lauan 1)	Imported ramin	Teak		
	(Number of firms)						
1-10%	3	7	7	2	6	14	6
10-20	6	6	7	4	5	10	3
21-30	1	9	10	3	4	8	-
31-40	-	6	5	2	2	5	1
41-50	-	3	2	-	4	5	-
51-60	-	-	1	-	1	3	-
61-70	-	-	1	1	1	1	-
71-80	-	1	-	1	-	-	2
81-90	-	1	1	2	2	-	-
+90%	3	2	2	2	3	-	-
Total	13	35	36	17	28	46	12

1) Includes lumber core plywood.

2) Includes various rough lumber.

Table 38. Number of factory of Group 2 using various wood products in manufacturing, 1974.

Percentage of wood products consumed	Lumber					Hardwood plywood	Other wood materials 2)
	Taiwan conifer	Taiwan hardwood	Imported lauan 1)	Imported ramin	Teak		
	(Number of firms)						
1-10%	1	4	6	3	5	9	8
11-20	8	8	8	2	3	9	2
21-30	1	3	6	1	8	9	2
31-40	3	5	3	-	2	7	-
41-50	2	1	4	-	2	7	-
51-60	-	-	3	1	-	2	-
61-70	1	-	1	1	1	-	-
71-80	-	1	-	1	-	-	1
81-90	1-	-	-	2	1	-	-
+90%	2	-	1	2	-	-	-
Total	19	22	32	13	22	43	13

1) Includes lumber core plywood.

2) Includes various rough lumber.

Table 39. Number of factory of Group 3 using various wood products in manufacturing, 1974.

Percentage of wood products consumed	Lumber					Hardwood plywood	Other wood materials 2)
	Taiwan conifer	Taiwan hardwood	Imported lauan 1)	Imported ramin	Teak		
	(Number of firms)						
1-10%	1	2	2	-	2	3	2
11-20	4	3	2	1	-	3	1
21-30	-	5	4	2	1	3	1
31-40	1	2	1	-	-	2	-
41-50	1	2	-	-	2	1	-
51-60	-	-	-	-	1	3	-
61-70	1	-	-	-	-	-	-
71-80	-	-	-	-	-	-	-
81-90	-	-	-	-	1	-	-
+90%	-	1	-	-	-	-	-
Total	8	15	9	3	7	15	4

1) Includes lumber core plywood.

2) Includes various rough lumber.

Table 40. Number of factory of Group 4 using various wood products in manufacturing, 1974.

Percentage of wood products consumed	Lumber					Hardwood plywood	Other wood materials 2)
	Taiwan conifer	Taiwan hardwood	Imported lauan 1)	Imported ramin	Teak		
	(Number of firms)						
1-10%	-	4	5	3	3	3	6
11-20	2	1	6	-	2	4	3
21-30	-	3	3	1	2	2	-
31-40	2	-	-	2	1	2	-
41-50	2	1	-	-	-	4	-
51-60	-	-	-	-	-	1	-
61-70	-	-	-	-	-	-	-
71-80	-	-	-	1	-	-	-
81-90	-	-	-	1	1	-	-
+90%	1	2	-	-	1	-	-
Total	7	11	14	8	10	16	9

1) Includes lumber core plywood.

2) Includes various rough lumber.

Table 41. Number of factory of Group 5 using various wood products in manufacturing, 1974.

Percentage of wood products consumed	Lumber					Hardwood plywood	Other wood materials 2)
	Taiwan conifer	Taiwan hardwood	Imported lauan 1)	Imported ramin	Teak		
	(Number of firms)						
1-10%	-	-	1	1	1	3	-
11-20	-	-	-	2	-	2	-
21-30	1	-	-	2	-	-	-
31-40	1	-	-	3	-	1	-
41-50	-	-	2	-	-	-	-
51-60	-	-	2	-	-	-	-
61-70	-	2	1	-	1	-	-
71-80	-	-	1	1	-	-	-
81-90	-	-	2	1	-	-	-
+90%	-	1	2	1	-	-	-
Total	2	3	11	11	2	6	-

1) Includes lumber core plywood.

2) Includes various rough lumber.

Table 42. Number of factory of Group 6 using various wood products in manufacturing, 1974.

Percentage of wood products consumed	Lumber					Hardwood Plywood	Other wood materials 2)
	Taiwan conifer	Taiwan hardwood	Imported lauan 1)	Imported ramin	Teak		
	(Number of firms)						
1-10%	3	4	7	3	-	9	3
11-20	3	2	5	3	-	6	2
21-30	3	3	3	4	1	6	1
31-40	1	2	4	2	-	-	-
41-50	1	3	2	1	-	6	-
51-60	1	2	4	2	-	1	-
61-70	-	-	3	-	-	2	-
71-80	-	1	1	3	-	-	-
81-90	-	-	3	3	-	3	-
+90%	-	5	4	3	-	2	-
Total	12	22	36	24	1	35	6

1) Includes lumber core plywood.

2) Includes various rough lumber.

Table 43. Proportion of timber species groups utilized by woodworking and furniture-making firms in 3 sample surveys.

Species group	1962 Survey		1967 Survey		1974 Survey[1)]	
	Furniture	Woodworking	Furniture	Woodworking	Furniture	Woodworking
Cypress	42.1%	20.0%	28.0%	4.6%	5.2%	0.9%
Cedar	1.3%	0.5%	0.6%	0.2%	---	---
Spruce-fir	---	---	0.3%	---	0.4%	0.1%
Hemlock	4.6%	0.2%	5.7%	0.2%	4.4%	2.1%
Pine	1.1%	0.9%	0.4%	---	0.3%	1.0%
Other Conifer	3.7%	1.3%	0.5%	1.4%	0.2%	---
Chinese and Japanese fir	1.3%	5.2%	0.5%	1.4%	0.2%	---
Machilus	20.5%	4.5%	28.6%	20.6%	12.5%	2.5%
Guger-tree	---	---	---	---	1.1%	0.4%
Alder	---	---	---	---	1.3%	4.4%
Achefflera-Trema	2.5%	14.7%	6.1%	0.8%	0.2%	0.6%
Michelia	1.5%	0.1%	1.5%	---	1.1%	---
Camphor-Zelkova	2.1%	2.1%	8.2%	2.1%	0.3%	1.9%
Other Hardwood	14.1%	45.1%	7.0%	68.6%	3.8%	6.7%
Teak	1.2%	---	---	---	13.5%	2.8%
Lauan	4.0%	5.5%	12.8%	0.8%	22.6%	35.7%
Ramin	---	---	---	---	12.2%	22.2%
Hardwood Plywood	---	---	---	---	20.8%	18.7%

1) In the 1974 survey, furniture-making firms included factories of Groups 1 to 4, and woodworking firms included factories of Groups 5 and 6.

the logs into needed lumber with desired specifications. They might also consign to the sellers or other drying kilns the job of drying wood materials before delivery to their factories. If the manufacturers had their own facilities for lumbering and drying, they usually completed these processes themselves but may also consign some of their milling and drying work to others when necessary.

Most or all of the interviewed manufacturers said that all the wood materials they used had been dried, mostly in kilns. Table 44 shows the different manners of timber seasoning by the 177 firms interviewed in the 1974 survey.

Table 44. Number of factories using different methods of timber seasoning in 1974.

Firms	Kiln drying			Air seasoning
	Self-operated	Consignment	Self and consignment	
Number	5	52	54	66
Percent	3	29	31	37

Sources of Wood Supply, Prices and Availability

Most of the wood materials used by interviewed factories was purchased from a local lumber mill, wholesaler or middleman. Some of the large firm imported their own wood materials from southeast Asia. Some purchased native timber from the Taiwan Forestry Bureau or other forestry agencies,

but only relatively small quantities. About 87% of the firms interviewed stated that they purchased their wood materials from local lumber mills and middlemen or from sources in nearby countries. About 11% of the firms imported their wood materials themselves, and only 2% of the firms directly purchased their wood materials from government forestry agencies.

The above mentioned was the overall general situation of the sources of timber supply for the woodworking and furniture-making industry based upon the information of the 1974 survey. Actually, in counting the number of firms, consideration had been given to the volume of purchase from different sources of wood supply, weighted volumes were used to make the count. For the purpose of further understanding the percentage distribution of various sources of supply, an analysis was made simply by counting the number of firms purchasing their wood materials from different sources but by different proportion. The results of this analysis is given in Table 45.

Table 45 indicates that most the interviewed manufacturers purchased their wood materials principally from the local lumber mills, wholesalers or middlemen, usually in the same area or in other neighboring counties or towns. Comparatively speaking, a few firms purchased a part of their wood materials from some forestry agency. And in particular, a number of large firms, more recently, imported their own wood materials from foreign countries, mostly from southeast Asia.

Table 45. Number of firms buying wood materials from different sources of timber supply in 1972 and 1974.

Percent purchased	1972 TFB survey			1974 survey		
	Middlemen	Self import[1]	Forestry agency[2]	Middlemen	Self import[1]	Forestry agency[2]
1-10%	1	1	3	2		1
10-19		1	1		2	1
20-29			1	1	1	1
30-39			1			1
40-49	1			4		1
50-59			1	3	2	2
60-69	2			2	1	1
70-79	1			1		
80-89			1	2		
90-99	4			1	2	
100	136		1	147	12	1
Total	145	2	9	163	20	9

1) Some factories obtained their wood materials from their own lumber mill or from the agency they belong to. If the plant or factory was an independent establishment of a large firm and the large firm imported its own wood materials from foreign countries, then the source of wood supply of the said independent plant or factory was taken to be self imported.

2) If the factory was one subordinate unit of a forestry organization and wood materials were supplied by the mother forestry organization, then it was taken as buying its wood materials from forestry agency.

Timber prices have changed very greatly in the last few years. It was generally understood that if the increase in prices of wood materials was higher than the relative prices of other substituting materials, and if other things being equal, then, wood materials usually used by manufacturers might be substituted for by other less expensive but equally usable materials. According to Mr. Jen's (20), low-income families usually purchase low grade, inexpensive wooden furniture, and people often regarded low class wooden furniture as a kind of inferior good. Accompanying Taiwan's economic growth and steady increase in per capita income, probably, wooden furniture and particularly low grade wooden furniture would be substituted gradually by metal furniture. From this fact, we learn that if the prices of wood materials increased much higher than the relative price of substituting materials, eventually, the problem of substitution of other materials for wood products in the manufacturing of woodworking and furniture products might occur. Even the different wood products will substitute for each others if there is much changes in their relative prices. Because the cost of wood materials constituted a very large part of total cost of woodworking and furniture-making, and because the price of wood materials played the most important role in the selection and purchase of wood products, and still further, the changes in price of wood products affected the future supply of wood materials, therefore there was a great need to understand more sufficiently the price and price changes of various wood materials.

Table 46 shows the statistics of wood price published by TFB in the last few years. Within the three years period from the first quarter of 1972 to the last quarter of 1974, the average prices of machilus, schefflera and other native hardwoods more than double, while the price of lauan, whether in the form of log or lumber, rose only about 50%. Besides, imported lauan had some merits such as large size, easy machine operation, and sufficient supply, for use as a raw material for woodworking and furniture manufacturing. Native hardwoods were of many species, generally of low quality. The quantity of supply of each species or species group was also too small, and furthermore, price varied much more than the relative price of other timber species. As a result, most of the woodworking and furniture manufacturers recently preferred to use imported lauan, lamin and other imported wood instead of native timber in the manufacturing of their products.

The native hardwoods mostly commonly used as raw material for woodworking and furniture manufacturing, were more than ten in number. However, because these many species were often found scattered in natural and poor subtropical mixed hardwood forests, the quantity of supply of each species was very small, quality was poor, machinability and treatment in wood seasoning was difficult. Each species had its own special properties, consequently, neither the control of quality of products made from these species nor the sufficient and constant supply of these raw materials

Table 46. Wholesale prices of selected timber products in Taiwan, 1972-1974 (In NT thousand dollars per cubic meter).

Species	Specifications	1972				1973				1974			
		Mar.	June	Sept.	Dec.	Mar.	June	Sept.	Dec.	Mar.	June	Sept.	Dec.
Logs 1)													
Taiwan Cypress	L 3-5 m. D40-60 cm.	4.4	4.9	5.3	10.5	9.6	8.7	8.9	10.2	10.4	9.5	9.0	7.6
Red Cypress		3.6	3.8	4.1	7.7	7.1	6.7	7.1	8.1	8.5	7.8	7.2	6.2
Hemlock		1.5	1.5	1.6	2.5	2.2	2.4	2.5	3.3	4.1	3.2	2.9	2.5
Machilus	L 3-5 m. D30-50 cm.	1.1	1.1	1.2	1.3	1.3	2.0	2.1	2.4	2.8	2.5	2.4	2.2
Schefflera		----	1.2	1.3	1.5	1.5	1.9	2.2	2.6	3.1	2.8	2.7	2.5
Oak	L 3-5 m. D30-50 cm.	1.1	1.1	1.2	1.3	1.3	1.7	1.8	2.2	2.6	2.3	2.3	2.0
Chinkapin		1.1	1.2	1.3	1.4	1.4	1.8	2.0	2.4	2.9	2.5	2.4	2.2
Other Hdwd.		.9	.9	1.0	1.0	1.1	1.4	1.6	1.9	2.3	1.9	1.8	1.7
Lauan	General	1.3	1.0	1.1	1.2	1.8	2.3	2.3	2.7	3.1	2.4	2.1	1.8
Lumber 2)													
Conifer I Rough	L 3-4 m. W&T 10.5cm.	5.2	5.7	5.5	10.9	9.9	9.5	9.8	13.6	16.2	13.8	13.4	11.1
Conifer I Door sash	General	6.7	7.1	7.5	14.6	13.2	12.7	13.6	17.1	19.1	17.9	15.5	13.0
Window sash		5.1	5.6	5.8	11.5	10.0	9.5	9.7	13.1	14.5	13.8	12.5	10.9
Conifer II Rough	L 3-4 m. W&T 10.5cm.	2.4	2.5	2.6	3.8	3.9	4.4	4.7	6.1	6.8	6.3	5.2	4.5
Conifer II Door sash	General	3.0	3.0	3.0	4.7	4.6	5.1	5.0	6.5	7.5	7.0	5.7	4.8
Window sash		2.8	2.8	2.9	3.9	4.3	4.7	5.0	6.0	7.4	6.5	4.8	4.5
Lauan	General	2.6	2.5	2.5	3.1	3.7	3.8	4.3	4.8	5.5	5.0	4.4	4.0

Sources: Taiwan Timber Journal, Volumes 4, 5 and 6, various numbers and Taiwan Forestry Journal, Volume 1, various numbers.

1) All of medium quality except lauan, which is common quality.

2) Conifers I and II are medium quality, lauan common quality and all others high quality.

could be handled easily at the manufacturers' disposal. Therefore, during the stage of establishment of a new plant, the firm owner usually considered using imported lauan or lamin as the basic required raw materials for their factory.

Taiwan native conifers were used only for some special occasions because the price of native conifer was pretty high. In fact, the utilization of native conifers in woodworking and furniture manufacturing had been much reduced in recent years. According to the Taiwan Forestry Bureau, the quantities of some principal species of native timber suitable and available for woodworking are as shown in Table 47.

Timber importation from southeast Asian countries had great effect on the development of the plywood and woodworking industry in Taiwan. As stated in chapter two about the background and stages of development of the woodworking and furniture-making industry, the plywood industry always dominated the others as the most important and the leading industry in the early stage of the development of Taiwan's wood-based industries. Later on, some of the plywood factories developed a method to make lumber core plywood. From lumber core plywood they manufactured panel doors or windows, or they manufactured knock-down type furniture or furniture component parts. Very fortunately, they succeeded in exporting these products and earned some money. Due to economic incentives and the stimulations from successful exportation, some plywood companies established subordinate plants to manufacture furniture by using wood core, and

Table 47. Domestic timber production available for supplying the woodworking and furniture-making industry, 1971-1974.

Species group	1971	1972	1973	1974
		(In cubic meters)		
Taiwan conifer				
Taiwan cypress	192,663	169,096	157,775	130,312
Red cypress	108,104	110,189	94,471	104,851
Cedar	114	50	489	688
Hemlock	136,737	127,321	111,662	100,257
Spruce-fir	24,873	21,278	23,501	38,884
Taiwania	6,256	704	2,341	737
Pine	27,866	28,825	31,333	38,585
Taiwan hardwood				
Michelia	4,084	3,311	2,033	2,444
Zelkova	3,014	1,823	1,098	1,257
Teak	10,992	8,882	6,439	3,652
Camphor	13,292	6,049	6,735	6,839
Machilus	91,049	81,624	74,394	72,774
Oak spp.	100,882	62,902	61,914	81,292
Guger-tree	6,919	6,285	13,521	4,937
Alder	402	1,030	779	5,385
Other hardwood	190,226	201,174	210,188	204,306

furthermore, many new factories of small size were also established to manufacture knock-down type or folding type furniture or furniture parts, principally using wood core as raw material. Since after, the woodworking and furniture-making industry gradually developed from old-type family-run small workshops to small plants, and eventually and rapidly developed to small to medium sized and well organized modern factory. All of this indicates once again that imported timber from southeast Asian countries had great effects on the development of the woodworking and furniture-making industry in Taiwan.

The quantity and value of importation of timber from southeast Asia increased very rapidly in the last decade. For instance, the volume of imported lauan (including lamin and other hardwood species) increased 26 times in the past 14 years, from 137,567 cubic meters of log in 1959 up to 3,694,885 cubic meters in 1973. The same was true for teak. In 1959, Taiwan imported only 53 cubic meters of teak. Imported teak increased to 4,270 cubic meters in 1972, equivalent to an increase of 80 times during the 13 year period (Table 48).

Practically speaking, imported lauan was mostly utilized for plywood production, and only a part of it was used as raw material for woodworking and furniture manufacturing. On the other hand, almost all of the imported teak were utilized by woodworking and furniture-making industry. Due to the lacking of detailed information on the utilization of imported teak

Table 48. Quantity and value of teak and lauan imported, 1959 to 1973.

Year	Teak		Lauan	
	Quantity (M^3)	Value (NT$1,000)	Quantity (M^3)	Value (NT$1,000)
1959	53	535	137,567	122,003
1960	100	1,149	161,066	128,291
1961	27	387	168,029	171,446
1962	762	4,734	275,958	312,128
1963	397	3,584	446,492	548,068
1964	383	3,334	562,307	669,812
1965	190	1,888	625,102	695,060
1966	1,204	11,388	691,878	822,428
1967	1,490	14,735	727,150	879,865
1968	641	5,302	1,090,141	1,351,987
1969	1,564	12,275	1,183,022	1,494,524
1970	3,776	28,544	1,489,298	1,901,347
1971	3,938	31,722	2,205,237	2,765,794
1972	4,270	27,253	3,503,803	4,123,411
1973			3,694,885	6,765,520

Sources: 1) Taiwan Timber Journal, Volume 1, No. 6.

2) China External Trade Development Council (1974): Timber Export of Southeast Asian Countries, CETDC Bulletin: Timber markets of raw materials No. 61-001.

3) Statistical Department, Chinese Maritime Customs: The Trade of China.

and the amount of imported teak was also small roughly we assumed that all of the imported teak is used for woodworking and furniture manufacturing. In respects to imported lauan (including lamin and other hardwood species), there were more than half a million cubic meters available for use in woodworking and furniture making. According to the survey of the marketing of the southeastern Asian wood in Taiwan conducted by Dr. Wu and others in 1973-74, 979,888 cubic meters or about one-fourth of the imported lauan were transferred from the plywood industry to other wood industries, and about half a million cubic meters of which was distributed to the manufacturing of woodworking and furniture products. The results of that survey is cited in Table 49.

Factors Influencing Wood Selection

In the analysis of utilization of various wood products in previous sections it was shown that lumber of various species and dimensions accounted for the most part (approximately 90% of total), and plywood, veneer and other wood materials (including rough lumber) were used only for some special occasions. Lumber, so welcomed and selected by manufacturers to use in the manufacturing of their products must certainly have some advantages in itself, and because of these advantages it had never easily been substituted by other materials, like metal in woodworking and furniture making. As was understood in general, wood products, and

Table 49. Proportion of utilization of lauan imported from countries in Asia, 1973.

Kind of utilization	Percentage of total quantity imported	Converted volume equivalent (M^3)
Lumbering	12.17	449,783
Woodworking	9.78	361,432
Furniture-making	3.70	136,541
Other wood uses and processing	0.87	32,127
Total[1)]	26.52	979,883

Source: Wu Shuen-chao, Lee Gin-fu and Yen Yung-huang (1974): Studies on the marketing of the Southeastern Asian wood in Taiwan.

1) The total quantity of lauan imported from Southeast Asian countries in 1973 was 3,694,885 cubic meters (log volume).

lumber in particular, used as a raw material has many advantages such as easy to work by hands or machine, and convenient to join and to hold together with various agents like glues, screws, nails, dowels, and other devices. If damaged parts are found in wooden furniture, it was they are easy to get repaired. Besides, lumber has many diverse properties such as nice color and grain, not very hard or soft in its hardness, poorly conductive with electricity and not feeling very hot or very cold when touched. This indicated that no other materials had so many advantages as lumber when used as a raw material in the making of woodworking and furniture products. Traditionally, people are fond of wooden furniture in their home, because wooden furniture can satisfy many requirements of the consumers. For these reasons manufacturers usually selected wood products, particularly lumber, as raw materials in the manufacturing of their products.

Although the manufacturers selected lumber as raw material for many reasons, some key factors could be identified to indicate the manufacturers' preference with wood material in some degree. Ten key factors influenced the manufacturers decisions to select wood material: (1) strength; (2) durability; (3) machinability; (4) moisture content; (5) appearance, color and grain; (6) stable supply; (7) price; (8) consumer choice; (9) technical design; and (10) other factors such as finishing, bending property, diverse choices or selectivity, and easy to obtain when ever needed and so on.

It was found that the firms in different groups of factories had their particular requirements on the uses of wood material and had their own reasons in the selection of different wood products for their factory. As analysis was made on the basis of 179 interviewed firms with 581 answers regarding their reasons in lumber selection. The results of analysis is tabulated in Table 50.

Information in Table 50 shows preference in general in the selection of wood materials. Although the factors influencing the firms' decision were different among each of the 6 groups of factories, however, generally speaking, most of the 179 interviewed firms considered wood price as the most important influencing factor. Consumer choice was ranked second. Durability and appearance were the third major factors affecting use of wood products.

As far as each group of factories was concerned, price was taken to be the most crucial factor influencing selection of wood by those firms in Group 1 (household furniture like tables or chairs), Group 4 (sofas and upholstery furniture) and Group 6 (sewing machine cabinets, radio and TV cabinets and miscellaneous products). On the other hand, firms making chest of drawers, wardrobes and cabinets took appearance and durability as the most important factors influencing their wood products selection. These facts indicated that not only preferences or reasons in the selection of various wood products, but also that wood products were not substituted by other materials easily.

Table 50. Main factors influencing the selection of lumber used for woodworking and furniture manufacturing, 1974.

Factor	Group 1[1]		Group 2		Group 3		Group 4		Group 5		Group 6		All factories[2]	
	Times	%	Times	%	Times	%	Times	%	Times	%	Times	%	Times	%
Price	30	18	16	15	6	11	10	24	8	19	37	22	107	18
Consumer choice	28	17	17	16	10	19	4	10	13	30	25	15	97	17
Durability	27	16	22	21	11	21	8	19	3	7	17	10	88	15
Appearance	25	15	22	21	7	13	7	17	5	12	20	12	86	15
Machinability	22	13	12	11	10	19	7	17	6	14	26	15	83	14
Constant supply	13	8	8	8	2	4	3	7	4	9	20	12	50	9
Technical design	3	2	6	5	2	4	1	2	3	7	16	9	31	5
Strength	14	9	1	1	4	7	1	2	-	-	7	4	27	5
Moisture content	2	1	2	2	1	2	-	-	-	-	2	1	7	1
Other	2	1	-	-	-	-	1	2	1	2	1	-	5	1
Total response and percent	166	100	106	100	53	100	42	100	43	100	171	100	581	100

1) For definition, see page 28.
2) Total number of firms responding to this question was 179 with 581 answers which is the base upon which the percentage in the column of all factories was calculated.

Selectors of Wood Materials

It was important that who decided what wood materials to use in a close relation with wood utilization. Because the key selectors of wood material to use had their own points of view they usually considered different factors of importance when making their decision. They would decide when to substitute one species for others, and also would make the substitutions of wood products for non-wood materials, and vice versa. In the analysis of cost structure of the woodworking and furniture-making firms in chapter 3, it was found that cost of wood materials took about one half of the total cost. The selection of wood products to use would influence not only the utilization of wood materials, but also would affect the cost of production as well as the price and sale of the products. Therefore, who decided what wood materials to use would closely related to the utilization of wood materials. As a result, this problem deserved special study.

According to the 1974 interviews most of the decisions on what wood materials to use were made by the owners themselves or the president or the manager-in-general. Only in a few cases was the decision made by a plant manager, and in still less cases the designer or engineer or purchasing manager decided what wood materials to buy and to use. Practically speaking, plant manager, designer, engineer and the personnel in purchasing and marketing departments all participated in making the decision, however, the owner's or

president's decision was the final decision. The result of analysis is given in Table 51.

To sum up, for those many small scale factories or workshops with only few workers in operation, the decision on what wood materials to use was generally made by the owner himself. For the large or medium sized factories, the selection of wood materials was commonly decided by the manager-in-general, and few other key persons might participate in the process of decision-making. It was also common in Taiwan that the owners or the general manager were often the founders of the plants, or the president and the manager-in-general were the founder's relatives. The founders of the plants or workshops usually took the position of president or general manager by themselves, and in most cases they headed their organizations for many years. They usually made the overall management decision, because they were familiar with all aspects of furniture production and sale. Their experiences with various wood products covered all aspects of their operations from the purchase of wood materials to production management and marketing of end products. They were the experts in the overall management for their business, and the decisions on the basis of their long-time experience in using some wood species often made the utilization of wood materials a stable condition.

In short, those firms in which the owner, the president or the general manager decided to use what wood materials had no or at most had very few occasions to substitute other

Table 51. Percentage distribution of firms selecting wood materials by different decision-makers, 1974.

Group of factory	Owner	President /general manager	Plant manager	Designer and engineer	Other	Total
		(Percent of firms)				
Group 1	43	31	19	2	5	100
Group 2	70	17	13	-	-	100
Group 3	47	23	15	15	-	100
Group 4	70	10	20	-	-	100
Group 5	--	63	21	5	11	100
Group 6	44	26	22	4	4	100
All factories	44	29	19	4	4	100

materials for wood, even there were very few cases for those firms to substitute some new species for the often used species except imported wood to replace native timber as the major raw material in the rapid development of this industry in the past. Practically speaking, once a firm decided to use the major timber products in its production line, it did not change the wood utilization pattern very often. Since the introduction of lauan and lamin into the factories in Taiwan as the basic raw materials, almost all the manufacturers preferred to use these two most common species in their operation.

Utilization of Plant Residues

Most of the interviewed firms in the 1974 survey stated that there was no better way to utilize their plant residues other than as fuel for their boiler or furnace. Originally, many of the woodworking and furniture-making factories were designed and established to use heavy oil as fuel. After the energy crisis many of the boilers were redesigned to use plant residues as fuel.

No survey was ever made to estimate the exact quantity of wood residues left over in the making of wood products. A roughly estimated percentage of plant residues of each wood product could be made on the basis of utilization rates from the conversion of wood materials to end products in the factories. According to the information collected in the 1974 survey, the percentage of plant residues and the average

utilization rate of various wood products were as in Table 52.

Table 52. Rate of utilization from wood materials to final products.

Kind of wood materials	Rate of utilization	Percentage of plant residues
Hardwood plywood	83%	17%
Lumber		
Teak	76	24
Ramin	75	25
Lauan	73	27
Taiwan conifer	69	31
Taiwan hardwood	68	32

About 91% of the interviewed firms used wood residues as fuel, and more than 4% of the firms sold their wood residues to others for using as siding materials or as raw materials to manufacture other small end products or chips (Table 53).

Table 53. Proportion of firms utilizing plant residues by different type of uses.

Type of uses of plant residue	Percent of firms
Fuel wood	90.0
Sale	4.2
Inner part of core plywood	1.1
Molding material	1.4
Other uses	2.1

CHAPTER V

POTENTIAL FOR INDUSTRY DEVELOPMENT

The economy in Taiwan is a typical island economy, external trade is an integrated part of Taiwan's industrial and economic development. For instance, in 1973 the total volume of imported goods and service registered 43% of the G.N.P. while the export was 52%. Totally imported and exported goods and service was 95% of the G.N.P. In other words, almost every cent of the domestic productive activities was related to foreign trade. Owing to the shortage of resources and very limited domestic market, for the last decade the woodworking and furniture-making industry in Taiwan had been mainly engaged in seeking overseas markets while at the same time importing raw materials and production equipment and necessary facilities from abroad. None of the native tree species could sufficiently supply the timber required by the industry. Furthermore, prices of Taiwan conifers was very high. In consequence, the development of the industry was highly dependent on the processing of timber imported from southeast Asian countries and on the exporting of end products to the markets overseas. And, was stated before, the woodworking and furniture-making industry in Taiwan could be said practically and factually to be the downstream industry of the plywood industry.

From what was said or discussed about the background, brief history and steps of development, characteristics and status of this industry in the preceding chapters, we could

find obviously that there were some main purposes of the development of woodworking and furniture-making industry in Taiwan. First, the development of this industry was to satisfy the growing domestic demand for furniture products of the rapidly growing population. Second, the development of this industry could help balance international payments by exporting products made of imported wood and some Taiwan timber. Third, it could offer more opportunities for employment and thus raise the living standard of the nation. Fourth, it could release the pressure of cutting Taiwan timber from high mountain areas giving an opportunity to improve Taiwan's forest condition for the future.

With these purposes of the development of woodworking and furniture-making industry in mind, an attempt was made to observe the means adopted by the woodworking and furniture manufacturers and the government agencies concerned to achieve these goals. It was also necessary to understand what measures and development policies cultivated the potentialities of this industry, and the effectiveness and disadvantages of means and policies carried out jointly by the manufacturers and the government agencies concerned. This information could provide a solid base to evaluate the potential development of the industry and to project the future of Taiwan's wood utilization.

The following reviews and discussions are directed toward analysis of the potentiality of development and utilization of wood materials of this industry in different aspects.

Aspects of concern range from environment and status to organizational structure and management concepts, from personnel betterment, capital investment, impetus and economic incentives to the improvement in production and sale policies, and from marketing information, market exploitation to the control of timber resources, government assistance policies, and research and development.

ENVIRONMENT AND STATUS

Generally speaking, Taiwan's social and economic environments favorable for the continued development of woodworking and furniture-making industry in 1974, the year of the interviews with individual firms. For instance, the people in Taiwan had good working discipline and high educational standards. They were diligent and easily-trained workers. Therefore, there were many ordinary labors and skilled workers employed with low wage rate by this industry. All public utilities were convenient, highways and railways were effectively used, and in particular, ten major construction projects were under construction. The cost of power widely used for industrial purposes was rather low. Three export processing zones and 36 industrial districts were established in Taiwan and on which some woodworking and furniture-making factories were located. Most kinds of woodworking machines could be manufactured by Taiwan ironworks and these machines were much cheaper than those imported. Wood materials supply was sufficient in volume for the use of this industry, and

the techniques of wood seasoning and processing was better than before, and quality control of products was carried out efficiently by many of the large factories.

Because of the rapidly growing population and prosperous economy, the domestic market for furniture products was expanding. Foreign markets were also expanding as efforts were made to exploit some new Europe and Mideast markets. The government agencies concerned and the manufacturers worked hand in hand to promote production and sales which, in turn, benefited the national income. And this pushed the rapid progress of Taiwan's woodworking and furniture-making industry. Moreover, the woodworking and furniture manufacturers themselves possessed many of the needed requirements and they were willing to improve further. For instance, the well-organized Taiwan Woodworking Manufacturers' Association and many of its district branch associations had contributed a lot to the development of this industry in the past. The environments and conditions were favorable to cultivate the potentiality of further development of this industry and to improve wood utilization in the future.

ORGANIZATIONAL STRUCTURE AND MANAGEMENT CONCEPTS

The traditional and family-run woodworking and furniture-making stores or workshops of the past were operated on the basis of a family-management concept. The type of their organization was sole-proprietorship. Their capital investment and scale of production were too small. There were no

woodworking machines in the shops. They operated with only hand tools and their productivity was very low. The market for their products was local. They did not display their products and waited only in their own stores for the customers to come to buy. In recent years, many things had been changed. Most of the newly established factories took the form of small or medium sized modern-type firms and these firms were managed under the organization of corporation or partnership. With large amounts of capital investment and modern woodworking machines, these modern factories were operated by professional personnel with scientific management and these firms produced large quantity of modern style and better-designed products. Their productivity has high and their market extended from local or island-wide to many countries of the world. In the past, each of the family-run small workshops utilized only several ten or at most one to two hundreds cubic meters of timber per year. Recently, most of the large scale modern factories consume, on the average, several hundreds up to several thousands cubic meters annually. The traditional workshops manufactured their products with air-dried or non-dried wood materials either dried by their own drying-kilns or by consignment to other professional drying-kiln operators. These continued improvements in organizational structure and management and other aspects on the part of the firms have laid a solid foundation for the modern woodworking and furniture-making industry to go forward to a much higher stage of development.

It could also help the firms in this industry to strengthen their potentiality and competitive power in world markets.

Under the impacts of economic recession, many small to medium sized woodworking and furniture-making factories in Taiwan naturally were weeded out, because of the shortage of professional personnel, poor management, and blindly expanded their plants in the past. On the other hand, those firms that survived the impacts of economic recession and stood still, underwent a severe test and learned a very good lesson to improve their management in many aspects. For instance, many firms adopted new measures to deal with their problems -- to practice quality control, to strengthen production management, to lower their cost, to pay more attention to marketing research, to collect marketing information. Firms also corporated, coordinated and combined with other firms to jointly purchase wood and other materials and to exploit foreign markets with joint efforts. These improvements proved that the firms in this industry had already changed their concepts and decided to better their products. All of these indicated that the development potential and wood utilization in Taiwan's woodworking and furniture-making industry are promising.

PERSONNEL BETTERMENT AND DEVELOPMENT INDUSTRY

During the interviews with manufacturers in the 1974 survey, it was often found that many of the firms' executives (such as manager-in-general, vice general manager, plant

manager and the head of the department of the firm) are college graduates majoring either in economics, business administration, or international trade. Although these newly entered personnel into this industry were lacking in knowledge about wood and wood markets their participation in this industry greatly raised the personnel quality of the industry. Particularly, these novices mostly are close relatives of the founder or owner of the factory. They often tried their very best for the betterment of their business. Hopefully and probably under the guidance of the founders or those old hands for two or three years, and after gaining the necessary knowledge of overall management, these novices will certainly become a new force to further develop the woodworking and furniture-making industry.

In addition, it was also found that there were some college graduates including some forestry majors who worked in the department of wood purchasing, quality control as well as business management or product marketing. This would be highly beneficial to the future development of this industry.

As far as technicians and skilled craftsmen were concerned, only the large firms employed a few vocational-school graduates who worked as designers or draughtmen or as foremen in the factories. It was common that each of the firms trained their own technical workers or ordinary labors by the way of apprenticeship. On the other hand, some of the vocational schools in recent years also had ever offered several training programs financed by government agencies

using in-service training funds. In doing this they trained a small number of workers for the woodworking and furniture-making firms to hire when they were in need. Above all, the improvement in quality of personnel in recent years would be very helpful to the development potential and wood utilization of the woodworking and furniture-making industry in Taiwan.

NEW CAPITAL INVESTMENT

As stated in chapter three, the wood industry developed very rapidly before 1974. Many new factories with modern woodworking machines were set up every year, and the old ones, in order to increase their production, also enlarged their investment and purchased more sites for new plant or new facilities. Consequently, net productive capacity of the interviewed firms increased tremendously. In 1973, the net productive capacity of the existing firms only increased by 15%. If new investments in productive capacity was included, the total productive capacity would, no doubt, increase much more than that. The facts indicate that if the industry could make good use of their existing productive capacity and fully develop their potential, it would easily double annual production. Only half of the total productive capacity were used in the first three quarters in 1974 because of economic recession. The fact was that besides the loss of productive capacity of the laidoff workers, even the working workers were working only part time in production.

With respect to investment, capital was usually provided by the owner or partners. Practically speaking, there were many possible neglected sources of capital. It was found during the 1974 survey, capital needed in the development of the woodworking and furniture-making industry was not the limiting factor. Possible sources of capital were there for the firms to apply.

FAVORABLE CONDITIONS FOR FURTHER DEVELOPMENT

The woodworking and furniture-making industry was greatly influenced by the impact of the 1974 economic recession. Some of the small to medium sized factories, particularly those of Group 6 specialized in certain products like "Happer" (the unique versatile 3 in 1 game table), billiard tables and juvenile furniture and so on had to close. Others had to lay off some workers and thus decrease their production. However, some well-managed firms were little affected by the impact of economic recession. These still continued growing and gained satisfactory profits during the time of economic recession because they could hire more labors at lower wage rates than before and purchase more lumber at lower prices than at the beginning of the economic recession.

Generally speaking, the establishment of a small to medium-sized woodworking and furniture-making factory did not need large amounts of capital and it did not require advanced technology. In other words, the techniques to

manufacture woodworking and furniture products were easy to learn and the technical workers were easy to train. In the period of the energy crisis (Taiwan imported all the needed crude oil) the development of woodworking and furniture-making industry had an advantage in that it consumed much less energy than other industries. Moreover, its products, especially handicrafts and high class furniture, could make much more profits than the products of mass production. According to the interviews with manufacturers the average profit they made was about 15%. This was a very satisfactory figure in comparison with those of other manufacturing industries.

During the time of economic recession, the exporting of wood products declined to its lowest point. On the other side, demand in the domestic market continued to increase owing to the growing population. Thus, the industry, taking advantage of the unsaturated domestic market, was able to cultivate its potential and improve in many aspects.

Firms competed freely in a competitive market, each could freely join in or withdraw from the industry without barriers at anytime they preferred. Normally, the woodworking and furniture-making industry existed partly on the basis of wood supply from the plywood industry. So, in some degree the two industries co-existed. Though the fact was this, when the plywood industry was in its worst conditions under the impact of economic recession in 1974 (less than half of the productive capacity of plywood factories was in

production), most woodworking and furniture manufacturers (except those in Group 6), still had 80% of production and sales. When some products were no more demanded, some manufacturers immediately and easily changed their production policy and manufactured some other products more demanded in the market.

The above mentioned various favorable conditions together with the flexibility of manufactures were of great help in the further development of the woodworking and furniture-making industry. If the woodworking and furniture-making industry could survived the impact of the 1974 economic recession, and if the period of recession lasts not too long, the industry could keep on growing steadily as soon as the recession is over.

IMPROVEMENT OF PRODUCTION, SALES AND MARKET PERFORMANCE

There was a great number of woodworking and furniture-making factories in Taiwan, but the scale of production of most firms was usually very small. About two-thirds of the interviewed firms manufactured products solely on the basis of the requirements as stated in customer's orders, and customers usually provided their own design and specifications. Most of the manufacturers did not design their own new products, and most of the interviewed firms recognized that they were exploited by either Taiwan exporters or foreign middlemen or by foreign buyers or the buyer's Taiwan

purchasing agents. But they had no way to shake off the trader's exploitation.

The manufacturer's products were of small amount and not unique. Most of the firms did not collect necessary marketing information and they had no knowledge for international trade. Practically speaking, on the supply side there were no flexibility in supplying their products because too many small factories competed for a small sale opportunity. But on the demand side, it had great flexibility. The elasticity of demand for Taiwan's products was very high, because foreign buyers had many sources to purchase what they wanted. Generally, the manufacturers did business directly with only one or two overseas buyers because that was the only opportunity they had. Consequently, the blind competition among many manufacturers often resulted in price cutting. Even worse than this, they often lost the opportunity completely because the buyers did not believe in them. On the other hand, in case the products they consigned to some small trading companies for sale, the manufacturers were also squeezed by these intermediate traders or middlemen. To solve the production and sales problem and to strengthen the competing potential in foreign market, the woodworking and furniture-making manufacturers in Taiwan were planning to set up a united professional corporation. In doing so, they could corporate to improve the production and sales policy, to purchase wood materials and other raw materials together, and to concentrate their effort to produce high-value

better-quality products. Furthermore, they could avoid duplication of production and blind competition, and each manufacturer could produce their own unique product. In addition, the manufacturers could jointly set up their overseas branch office in order to sell their differentiated products in foreign markets. Furthermore, this overseas branch office might also be a place for product exhibition, might have its own warehouse and workshops to assemble and finish their products and especially to handle after-sale service in foreign markets. Besides, it would be also an ideal agent to collect marketing information in foreign countries. Many former small to medium scale exporters also planned to set up a united company in order to perform their important function more efficiently in the whole market system.

On the other hand, many of the manufacturers tried individually to change their selling policy. These firms did their best to try to do business with more foreign buyers instead of only one or two, or with the buyers' Taiwan agents directly and concurrently, or to consign the sale of the individual's products to several or more exporting companies. In this way, the individual firm hoped to shake off the control by the exporters as happened in the past because of their unfamiliarity with market situations.

Owing to the cooperation among the manufacturers, the unfavorable conditions the woodworking and furniture manufacturers faced in the past can be expected to be much improved later on. Accordingly, the woodworking and

furniture-making industry will be able to compete more competently in foreign market and will utilize more wood materials.

MANAGEMENT INFORMATION AND MARKET EXPLOITATION

Most of the interviewed manufacturers stated that they had no or very little information about foreign markets. They manufactured their products totally on the basis of orders from the buyers through the exporting companies. This is to say their sales in foreign markets wholly or mostly depended on the exporters of various sizes, often very small. Some of the large firms also tried to handle their own exportings, but only a few to them collected marketing information about the foreign markets. Even worse, as was said in the interviews, that the sources of their information were chiefly advertisements in newspapers and magazines or from personnel correspondence. Most manufacturers knew little about the demand for their products in foreign market, or about their competitors from other countries. They understood nothing about trade barriers and the tariff systems of importing countries. Nor did they pay attention to the inspection rules and safety standards for products set down by importing countries.

To better understand foreign markets, recently the industry and trade associations had been engaged in building their marketing information system and had fostered closer relationship with the governmental commercial representatives

or economic-affairs consultants of chinese embassies in foreign countries. In addition, manufacturers began to go abroad in groups to make observation trips in order to have a deeper understanding about foreign markets, and they began directly selling their products by joining woodworking and furniture exhibitions in different countries. Thus, they tried to exploit other foreign markets in addition to those in America, Canada, and Japan. Such measures as collecting marketing information, selling directly in foreign markets and group observation and market exploitation were very beneficial and effective. Owing to the joint efforts by the woodworking and furniture manufacturers, the trade associations and the government agencies concerned, it is expected that this industry and its wood utilization will keep on growing in the future.

SUPPLY OF FOREIGN TIMBER

Because of the use of imported wood, the so-called timber-shortage problem of the past no longer exists in Taiwan in 1974. The important problem the industry have to worry about and consider was how to get foreign timber sufficiently with a steady price. Authorities in the government and the woodworking and furniture-making firms had foreseen this problem in the past. For this, the Overseas Forest Development Corporation was set up in 1974. The corporation, whose purpose is to sufficiently supply the timber needed by the woodworking and furniture industry in Taiwan, had been

engaged in investments in countries rich in timber reserves, such as Indonesia. This arrangement could greatly benefit the woodworking and furniture-making industry in controlling its needed wood materials. In addition, the Overseas Forest Development Corporation also rendered various service to the woodworking and furniture manufacturers.

On the other side a total of two hundred thousands cubic meters of domestic timber of various species were still available for the making of woodworking and furniture products every year in 1971-1974 (see Table 47 for reference). Since the local timber constituted only about 20% of the total amount of wood materials needed by woodworking and furniture-making industry in recent years, there was no need to worry about the shortage of domestic timber. More of a problem is the technology of utilization and the price of domestic timber. In the past few years, some manufacturers developed a new method to produce small sized and bendable plywood from Taiwan hardwoods for making musical instruments or for other purposes. Since this plywood was of good quality had a good bending property and was reasonable priced, it was highly welcomed and demanded by the woodworking and furniture-making industry. It can be seen from this example that improvement in domestic timber utilization will be very helpful for the future development of and the cultivation of potential for the woodworking and furniture-making industry in Taiwan.

GOVERNMENT GUIDANCE AND ASSISTANCE POLICIES

The woodworking and furniture-making industry was one of those industries that had been encouraged by the government. As discussed in previous chapters, government agencies had continuously given necessary guidance and assistance in the development to the industry. Many aspects of governmental assistance are worth mentioning. For instance, the concerned government agencies like the Industrial Development Bureau has invited many foreign specialists and professors to Taiwan to help the industry improve production management, marketing and development strategy. Government agencies also sponsored technician training programs, offered loans to finance manufacturers in purchasing raw materials or in product exporting. Moreover, in the recent years, government agencies helped manufacturers by establishing more professional industrial districts for the woodworking and furniture-making industry and taking part in woodworking and furniture exhibitions in different countries. In order to expand foreign markets government agencies helped manufacturers by organizing professional teams to go abroad to sell their products directly and to deeper understand the foreign markets. At the same time, governmental commercial representatives or counselor on economic-affairs in chinese embassys in foreign countries also helped the industry in many ways. For example, they collected business information, promoted the interflow of resources, capital and services, strengthened the people-to-people contacts on a mutual interest basis, made great

effort for favorable tariff treatment on Taiwan exported wooden products, and helped expand the markets to more countries and for more sales of products.

Owing to the guidance and assistance of the government agencies the woodworking and furniture-making industry has reached a high level of development, and further the industry was able to keep on growing. More recently, woodworking and furniture products of about two hundred millions U.S. dollars worth had been exported a year. In addition, under the impact of the 1974 economic recession, the government announced a series of economic measures and did everything possible to help industries weather the period of doldrums. For instance, those measures of liberalizing loan terms, extending and relaxing collateral requirements, lowering and postponing levies on imported raw materials, spurring of export promotion abroad, and technical aids and so on were very helpful. It was expected that this industry could survive the economic recession and still keep on developing because the government actively offered the necessary assistance and the manufacturers devoted their best effort to cultivating their potentiality. That is, both parties worked hard for the same goals.

The government also helped the industry compete in foreign markets. It stabilized commodity prices (including public utility rates and energy price) and wages, lowered interest rates, assisted small firms to merge into larger organizations for more efficient management and for

profitable exporting, helped many small exporters organize a larger trading company, sponsored exhibitions, and trained technicians for the benefit of the industry. The government agencies also tried to lower the timber importing tariff several times in the past decade to meet the demand of the wood manufacturers who hoped to exempt wood from the tariff list totally. The government also considered very cautiously lowering foreign exchange rates for the NT dollar (devaluation of NT dollar). Once it is found necessary, the government might further lower the import tariff or even release woodworking and furniture manufacturers from the import duty, or adjust the foreign exchange rate in order to strengthen the competing power of this industry. Because of all of this governmental assistance, it is hoped that the woodworking and furniture-making industry should be able to compete more competently in international markets.

RESEARCH AND DEVELOPMENT

Progressiveness in technology could help manufacturers better utilize wood materials and in turn help increase the industry productivity. Comparatively, the Taiwan woodworking and furniture-making firms and government educational and academic research organizations had paid much more attention than in the past to the study of wood utilization in furniture-making, production, marketing, and overall management in this industry. In addition to that the industry itself has engaged in developing new products, studying wood

utilization techniques, producing high-quality products and lowering cost by adapting modern management concepts, as were governmental research organizations and the educational institutions.

Joint government-industry efforts were also under way. For instance, under the sponsorship of Taiwan Forestry Research Institute(TFRI), the National Council on Science Development (NSC) and the Joint Commission on Rural Reconstruction (JCRR) had jointly appropriated a large sum of research funds to the TFRI to conduct a research project entitled "Research on Technical Improvement of Utilization and Processing of the Wood and Bamboo" in December of 1973. The 1974 survey for this study, financed by JCRR, could be said to be a complement to that TFRI big research project. Other research projects concerning woodworking and furniture-making industry were also conducted by the Taiwan Joint Industry Research Institute, other research organizations, individual research agencies or individual research workers. Examples of research projects in current years are many, including the control of formaldehyde resin in the manufacturing of wooden bowls or other items, studies on various glue materials and the gluability of wood products, studies on paintability and wood-decay, studies on timber drying and humidity control, survey and analysis of wood utilization in the woodworking and furniture-making industry, marketing research and so on. The results of these current studies will be very beneficial to the cultivation of the potential of the

woodworking and furniture-making industry and Taiwan's overall problem of wood utilization.

The optimistic discussion in this chapter was mainly deduced from the information collected in the 1974 survey and analyses of the characteristics and the development history and status of the woodworking and furniture-making industry and its wood utilization. In fact, there is still more room for improvement of this industry. For instance, manufacturers often put the cart before the horse and engaged in blind competition by cutting prices at the expenses of quality improvement, business credit and overall scientific management of their factories. Some problems will be discussed and recommendations will be given in the next chapter. However, generally speaking, the woodworking and furniture-making industry in Taiwan will have a bright future if all the firms could well cooperate under the guidance of the government and under the united or merged system in that each individual firm could have products of its own style and solve their common problem in joint efforts.

CHAPTER VI

SUMMARY AND RECOMMENDATIONS

SUMMARY

Taiwan's woodworking and furniture making industry is characterized by a large number of small, low capital investment workshops and factories. Many of the small firms are managed by people not knowledgeable about wood properties, wood utilization techniques and supply sources, production management or product marketing.

There are only a few large-scale modern machinery equipped factories managed by specialists. Many of these are organized as corporations, but in actuality the managers are mostly relatives of the owner. A great variety of products are manufactured, with production schedules determined on the basis of orders. Products are usually manufactured strictly according to samples or specifications provided by the buyer. Few firms produce products of their own design.

Sawmills frequently manufacture furniture and furniture factories often produce other wood products. Consequently, there is not a definite division between sawmills, woodworking shops and wooden furniture manufacturers. Each type of establishment belong to one trade association, the Taiwan Woodworking Manufacturers' Association and are identified as "woodworking manufacturers."

The woodworking manufacture industry is highly competitive. Capital requirements are low and firms enter or leave the industry at will. For most firms, the duration of operation is short. A great number of small factories were established in the past five years. Those with longer tenure are mostly small workshops that gradually grew in size.

The style and design of furniture produced has changed moderately in the past few years. Correspondingly, the utilization of wood products consumed by furniture manufacturers has also changed. For woodworking products, there has been only a slight change in style and few cases of substitution of one wood raw material product or species for another.

However, in recent years woodworking manufacturers began using more imported and less local timber. Local species are numerous but their quality is poor and the supply of individual species is limited. In addition, local timber is difficult to process and does not allow for each product quality control. Because of imports domestic timber supply has not limited development of woodworking manufacturers. In recent years approximately three-quarters of the industry's wood consumption was imports, mainly lauan and ramin from Southeast Asia.

As with wood, neither factory workers or woodworking machines are in short supply. Most machinery purchased in recent years was locally made. Only the most delicate machines must be imported. Skilled workers and technicians are still in short supply.

Since wood supply is adequate, price is the major factor considered by manufacturers in the selection of wood material. For most firms wood raw material accounts for over 40 percent of total costs. Wood price is, therefore, carefully watched. It is relative differences that have caused many manufacturers to use lauan and ramin in place of domestic timber although imported wood is also desired because of its constant supply.

In Taiwan the owner, general manager or firm president usually decides what wood material will be used. In individual factories and shops the utilization of wood is quite stable. Only when designers do the selecting is there a volatile pattern in the use of wood materials. However, even then once production starts utilization is usually stable.

Manufacturing wood residue is most always used as boiler fuel. The small volumes of residue in each factory make it uneconomical to collect for other uses.

RECOMMENDATIONS

As a result of this study a number of recommendations can be made for improvement of Taiwan's woodworking industry.

The most important problem facing the industry is the lack of trained specialists and technicians. Although a number of business administration, economics and international trade college graduates are working in the industry they are laymen in terms of their knowledge of woodworking and furniture production, wood utilization and marketing.

A small number of forestry graduates also work in the industry. They usually purchase wood materials or run show rooms. They have a textbook knowledge about wood properties, but have little or no knowledge about practical production processes, quality control and other areas like business management and marketing. In Taiwan, forestry graduates are not trained in plant management, economics, accounting, marketing, business administration or international trade. Consequently, they have contributed little in these areas.

The shortage of specialists and technicians is an important factor limiting the future development of the industry. Every effort should be made to train people in these needed areas. Many of the interviewed manufacturers expressed the need for the government agencies to provide the needed education programs.

To help solve this problem training plans and offered educational programs in general curricula have been set up in some colleges. This is a long-term solution, but does not meet the current need. What appears necessary is to have the Taiwan Woodworking Manufacturers Association launch a seminar on professional knowledge and a training program for development of technological skills. Such a program would allow industry executives to acquire new management concepts and knowledge. It would also enable lower level personnel to acquire new knowledge about product design, wood utilization and craftsmanship.

Woodworking factories in Taiwan are scattered everywhere. This is because many owners built their facilities on their own property, preferring to stay in a familiar location and to avoid the costs of purchasing new land. In the future, more woodworking industrial districts should be developed, particularly in or near port cities.

At the same time, government agencies should provide economic incentives to encourage the concentration of factories in such industrial districts to improve rail, highway and harbor facilities in order to facilitate timber imports and product exports. The development of woodworking industrial zones will have many advantages. Wood materials could be purchased at less cost if purchases were made collectively by industrial zone firms. Each firm could be a part of a larger united group, thus increasing its competitive potential in world markets.

Government agencies can encourage the concentration of factories in the industrial zone districts. Incentives might include giving the locating firms priority in getting long-term loans. It might also provide industrial zone firms with financing for the purchase of raw materials and exporting, and give priority for obtaining technical aid and training.

A major improvement would be made in the industry if the average size of firms were increased and professional managers employed. The family-owned and -run concept should be discarded.

The industry would also be improved by government encouragement of collective import of required timber through a new corporation or through the Overseas Forest Development Corporation. Collective buying should enable firms to purchase timber in accordance with their needs at a lower price. The historical practice of import of timber by many small traders has adversely affected the development potential of the industry. Prices have been higher and quality lower than necessary and delivery schedules have been uncertain.

Another pressing need is for the industry to upgrade its manufacturing methods and its products. Government agencies should help manufacturers adopt modern production methods and encourage them to produce self-designed high quality products. Because of the high cost of wood materials and the current practice of manufacturing low grade and simple products, Taiwan's industry will increasingly be at a competitive disadvantage with

countries like Japan, Korea, and particularly the Southeast Asian countries that have rich timber resources.

Upgrading of techniques and products should be a high priority item for the Taiwan Woodworking Manufacturers Association. Some reorganization and strengthening of the Association will be necessary if it is to serve this function. The Association should set up an R & D and Service Department. This Department should employ college graduates with various professional talents and backgrounds and let them be responsible for studies and contacts with government agencies. The Department should work closely with agencies such as the JCRR, TFB, and TFRI. Such cooperation would also help public agencies keep in touch with current problems of the industry.

Currently there are many professional talents and facilities of government agencies which are not utilized by woodworking firms. Hence, it appears desirable to somehow unite governmental agencies and manufacturing firms. This could be accomplished by a governmental industry cooperatively organized "Center for Development of the Woodworking Industry." This joint development center might involve government agencies like JCRR. JCRR helped develop the Taiwan Wood and Bamboo Market Development Center and, hence, is experienced in working with the industry on development projects. It should expand its efforts to the field of woodworking and furniture making. This would be within its area of responsibility since the development of the woodworking and furniture making industry is conducive to developing the rural economy and increasing employment of rural people.

A number of other government agencies could cooperatively work with industry to form the development group. Included are the Industrial Development Bureau, the Bureau of Commodity Inspection and Quarantine, Board of Foreign Trade, Taiwan Forestry Bureau, Taiwan Forestry Research Institute, East/West Highway Forest Development Administration and educational and academic institutes.

The tasks of a Development Center should include but not be limited to the collection, analyses and use of market information, and investigation and data reporting. It could issue a professional journal and study government policies affecting the industry and the need for guidance, assistance and financial aid. It could also study and survey sources of wood supply, resource and product markets and be a center for information collection. In general, its principal responsibility should be to unify the development goals of industry and government agencies.

Finally, there is a need for the industry to expand market areas. Most woodworking firms do not do their own market investigation. Rather, they depend heavily upon government overseas commercial offices for such services. But these offices have not been particularly helpful to the industry in getting good market information, preferential duty treatment or in securing more orders. More support is needed in these areas, either from government or from the Manufacturing Association.

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