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SERVICE LINKAGES IN THE THAI ECONOMY

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I. Introduction

The service sector has always played an important role in the Thai economy. Over the past two decades, while the agricultural sector grew consistently in real term about 5 percent a year, its relative share in the economy fell however shares in gross domestic product originating from manufacturing and services, rose substantially. During the period, the manufacturing sector grew almost 11 percent a year while the service sector increased more than 8 percent in real term a year, as compared to the real growth of gross domestic product of 7.6 percent annually over the same period.(1) In terms of employment, the share of labor force in agriculture dropped 3 percent yearly between 1960 and 1970 but those in the manufacturing (including mining) sector and the service sector rose by an annual average rate of 1 and 2 percent, respectively.(2)

The role of services in the economy of Thailand is further magnified by their contribution to the country's balance of payments. Without any doubt, the value of services traded in the world has expanded rapidly as countries become more interdependent of merchandise trade. It was estimated that during the period between 1969 and 1979, the world trade in services grew about 16 percent a year and has consistently accounted for 25 percent of the total world trade with almost 1,000 billion U.S. dollars in value. This increasing trade activity in services also take place in Thailand as service trade receipts increased from 10.1 billions baht in 1970 to almost 17.8 billions in 1978, of which 11.2 billions baht were accounted by travel receipts alone.

The importance of the service sector in the Thai economy is not by any means unique. Data available from the United Nations pertaining to market economies give a strong evidence suggesting that the pattern of growth in the service sector is significantly associated with levels of per capita gross domestic product. For examples, the service sector accounts for 56.3 percent of GDP in North America and the corresponding figures for Europe and East and Southeast Asia are 26.4 and 7.4, respectively.(3) Furthermore, a study conducted by OECD for certain member countries showed that in agriculture-based countries, the growth of employment

in services was slow while a significant increase in employment in manufacturing and commerce and services was observed in partially industrialized countries. The shifting of employment from agriculture to commerce and services became highly visible when industrialization was completed with lower manpower in agriculture and major movement of employment from manufacturing to services.(4) This characterization of the contributing part of the service sector in economic development process has been well described by A.G.B. Fisher and theorized by Walt Rostow in his famous five stages of development leading to a service economy.(5)

In spite of its great contribution both to output and employment, the service sector has received far less attention by economists and far less detailed analysis has been carried out than is the case of manufacturing and agricultural sectors. This lack of appreciation of services is quite understandable as services have traditionally been considered "unproductive" and trade in services has been commonly referred "invisible". These attitudes have, however, changed in recent years with an upsurge revival of interests to examine the ways in which the service sector functions and the importance of its role in the total economy and trade between countries. This paper is intended to add to such existing understanding by examing the structure of service activities in the Thai economy as to their role and relationship with other sectors of the economy. This is done by using input-output analysis to investigate the linkage effects generated by services for both inter-sectoral and intra-sectoral linkages. Improved information about these interacting influences of services will enable service industry policies to be formulated within a perspective of interdependence among economic activities rather than reference to individual ones in isolation.

II. Services in Domestic Economic Structure

II.1 Service Activities in the Thai Economy

While there has not yet been a definite and precise definition of the service sector to which economic activities should be included in this sector, it is however widely accepted that a service may be simply defined as "any intangible product purchased and sold in the market place."(6) As such, services are therefore a derived product in which they yield immaterial satisfaction to consumers or assist in facilitating the flow of goods. Thus, recreational, personal, legal, health, finance, educational, business consulting, housing, transportation, and communication activities are classified as services.(7)

In Thailand, the service sector, as reported in the gross domestic product account, comprises six aggregate industries, namely:

1. Transportation and communication;
2. Wholesale and retail trade;
3. Banking, insurance and real estate;
4. Ownership of dwellings;

5. Public administration and defence; and
6. Other services not included above.

Although this supply side list of service industries is highly aggregate and only partial, it is nevertheless in conformity with those given by ILO and OECD and will therefore be used as the basis for the analysis in this study. A more disaggregate breakdown of service industries, though incompletely, is reported as major demand components in consumption expenditures of both private and public sectors. In the private sector, service expenditure items are individually listed in the following categories :

1. Personal care and health expenses;
2. Transportation and communication;
3. Recreational expenses; and
4. Miscellaneous services.

For the public sector, the service demand breakdowns are available in the following activities :

1. General administration;
2. Defence;
3. Justice and police;
4. Education and research;
5. Health services;
6. Special welfare services;
7. Transportation and communication; and
8. Other services.

II.2 Services in the Economic Structure

As an agricultural economy, Thailand's economic structure is dominated by agriculture both measured in terms of its contributions to GDP and employment, despite the government's efforts to diversify the structure into manufacturing and other non-agricultural activities since 1960 when it first launched the First National Development Plan (1961-1966) with the main purpose to facilitate domestic industrialization process.

From 1960 to 1977, overall real economic growth was relatively high as compared to other developing countries with 7.6 percent a year. The rate was even higher during 1975 to 1979 at 8.9 percent a year. Table 1 shows the real growth rates of GDP and three major sectors of agriculture, industry, and service over these periods and other selected sub-periods. During 1970 to 1977, the average annual growth rates of agriculture, industry, and service sectors were 4.9, 7.4, and 8.1 percent, respectively. But in the later period of 1975 to 1979, the growth rate of agriculture was slow down somewhat while those of industry and service went up as indicated by the corresponding figures of 4.6, 13.5, and 9.3. These salient figures therefore demonstrate a shift in the structure of the economy from basic agricultural activities to higher levels of production technology and services as the industry

and service sectors expanded faster or at same pace as GDP whereas the agriculture sector lagged behind.

In terms of percentage contribution to GDP, as shown in Table 2, it can be clearly seen that since 1960, the Thai economy has undergone a structural change with the percentage share in GDP by the agriculture sector decreasing sharply from 40 percent in 1960, to only 28.3 percent in 1970 and remaining at around 30 percent since then. Over the same time span, the share of industry grew from a mere 14 percent in 1960 to about 25 percent by 1970 and that of the service sector was approximately 45 percent throughout the period. Since 1970, the GDP shares of the two sectors have been stable at around 25 and 45 percent, respectively. This changing composition of GDP reflects that an industrialization policy which encourages transfering resources out of agriculture to industry cannot be as successful if service activities such as banking and trading could not expand to accomodate this shifting. In fact, although its share in GDP is unchanged, the role of the service sector has been restructured from a complementary role of facilitating commodity trade and distribution to a higher level of industrial and personal services. Table 3 shows the values added for some service sector industries and their average real growth rates from 1976 to 1980. Among them, the services of insurance and real estate, banking and finance, business service, hotel and restaurant, electricity and education have experienced a high real growth rate of well over 10 percent a year over this period.

III. Theoretical Basis of Analysis[8]

An input-output table of a national economy represents a systematical flow of the economic activities over a stated period of time. Economic activities are grouped according to branches of industry such as agriculture, mining, manufacturing, transportation, service, etc. Since each industry is assumed to produce only one good using only one production process of fixed factor proportion, the production of industry output requires other industry outputs and itself for intermediate uses. In addition, the industry output is consumed as a final product by households, firms, the government, or foreign countries. Therefore, it can be seen that each industry must satisfy not only the direct requirements of final consumption demand but also the indirect requirements of intermediate input uses generated by the inter-industrial transaction system of production.

The inter-industry system can be expressed in the following algebraic form.

$$\sum_{j=1}^{n} x_{ij} + F_i = X_i \quad (i = 1, 2, \ldots\ldots, n)$$

where x_{ij} is the intermediate transactions of industry j for industry i's output

x_i is the total output of industry i

F_i is the final demand for industry i's output

Assuming the fixed proportion production process for each industry, the total indirect requirement of industry j's output for producing industry i's output can be established as follows :

$$x_{ij} = a_{ij} X_j$$

where a_{ij} is called "input or technical coefficient".

Since there are n industries in the economy, the interindustrial transaction system can be conveniently represented in a matrix form.

$$A = \begin{bmatrix} a_{11} & a_{12} \cdots\cdots & a_{1n} \\ a_{21} & a_{22} \cdots\cdots & a_{2n} \\ \vdots & & \\ a_{n1} & a_{n2} \cdots\cdots & a_{nn} \end{bmatrix}$$

So the inter-industry system can be written compactly as

$$X = AX + F$$

Where

$$X = \begin{bmatrix} X_1 \\ X_2 \\ \vdots \\ X_n \end{bmatrix}$$

and

$$F = \begin{bmatrix} F_1 \\ F_2 \\ \vdots \\ F_n \end{bmatrix}$$

The above system of n variables and n equations can be solved easily for X, providing that some certain conditions are met. Thus, we have

$$X = (I - A)^{-1}F = B^{-1}F.$$

This basic relationship provides a wide variety of technical uses of input-output techniques that shall not be discussed here. One of such analytical uses, which is employed in this paper, is to illustrate backward and forward linkage effects. The index for the backward linkage effect for industry j is defined as follows :

$$\alpha_j = \left(\sum_{i=1}^{n} bij\right)/v \quad (j=1, 2, \ldots\ldots n)$$

where b_{ij} is element in matrix B

and v is $\frac{1}{n}\sum_{j=1}^{n}\sum_{i=1}^{n} b_{ij}$

Thus, the backward linkage effect is simply the column sum of the inverse matrix (I-A) representing the output generated by one unit of final demand for industry j normalized by the average of total sum of rows and columns.

Similarly, the forward linkage effect index is constructed to represent the normalized output generated by one unit of final demand of each industry. Thus, we have

$$\beta_i = \sum_{j=1}^{n} bij/v \quad (i=1, 2, \ldots\ldots, n)$$

IV. Economic Linkages of Service

To examine service linkage relationships, the Input-Output Table of Thailand for 1975(9) was used in the analysis within the framework undertaken by Australia's Bureau of Industry Economics in studying roles of services in the Australian economy.(10) The 1975 table is the latest available one for Thailand that provides a 58 interindustry tableau and its related technical matrices for analytical uses as well.(11)

As indicated by percentage input shares in Table 4, service industries acquire most of their intermediate inputs from the manufacturing sector and the service sector itself. Agriculture and mining provide insignificant input amounts to all service industries except building construction and public works that require large percentage input shares from the mining sector with 6.16 and 11.48 percent, respectively. The largest input share of the agriculture sector among service industries is 11.86 percent in restaurants and hotels. The strong direct linkage between service industries and the manufacturing sector is indicated by a great number of the industries employ more than 50 percent of their intermediate inputs from the sector. Of the 12 service industries listed, 5 industries obtain more than 50 percent of their intermediate inputs from the manufacturing sector. In addition, another 6 industries acquire higher than 30 percent manufacturing input shares. The least use of manufacturing input is 11.29 percent for real estate, and the greatest use is the electricity industry

which obtains almost three-fourth of its direct intermediate inputs from the manufacturing sector alone. This large percentage share is mainly resulted from the industry's heavy reliance on petroleum product refineries. It is also true with the transportation industry that has the direct manufacturing input share of nearly 73 percent.

A significant intra-relationships among service industries is also reflected by percentage shares of their direct intermediate inputs from the service sector as shown in Table 4 that all of them require no less than 25 percent of intermediate inputs from service industries. Among them, the real estate service has a large share of intermediate input use from the service sector with 87 percent, whereas the electicity industry uses direct service inputs only about 25 percent of its total intermediate input requirements. Of all the service industries, 7 industries obtain more than half of service input shares in their total direct intermediate inputs.

Showing another side of inter-sectoral relationships, Table 5 gives the output amounts of service sector industries distributed as intermediate inputs for the four sectors. A similar situation to the previous direct backward linkages prevails. Large percentage shares of service outputs used as intermediate inputs are attributed to the manufacturing sector and themselves. The agriculture and mining sectors require relatively small amounts of their direct intermediate inputs from service industries. Trade, water works and supply, electricity, public works and building construction are major service sector industries providing the manufacturing sector large shares of its required direct intermediate inputs. On the other hand, communication, real estates, public services, and other services supply most of their intermediate use outputs to the service sector. The trade service industry is prominent in supplying nearly 75 percent of its total direct intermediate service to the manufacturing sector as compared with 18 percent to the service sector and about 6 percent to the agriculture sector. The leading service industry that provides a largest share of its outputs for direct intermediate uses in other service industries is the communication industry with 61 percent. It is then followed closely by the real estates industry with 60 percent.

From Table 5, it is also apparent that direct intermediate services from electricity, water works and supply, public works, communication, real estates, business services, and public services are supplied mainly to the manufacturing sector and the service sector whose combined shares are above 90 percent. The highest direct intermediate input share supplied to the agriculture sector among service industries is bank and insurance which provides 21 percent of its total intermediate use outputs to the sector. It also provides a relatively large percentage share to the mining sector of almost 7 percent.

Since service outputs may be consumed as final services instead of being used as intermediate inputs in other industries, Table 6 shows the percentage distribution of service uses for intermediate and final consumption for each service

sector industry. According to the distributional shares, it is clear that most service industries provide their outputs mainly for final consumption as 11 of 13 listed service sector industries have well above 50 percent of their outputs allocated for final demand. Only two service industries, the electricity and business services, have larger shares of their outputs for intermediate use. The latter allocates about 64 percent of its output to intermediate use, whereas the former provides nearly 64 percent. It is also clear from the table that certain services such as public services, real estates, and public works are primarily consumed by final demand and their intermediate uses are likely insignificant.

IV.1 Total Intermediate Linkages

In a system of inter-industry relationship, producing one unit of output of any industry requires both direct and indirect uses of intermediate inputs from other industries as well as itself. Thus, the total amount of intermediate inputs supplied by an industry is the sum of direct and indirect employments of its output in the other industries. In Table 7, percentage distribution of total intermediate inputs supplied to service sector industries by the four major sectors in 1975 is shown. Contrary to Table 4, where only direct intermediate uses are considered, and where a few service sector industries do not employ directly any intermediate inputs Prom the agriculture and mining sectors, Table 7 indicates all service sector industries obtain in certain proportions inputs from every sector in the economy- Still, however, the percentage shares of total intermediate inputs to service sector industries supplied by the agriculture and mining sectors are relatively small as compared with the other two sectors. From a comparison between the service sector's total input linkages in Table 7 and its direct effects in Table 4, there emerges a clear indicator that the manufacturing sector has reduced substantially its intermediate input shares supplied to service industries, while the percentage shares of intermediate inputs provided by the service sector have risen in every service industry. As is seen from Table 7, all service industries obtain more than 50 percent of their total intermediate inputs from themselves and, furthermore, 8 service industries get at least 70 percent of their total intermediate inputs from services. This indicator, therefore, signifies the strength of intra-sectoral relationships of service industries in the Thai economy on the basis of their total intermediate input employment.

To measure the service sector's total output linkages with other sectors, the percentage shares of total intermediate inputs supplied to each sector by service sector industries are shown in Table 8. The results are not different from those of input linkages that the manufacturing and service sectors still command large percentage shares of their total intermediate inputs supplied by service industries and that the intra-sectoral relationships between services themselves are strengthened due to the effects of indirect intermediate input demands for service industry outputs by the service sector. These remarks are obviously seen from a comparison of Table 5 and Table 8. When excluding the indirect input employments, only 4 service sector

industries provide at least 50 percent of their outputs used as intermediate inputs to the service sector, the number rises to 12 after the indirect effects are also taken into account. Among the service sector industries, water works and supply, public works, communication, real estates, and public services have almost all of their intermediate services supplied to other service industries. The manufacturing sector's shares of total input demand for intermediate services have been reduced sharply from those with only direct effects considered. Only the trade service still allocate much of its total intermediate service to the manufacturing sector with about 62 percent, compared with 32 percent to the service sector. To the agriculture sector, services from the bank and insurance, transportation, and trade industries are relatively important to other sector industries although their intermediate supply proportions in the sector are minimal. The transportation and banking and insurance industries also provide comparatively large total intermediate input shares to the mining sector.

IV.2 Forward and Backward Linkages

The important role of the service sector in relationship with other sectors in the Thai economy is further illustrated by the indices for backward and forward linkages effects computed from the inverse matrix of the net domestic input-output tableau. The forward linkage index then represents the normalized amount of output generated by one unit of final demand of each sector, whereas the backward linkage index is the measurement of normalized output of other sectors generated by one unit increase of any sector's final demand. Table 9 shows the backward and forward linkage effects of service sector industries for the Thai economy in 1975. Since inter-sectoral relationships vary across industries, certain industries may have relatively strong forward linkage effects to backward ones, reflecting high demand requirements of these industries' outputs as intermediate inputs by other industries resulting from one unit increase of final demand of each other

Among service sector industries, the trade service industry has the highest forward linkage effect index of 3.35 as compared with 0.81 for its backward effect index, which is low in the service sector. Other service industries that have forward linkage indices higher than one are the electricity, restaurants and hotels, transportation, and banking and insurance industries to signify their necessary role in supplying their outputs as intermediate inputs to other industries in the economy. For those industries that have the indices below one, the public service industry seems not to have much effects on forward linkages with other sectors as its index is computed at only 0.65. For the backward linkage effects, there is apparently no service sector industry that has as much effects in magnitude as compared to the trade service on forward effects. The relative low index values of backward linkage effects among service industries, therefore, reflects a weak role of the service sector to generate intermediate input demands of other sector outputs in the economy. The highest backward linkage index obtained is for the building construction with 1.19 while the lowest one is again eth public service industry's index of 0.72.

IV.3 Service Sector and Employment Effects

The preceeding analysis of the service sector industries has so far concentrated mainly on their inter-sectoral relationships with other sectors in the economy either as the supply sources of outputs for intermediate inputs or as the intermediate input demand sources for other industries' outputs. The analysis may be extended further to examine the relationships of the service sector and other sectors as well with the basic input factor of labor employment. Table 10 shows total coefficients of final demand impact on employment, computed from the inverse matrix of the net input-output tableau and the employment coefficient matrix.

From the obtained coefficients, it is clear that the agriculture sector has the strongest impact on employment in the Thai economy with the calculated coefficient of 0.14. This estimation apparently reflects the nature of agricultural farming in Thailand being relatively labor intensive and furthermore much of the labor force being engaged in one way or another with agriculture related activities. For the manufacturing sector and the service sector, the employment coefficients obtained from the input-output relationships do not give a clear indicator of their labor intensitivity levels. Although it is generally believed that the service sector is relatively labor intensive as compared with other sectors, the derived employment coefficients cast some doubts on this hypothesis. According to the obtained coefficients, the service sector industries do not have much significant impact on employment differently from those in the manufacturing sector. Furthermore, the food manufacturing industry has its impact coefficient four times higher than any service sector industries included in the study. Among service industries that are expected to employ a large number of labor such as trade service and banking, restuarants and hotels, real estates, and other services, their employment impact coefficients are not different significantly from that of the textile industry. This, therefore, suggests that the labor employment linkage with the service sector may be unexpectedly less different from that of other sectors in a labor surplus economy. There is, nevertheless, an indicator drawn from the obtained coefficients that for any modern technology industry such as chemical, rubber and textile product industry or public utility service industry, its employment impact is significantly lower than that of basic industries and services.

V. Summary and Conclusions

This paper provides an overview into Thailand's economic structure with emphasis on the service sector. The role of service activities was examined over the past two decades as to its contribution to the country's economic growth and trade. The economic linkage effects of the service industries was investigated by using the 1975 input-output table. The analysis found that the trade service industry has the highest forward linkage effects. And, in general, the service sector industries tend to have higher forward linkage effects than their backward effects.

With regards to employment effects, the results indicate that the employment impact of service industries is not significantly different from any manufacturing industry but is clearly lower than the agricultural sector.

Since the scope of this analysis has been limited to the interactions of service industries within a closed economy system framework, no discussions are given to service trade and trade barriers. These areas of research are severely lacking as trade in services is often treated with less importance than trade in commodities and manufactures. This lack of interest is likely to be changed soon because the setting for a large portion of future economic growth and job creation in the world economy lies heavily on the service sector.([12])

Table 1

GDP Annual Growth Rate by Sector, 1960–1979
(in constant 1962 prices)

	1960–65	1965–70	1970–77	1960–77	1975–79
Agriculture	5.2	5.7	3.8	4.9	4.6
Industry	11.3	10.4	8.5	7.4	13.5
Service	7.8	8.9	6.8	8.1	9.3
GDP	7.6	8.2	6.4	7.6	8.9
GDP per capita	4.2	4.9	3.7	4.4	4.7

Source : The World Bank, *Thailand : Toward a Development Strategy of Full Participation*, March 1980, p. 6 and NESDB.

Table 2

Percentage Distribution of GDP at Constant
Market Price by Sector, 1970 77

	1960	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Agriculture	40.0	28.3	28.2	30.3	33.8	31.6	30.5	29.6	27.4	28.1	25.3
Industry	14.0	25.3	25.7	24.5	22.9	23.9	25.1	26.5	28.3	28.3	29.7
Service	46.0	46.4	46.1	45.2	43.7	44.5	44.4	43.9	44.3	43.6	44.8
GDP	100	100	100	100	100	100	100	100	100	100	100

Note : Figures in 1975 to 1978 are revised in January 1980; Figures in 1979 are estimates.

Source : NESDB, *National Income of Thailand*, 1980 Edition.

Table 3

Value Added of Services at 1972 Prices, 1976–1980
(billions of baht)

	1976	1977	1978	1979	1980[a]	Average Growth Rate
Electricity	3.3	3.8	4.1	4.7	5.3	12.3
Water Supply	0.4	0.4	0.4	0.5	0.5	6.9
Transportation & Communication[b]	13.4	14.5	16.2	17.7	19.0	9.4
Retail and Wholesale Trade	38.8	41.2	43.7	45.5	47.1	5.0
Bank and Finance	9.2	10.3	12.0	13.9	14.8	13.3
Insurance and Real Estate	1.0	1.3	1.5	1.7	1.9	16.8
Education	5.6	6.2	7.1	7.8	8.4	11.0
Medical and Health	2.7	3.1	3.5	3.9	4.3	12.3
Recreation and Entertainment	2.0	2.0	2.1	2.3	2.6	7.8
Domestics	1.0	1.1	1.2	1.2	1.3	6.3
Hotels and Restaurants	6.5	7.1	8.2	8.9	9.8	11.0
Personal Services[c]	1.1	1.2	1.4	1.4	1.5	8.1
Business Services[d]	2.4	2.6	3.0	3.2	3.8	11.9
Ownership of Dwellings	3.7	3.8	4.1	4.3	4.5	5.3
Public Administration[e]	8.9	9.6	10.2	11.6	12.7	9.4

a) estimates
b) both public and private
c) laundries, barber shops and other personal services
d) religious organizations, welfare institutions, legal services, trade associations, etc.
e) including defence

Source : NESDB, *National Income of Thailand*. 1980 Edition.

Table 4

Intersectoral Linkages : Direct Intermediate Inputs (at Producers' Price) Supplied to Service Sector Industries, 1975

	Agriculture	Mining	Manufacturing	Services
Electricity	–	0.65	74.45	24.90
Water Works & Supply	–	6.16	47.36	52.64
Building Construction	1.34	6.16	65.16	27.34
Public Works	0.60	11.48	62.75	25.17
Trade	0.20	–	32.12	67.86
Restaurants & Hotels	11.86	0.04	57.61	30.49
Transportation	0.11	–	72.95	26.94
Communication	–	–	23.97	76.03
Banks & Insurance	0.06	–	32.89	67.05
Real Estates	1.95	–	11.29	86.76
Business Services	0.01	–	33.82	66.17
Public Services	2.02	–	49.29	48.69
Other Services	0.87	0.01	46.54	52.58

Source : Computed from Thailand Input-Output Joint Project, *Input-Output Table of Thailand for Analytical Uses, 1975*, Table 6.1.

Table 5

Intersectoral Linkages : Direct Intermediate Inputs (at Producers' Price) Supplied to Each Sector by Services, 1975

	Agriculture	Mining	Manufacturing	Services
Electricity	0.36	0.48	62.20	36.96
Water Works & Supply	4.32	2.50	62.54	30.64
Building Construction	9.28	6.57	50.67	33.48
Public Works	–	–	62.03	37.97
Trade	6.36	0.71	74.33	18.60
Restaurants & Hotels	0.26	4.51	56.07	39.16
Transportation	10.66	3.98	48.47	36.89
Communication	0.15	0.34	38.49	61.02
Banks & Insurance	21.11	6.63	43.21	29.05
Real Estates	3.30	0.12	36.38	60.20
Business Services	0.03	3.29	52.74	43.94
Public Services	–	–	40.36	59.64
Other Services	2.10	0.77	19.71	77.42

Source : See Table 4

Table 6

Intersectoral Linkages : Percentage of Service Industry Output Supplied for Intermediate and Final Use, 1975

Industry	Intermediate Use	Final Use
Electricity	65.96	34.04
Water Works & Supply	38.85	61.15
Building Construction	7.56	92.44
Public Works	2.00	98.00
Trade	26.40	73.60
Restaurants & Hotels	14.74	85.26
Transportation	24.49	75.51
Communication	37.28	62.72
Banks & Insurance	43.60	56.40
Real Estates	1.02	98.98
Business Services	63.53	36.47
Public Services	0.54	99.46
Other Services	15.73	84.27

Source : See Table 4

Table 7

Intersectoral Linkages : Total Intermediate Inputs (at Producers' Price) Supplied to Service Sector Industries, 1975

	Agriculture	Mining	Manufacturing	Services
Electricity	0.45	13.37	29.34	56.84
Water Works & Supply	0.59	5.29	23.22	70.90
Building Construction	2.16	4.88	35.03	57.93
Public Works	0.99	7.79	35.38	55.84
Trade	1.29	0.94	10.65	87.12
Restaurants & Hotels	8.08	1.30	24.12	66.50
Transportation	0.93	8.79	28.38	61.92
Communication	0.50	3.91	14.71	80.88
Banks & Insurance	1.10	1.24	12.19	85.46
Real Estates	0.56	0.86	7.53	91.05
Business Services	0.93	1.46	20.61	77.00
Public Services	0.78	0.86	8.32	90.04
Other Services	1.26	2.13	20.43	76.18

Source : See Table 4

Table 8

Intersectoral Linkages : Total Intermediate Inputs (at Producers' Price) Supplied to Each Sector by Services, 1975

	Agriculture	Mining	Manufacturing	Services
Electricity	2.05	0.86	26.64	70.44
Water Works & Suppty	0.69	0.37	8.21	90.73
Building Construction	2.62	1.52	19.59	76.27
Public Works	0.20	0.05	4.11	95.64
Trade	5.12	1.10	61.56	32.22
Restaurants & Hotels	2.35	1.62	31.24	64.79
Transportation	5.79	2.08	37.15	54.98
Communication	0.47	0.17	7.41	91.95
Banks & Insurance	6.61	1.99	28.43	62.97
Real Estates	0.20	0.07	3.16	96.57
Business Services	1.01	0.74	18.70	79.55
Public Services	0.07	0.03	1.29	98.61
Other Services	1.03	0.45	13.84	84.68

Source : See Table 4

Table 9

Backward and Forward Linkages Effects of Service Industries

Industry	Forward	Backward
Electricity	1.31	1.10
Water Works & Supply	0.73	1.02
Building Construction	0.91	1.19
Public Works	0.67	1.13
Trade	3.35	0.81
Restaurants & Hotels	1.20	1.11
Transportation	1.64	1.01
Communication	0.73	0.93
Banks & Insurance	1.26	0.83
Real Estates	0.67	0.74
Business Services	0.84	1.00
Public Services	0.65	0.72
Other Services	0.92	0.93

Source : Thailand Input-Output Joint Project, *Input-Output Table of Thailand for Analytical Uses, 1975*, Table 6.19.

Table 10

Coefficient of Final Demand Impact on Employment
(Persons/Thousand Baht)

Industry	Coefficients
Agriculture	0.140899
Mining(1)	0.016591
Food Manufactures(2)	0.077620
Textile	0.027662
Chemical, Rubber & Petroleum Products	0.013201
Public Utility	0.013688
Construction	0.019365
Trade	0.022215
Transportation & Communication	0.019582
Services(3)	0.025890

(1) including quarrying

(2) including beverage and tobacco

(3) including restaurants and hotels, banking and insurance services, real estate, and other services

Source : Thailand Input-Output Joint Project, *Input-Output Table of Thailand for Analytical Uses, 1975*, Table 6.16.

Footnotes

1. NESDB
2. Census Report 1960 and 1970
3. UN, *Statistical Year Book 1971*, (New York : UN, 1972), pp. 12–3. For specific service sector proportions of GDP in some selected industrialized countries, see Susan Clark Livingston, "The Role of Services in Trade", *Economic Impact 1982/4*, Figure 2, p. 49
4. Maurice Lengelle, *The Growing Importance of the Service Sector in Member Countries*, (Paris : OECD, 1966), pp. 8–9.
5. Quoted in Livingston, "The Role of Services in Trade", p. 50.
6. John M. Rathmell, *Marketing in the Service Sector*, (Cambridge, Winthrop Publisher, 1974), p. 24.
7. For a more detailed and complete list of service industries arranged in Standard Industrial Classification (SIC) numbers, please see Rathmell, *ibid.*, Appendix A.
8. For a theoretical discussion of the input-output table, see Robert Dorfman, Paul A. Samuelson, and Robert M. Solow, *Linear Programming and Economic Analysis*, (New York : McGraw-Hill, 1958), chs. 9–10.
9. Thailand Input-Output Joint Project, *Input-Output Table of Thailand for Analytical Uses, 1975*, (Bangkok, NESDB, 1972)
10. Bureau of Industry Economics, *Features of the Australian Service Sector*, Research Report No. 5, (Canberra : Australian Government Publishing Service, 1980), ch. 6. Basic technical uses of input-output analysis can also be found in Michael P. Todaro, *Development Planning, Models and Methods*, (Nairobi : Oxford University Press, 1975).
11. A larger table of 180 by 180 sectors is also available. But it does not provides necessary analytical features to be useful in this study.
12. See Livingston, "The Role of Services in Trade", pp. 51–2.