Economic Impact of Trade Exhibitions on the City-state Singapore Economy

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1. The Objective

This paper aims to study the economic impact of the trade exhibitions on the city-state Singapore economy from an intensive nation-wide survey as well as secondary source data for year 2000. An analytical model is developed to measure the economic impact on the following parameters:

- Output;
- Value added (or GDP);
- GST and gross tax revenue;
- Employment or jobs;
- Income (remuneration)
- Export, import and net foreign exchange earnings;

In all these parameters, the direct, indirect and induced impacts will be assessed to cover all aspects of the Singapore economy to be affected by the trade exhibition industry. Hence, the study will also provide detailed description of the trade exhibition industry's impact and economic multiplier on the various relevant industries such as hotels, food & beverage, transportation and other business service industries. In other words, there will be detailed breakdowns of the total impact according to the related industries.

2. The Conceptual Framework of Economic Impact of Industry Activities

Economic impacts are defined in this study as the changes in economic activity resulting from the activities in the trade exhibition industry. These changes have been expressed in terms of industrial output, value added, employment, foreign exchange earning and good and service taxes (GST).

Traditionally, an important use of the economic impact assessment tools is to measure or predict the economic effects of changes in tourism development and activity. Spending of tourists in a host community or region creates sales, income, jobs, tax revenues, and related economic activity. Recently, many such economic impact studies have been applied to exhibition industry as it not only includes the feature of tourism industry but also stimulate other export-related income from sectors such as freight transportation, advertisement and other business services. The exhibition industries in the internationalized cities such as Hong Kong, New York and Singapore are especially so.

The exhibition industry can have successive and magnified influences on a local economy in three ways.

- The initial injection of the exhibition spending (including spending from companies involved in the exhibitions and from exhibitors and visitors) provides ***direct*** revenues for organisers, contractors, venue operators, freight forwarders, hotels, food & beverage, retailers, airlines, sightseeing and creations, telecommunications and other local services.

- Second, the recipients of these direct expenditures spend some of that money to purchase the necessary inputs such as labour and materials. For instance, contractors purchase materials to build exhibition equipment and facilities; hotels purchase raw food for their restaurants, etc. This economic activity constitutes the indirect effect. One may have to notice the subtle revolving effect of these changes resulting from the initial trade exhibition activities between all economic sectors. Simply speaking, the

indirect effect would also feed back to the industries initially involved in the trade exhibitions in many rounds. Hence, the multiplier effect is named to account such revolving effect of changes in all sectors. If these multiplier effects, for example in sales revenue, are added to the above direct sales revenue of the industries initially involved in the trade exhibitions, the total sales revenue of these industries from trade exhibitions should become obviously more than their initial sales revenue. One will see very soon that such distinction between the original sales revenue and the total sales revenue from trade exhibitions is quite critical while considering the multiplier impact of trade exhibitions in the whole economy.

- Third, the beneficiaries of these direct and indirect revenues in turn spend their newly acquired income on unrelated goods and services, such as, housing, transportation and entertainment. This activity spurs successive rounds of purchases, with each round having diminishing effects because of leakage due to savings and purchase of imported products and services. This third type of spending creates the induced effect that is usually termed as the Keynesian consumption multiplier effect.

Taking together, the ***total effect*** of successive rounds of spending is a multiplier of original sales revenue from industries involved in the trade exhibitions. A simple measure of economic impact of trade exhibition would be the ***total effect*** itself. This simple measure means that the opportunity cost or the benefit forgone for not having the trade exhibition industry is the ***total effect***. However, if one would like to measure the multiplier impact of the trade exhibition activities in the whole economy, there are two alternative measures:

(a) The ***total effect*** over the original sales revenue from industries initially involved in trade exhibitions.
(b) The ***total effect*** over the total sales revenue from industries initially involved in the trade exhibition.

As explained above, the total sales revenue should be higher than the original sales revenue. Hence, the first measure of multiplier impact should have higher magnitude than the second.

3. Data for the Key Industries in the Trade Exhibition

Since the aim of this study is to assess the economic impact in Singapore for year 2000, one of the key tasks of this study is to obtain a complete industrial data from a comprehensive nation-wide survey and to utilize some secondary data sources provided by government bodies, such as Singapore Trade Development Board (TDB), Singapore Tourism Board (STB) and the Department of Statistics (DOS). The design of the survey and the compilation of data from secondary data sources are based on the understanding of the industrial structure for industries that directly involve in and are affected by trade exhibition.

3.1. The Industrial Structure for the Industries in Trade Exhibition

The exhibition industry in Singapore directly involves four kinds of players:

(1) **The venue operators**: They provide exhibition space and exhibition-related services. Their revenue includes
   - ♦ Rentals for the exhibition spaces
   - ♦ Service charges for exhibition functions

(2) **The exhibition organizers**: They organize regular and irregular (annualized or other irregular) exhibitions. If the organizers are not the venue operators, they will rent the exhibition spaces from various exhibition centers and partition the spaces into small standard shell booths and, eventually, sublet these booths to participants. Their revenue will include
   - ♦ Rentals from standard shell booths

- Service charge
  - To the regular exhibition participants: (a) charges of advertisement in local papers and media, (b) other management fees if the participant would trust the organizers to manage their product exhibitions.
  - To the irregular exhibition participants: (a) charges of advertisement in local papers and media, (b) other services charges such as providing hotel booking, teas and food for the exhibition and tourism arrangements.

(3) **The exhibitors**: They demonstrate their products in the exhibitions. They can be further divided into local and foreign participants. Most of exhibitors will have their staff attending the exhibitions. However, some exhibitors will only send their products for the exhibitions and trust the organizers to manage the exhibitions for them.

(4) **Visitors**: They participate exhibitions in order to view the products and make potential orders. They can be further divided into local and foreign visitors. There may be some visitors who do not have direct business interest from visiting the exhibitions but just have general interest on the exhibitions. They are mostly tourists.

The exhibition industry will have their impact on various industries. Based on the degree of impact, we can categorize the related industries in the following tiers:

(1) **The first tier**: the *directly* related industries

- Freight forwarders
- Designer/stand
- Supply of various exhibition-related equipment
- Transportation industry: airline, port, taxis
- Packaging and storage

(2) **The second tier**: these *indirectly* related supporting industries

- Hotels
- Food & Beverage (Restaurants)
- Telecommunication and postage
- Banking and financing
- Advertisement and publication
- Retail trade: spending by the exhibitors and visitors
- Entertainment
- Tourism

(3) **Third tier**:

- The supporting industries to all the above industries. For example, relevant equipment rental industries, food, fruit, meat and diary import industries, clothing and fashion industries, labor service industry.

In the conventional wisdom, industries in the 1st and 2nd tiers are considered as industries directly involved in trade exhibitions since a trade show will not be possible without their active involvement. Although all these industries in the 1st tier and 2nd tier industries will generate output from trade exhibitions, their roles in trade exhibitions are substantially different. The first tier industries ***actively and directly*** contribute to the trade exhibition events while the 2nd tier industries eventually derive revenue from the expenditures of exhibitors and visitors. In other words, the first tier industries play more active and direct roles in trade exhibitions than the second tier industries. Following the conventional industry grouping for the trade exhibition industries, a relatively large industrial base will have to be used for the impact study. The derived multiple times[1] of impact will thus be relatively small. If only the first

[1] Readers may wonder why we use the term "multiple times" instead of the normal term of "multiplier". The reason is that we do not want to cause any confusion with the various multipliers derived from the Input-Output Table in the coming sections. In fact, the purpose of this paragraph is to warn the readers to be aware of the fact that the magnitude of the actual impact depends on the selection of the base.

tier industries are considered as industries in trade exhibition industries, a relatively small industrial base will be applied for impact study. Consequently the derived multiple times of impact will have to be larger. In the following analysis of multiple times of economic impact of trade exhibition, we will try to explore the sensitivities by applying the two different industry groupings.

3.2. The Primary Data from the Nation-wide Survey

At the beginning of the study, we were informed by the Study Committee that there have been about 50 companies actively involved in the trade exhibition before the survey was designed. However, based on the information from the Exhibition Industry Directory compiled by TDB, our survey has tried to cover more than 200 companies in the following sectors of exhibition industry (See Appendix I for list of these companies):

(1) Professional exhibition organizers: 41 companies
(2) Venue operators: 14 companies
(3) Design & stand contactors: 116 companies
(4) Fright forwarders: 13 companies
(5) Suppliers: 14 companies
(6) Destinations: 11 companies
(7) Other: 10 companies

The aim of this wide coverage is to make such survey a comprehensive nation-wide survey for this industry. It should nevertheless be noticed that the number of companies in the category of Design & Stand Contractors consists of more than half of the companies in the survey. We found from the survey that many companies in this category were either no longer in operation for the trade exhibition or too small to be able to report their involvement in trade exhibition statistically meaningfully. We also found the same situation, to a less extend, in other categories. Therefore, the number of companies that participated in the survey was effectively restricted to 44, very close to the number suggested by the Study Committee. By considering such reasonable

omission of these insignificant companies from the survey, we believe that the survey has covered the majority of key players in all categories (see Appendix I for these companies).

Before finalizing the survey forms, we have conducted brainstorming sessions with various key players in the exhibition industry. In the end, six survey forms were created for the primary data collection. Details of these survey forms are attached in Appendix II.

The data of the following statistics has been collected from the survey:

(1) Operation revenue or total sales
(2) Operation expenditure including key expenditure components for events organizers
(3) GST payment
(4) Corporate tax
(5) Other indirect taxes
(6) Remuneration
(7) The number of full time employees
(8) The number of part time employees
(9) Aggregate events statistics of foreign and local exhibitors and visitors from event organizers
(10) Individual event statistics of foreign and local exhibitors and visitors, exhibition space, period of shows.

Except for the event statistics, the rest of the data in the above list are confidential information. To protect the interests of responding companies, these data will remain to be confidential and will not available to anyone else except the two neutral government bodies, namely TBD and STB, with the sole purpose of cross-checking the model.

Additional questions in regarding to the competitive situations of exhibition industry are also asked in the survey forms. From these qualitative questions

through survey, we will be able to collect **additional** qualitative information on many aspects of the industry, such as, perception on the industry performance, the role of government agencies, the impact of government services and policies, fee structures. These tangible and intangible aspects will be important for both government and industry initiatives in helping and positioning the industry in the coming years. They are also very useful to unlock the linkages between the industry performance and the various multipliers generated by the model.

3.3. Secondary Data Sources

TDB, STB and the Department of Statistics (DOS) have been approached to obtain the following data.

(1) The Number of Foreign Exhibitors and Visitors and the Number of Days that Foreign Exhibitors and Visitors Stayed in Singapore

Initially, TDB has provided the data from 29 trade exhibitions approved or endorsed by TDB in 2000. STB has subsequently provided the data from 41 trade exhibitions that overlap 25 trade exhibitions provided by TDB. During our survey exercise, we obtained data for a few more additional trade exhibitions. In the end, these three sources have provided the data of foreign exhibitors and visitors from 51 trade exhibitions (See Appendix III for the data). These shows together provide a fairly comprehensive coverage of trade exhibition activities in Singapore for year 2000.

Since the exhibition companies only reported the number of exhibition companies participated in exhibition instead of the number of individuals from the exhibition companies, we considered the following two scenarios to covert the company numbers into number of individuals from companies for the empirical sensitivity studies:

- Multiplying the number of exhibition companies by 3 by ***conservatively*** assuming that each company only sent 3 people to exhibition.

- Based on our survey of the four trade exhibitions in 2001, namely, MTA Asia, Sial Asia, CommunicAsia and Pala, the average number of individuals from exhibition companies is very close to 6 people. We hence multiply the number of exhibition companies by 6.

In regarding to how many days that foreign exhibitors and visitors stayed in Singapore for the exhibition, we basically relied on the actual days of each exhibition. On average, exhibitions last about 3-4 days. However, it is usually believed that most of exhibition companies would send their staff to Singapore about 2-3 days in advance to make preparation for exhibition and will leave Singapore one day after the exhibition. Nevertheless, most visitors will only stay in Singapore about 3 nights during the exhibition, approximately, the arriving day, one day or two for visiting the exhibition and the leaving day. This means that the number of days visitors stay in Singapore is quite close to the average days of exhibitions. Our survey from the 4 exhibitions in 2001 (MTA2001, Sial 2001, CommunicAsia 2001 and PALA 2001) basically confirmed such pattern (see Section II of this study - upcoming). We hence assumed the following scenarios for the empirical sensitivity studies:

- The conservative consideration: all exhibitors arrive and visitors in Singapore one day before the exhibition. The exhibitors leave Singapore one day after the closing day and visitors leave Singapore just in the closing day. Hence, the number of days staying in Singapore for foreign exhibitors is the actual days of each exhibition plus one more day and the days staying Singapore for visitors are the actual days of exhibitions.
- The more realistic consideration: The number of days staying in Singapore for foreign exhibitors are the actual days of each exhibition plus three more days. The number of days for the foreign visitors will remain as that in the above scenario.

To summarize the about assumptions about the number of individuals from exhibition companies and the days that exhibitors and visitors stay in Singapore, we have the following 4 scenarios that would generate different data sets of the number of staying days from foreign exhibitors and visitors (Table 1):

Table 1: Four Scenarios Considered in the Study

	Numbers of Foreign Exhibition companies (E)	Number of Foreign Visitors (V)
Scenario 1	(3 x E) x (1 day + actual exhibition days)	V x (actual exhibition days)
Scenario 2	(3 x E) x (3 days + actual exhibition days)	V x (actual exhibition days)
Scenario 3	(6 x E) x (1 day + actual exhibition days)	V x (actual exhibition days)
Scenario 4	(6 x E) x (3 days + actual exhibition days)	V x (actual exhibition days)

(2) Expenditures by Foreign Exhibitors and Visitors and Airticket Expenditure for Singapore Airlines

STB has provided the aggregate data of per diem expenditure for both foreign exhibitors and visitors and the percentage breakdown of the per diem expenditure in the categories of hotel, food & beverage, shopping, sightseeing, transport, entertainment & recreation and others. Applying the per diem expenditure data to the number of foreign exhibitors and visitors (on the person-day basis), we generated the total expenditure from foreign exhibitors and visitors in the various sectors.

Airticket expenditure for Singapore Airlines from foreign exhibitors and visitors is considerable revenue for the Singapore economy. Based on the survey from the 4 exhibitions in 2001, about 40% foreign exhibitors and visitors took Singapore airlines and, among them, approximately 25% took business class and 75% took economy class. We accordingly derived the airticket expenditure for Singapore Airlines based on the country distribution of foreign

exhibitors and visitors and the various fees charged to different countries by Singapore Airlines.

(3) Singapore's 1990 I-O Table

We obtained the 1990 I-O Table from Singapore Department of Statistics (DOS). The Singapore's 1990 I-O Table captures 173 I/O inputs. The trade exhibition industry was aggregated into the Other Business and Technical Services Industry in I-O Table (Code 160).

The 1990 I-O table provides the matrix of input-output linkage between 174 sectors in 1990. Such linkage eventually indicates an industrial linkage or relationship model of the Singapore economy. We applied the collected data to the industrial linkage model specified from the 1990 I-O table to verify how much the exhibition industry impacted the whole Singapore economy in 2000. It should hence be noticed that the validation of our estimates is largely restricted to how representative the 1990 I-O table could be for the industrial relationship of Singapore economy in 2000. The Singapore economy completed its transformation from a relatively labor-intensive economy into a capital-intensive economy in early 1980s and has entered into a stable economic growth since 1986 (Lim Chong Yah and Associates 1988). We thus assert that the basic industrial relationship in 1990 should largely remain the same in 2000.

(4) Time-series data for trade exhibition and business and technology service industries

We also obtained this time-series data from DOS. Since the trade exhibition industry was aggregated into the Other Business and Technical Services Industry in I-O Table, we intended to use these time-series data to understand how the trade exhibition industry has been weighted in the Other Business and Technical Services Industry over time.

3.4. Data Processing

After obtaining the above data from survey and secondary sources, we have done the following data editing to obtain the final data for modeling:

- Compiling the sales revenue data for the sectors of events organizers, venue operators, freight forwarders, design & stand contractors, suppliers and destinations based on the data collected from the nation-wide survey. The sales revenue of freight forwarders from the survey was distributed into the sectors of freight transport services (road, shipping line), freight shipping agent, freight agent (airline), forwarding, packaging & crating services, storage & warehousing services, courier services, cargo surveying services, crane & container services according to their corresponding percentages in the freight forwarding industry in the 1990 I-O Table.[2]

These compilations led to sales revenues of the following 5 key industries in trade exhibition or 10 sectors in the 1990 I-O Table (Table 2):

Table 2: The Key Industries in the Trade Exhibition and Their Corresponding Sectors in the 1990 I-O Table

Key industries in trade exhibition	Industries in the I-O Table	Industry Code in I-O Table
1. Exhibition organizers	Business & technical services	160
2. Designers & stand contractors	Business & technical services	160

[2] The percentage distributions are: freight transport services (road): 6.69%; freight transport services (shipping line): 27.76%; freight shipping agent: 7.92%; freight agent (airline): 36.28%; forwarding, packaging & crating services, storage & warehouse: 6%; courier services, cargo surveying services: 14.43%; container services and crane services: 0.9%.

3. Freight forwarders	Freight transport services (shipping line)	139
	Freight shipping agent	140
	Freight transport service (road)	138
	Freight agent (airline)	141
	Forwarding, packing & crating services, storage & warehousing	142
	Cargo surveying and courier services	143
	Container services (incl rental) and crane services	144
4. Suppliers	Rental of office machinery & equipment, sound reproducing & recording equipment, etc.	158
5. Venue operators	Letting & operating of self-owned real estate except hotels, lodging & boarding houses	151

- Compiling the sales revenue data for the sectors of hotel, food & beverage, shopping (retails), sightseeing, transport, entertainment & recreation, telecommunication and medical, Singapore Airlines (or air transport) based on the data of per diem expenditure, the number of days staying in Singapore from foreign visitors and exhibitors in each trade exhibition.

It is obvious that the above two sources of sale revenues are directly generated from trade exhibitions. These data are hence considered as the ***preliminary data*** that will be applied to the analytical model based on 1990 I-O Table.

- Distributing (or margining) the sales revenue from the above two sources into the final demands of all 173 sectors in the 1990 I-O Table. It is clear that data from this distributing process is the ***derived data*** in nature as the economic relationship between sectors implied in the 1990 I-O Table is already applied in the distributing process.

3.5. Preview of the Preliminary Data

Appendix IV reports the summary of the preliminary data complied from both survey and secondary source. Some key features of the relative importance of industries initially involved in trade exhibitions can be observed from the preliminary data. Table 3 uses the sales revenues of these industries to illustrate such of these features. The industries that provide preliminary data from survey are the industries directly involved in the trade exhibitions. The industries which sales revenues are derived from secondary source data are the industries affected initially from the trade exhibitions. Under the first two scenarios with the conservative assumptions about the individual whom the exhibition companies send to exhibitions and the extra days foreign exhibitors and visitors stay in Singapore, the total sales revenue of the industries from survey is slightly more than that from the secondary source data. The application of moderate assumptions just reverses this ratio. The application of 6 individuals per exhibiting company led to considerable change of the ratio.

Table 3: The Sales Revenue of Industries Initially Generated from Trade Exhibitions

S$ millions

(1) Data from survey				
Organizers	155.80			
Designer/Stand	102.89			
Freight forwarders	17.92			
Destinations	9.86			
Suppliers	3.23			
Sub-total	289.71			
(2) Data from secondary source				
	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Airtickets	112.95	112.95	149.08	149.08
Hotel	84.23	97.76	117.57	144.63
Food & Beverage	34.12	39.84	48.23	59.68
Shopping	38.97	43.4	49.88	58.73
Sightseeing	3.76	4.09	4.59	5.26
Local transport	12.32	14.37	17.38	21.50
Entertainment & Recreation	11.74	13.71	16.60	20.53
Others	2.02	2.47	3.12	4.02
Sub-total	300.11	328.61	406.45	463.43
Grand total*	589.83	618.32	696.16	753.15

% of sub-total from survey in the grand total	**49.1%**	**46.9%**	**41.6%**	**38.5%**

(*) The grand total is the sum of sub-total from survey and sub-total from secondary data by each scenario.

4. The Analytical Model of Economic Impact and Its Implementation

We used the input-output approach to estimate the direct, indirect and induced economic effects as the approach has been widely accepted as the most comprehensive approach for the study of economic impact. The full explanation of input-output methodology in the study of economic impact is quite technical and rather tedious. We hence leave those technical explanations to Appendix V. The following section will only focus on the basic structure of the model and its implementation.

4.1. The Basic Features of Leontief's Input-Output Model

The basic structure of the original Leontief's input-output model can be illustrated by the following table (Table 4):

Table 4: A Highly Simplified Input-Output Accounting Framework

	Industries	Net final demand	Total output
Industries	Z	Y	X
Value added (primary inputs)	V		
Total output	X		

Source: United Nations (1999).

In the above table,

- The first row characterizes the "purchasing sectors" (**purchasers**), while the first column captures the "selling sectors" (**sellers**);
- Each data column under "Industries" represents the sales from other sectors to sector *i*, that is, *i*'s purchases of the products of
- various producing sectors in the economy. Hence the column represents the sources and magnitudes of sector *i*'s **inputs**.
- On the other hand, in engaging in production, a sector also pays for other items – for example, labour and capital – and uses other inputs as well, such as inventoried items. All of these together are termed the **value added** in sector *i*. In addition, imported goods may be purchased as inputs by sector *i*. All of these inputs (value added and imports) are lumped together as purchases from what is called the **payments sector**, whereas the *Z*'s on the right-hand side of (I.1) serve to record the purchases from the **processing sector**. In other words, *Z* captures the so-called **interindustry inputs**.
- In the case of Singapore, the net final demand is the sum of the following items:[3]
  - Private consumption;
  - Government consumption expenditure;
  - Gross capital formation;
  - Change in stocks; and
  - Exports.
- For Singapore, the total value added is the sum of the following items:
  - Imports of goods and services;
  - Commodity taxes;
  - Other indirect taxes;
  - Remuneration; and

[3] Hence, the distribution of preliminary data from the survey and secondary source in the industries involved initially in the trade exhibitions into the final demand of each sector in the economy will eventually assign the corresponding values of these items in each sector.

- Gross operating surplus.

There are whole ranges of impact studies based on the input-output table. The underlying principle is quite simple (Miller and Blair (1985)):

$$\Delta \boldsymbol{X} = (\mathbf{I} - \boldsymbol{A})^{-1} \Delta \boldsymbol{Y} \qquad (1)$$

where $\Delta \boldsymbol{Y}$ captures the **change** in the final demand as a result of a particular event or policy or by a particular sector and $\Delta \boldsymbol{X}$ captures the impact on outputs of all sectors.

A multiplier is a ratio which measures the impact on the total economy as a result of an initial autonomous change in any of the final demand components. The common multipliers used are output, valued-added (VA), employment, import and income multipliers. For comparative purposes, multipliers are usually expressed with respect to a unit of autonomous change in final demand. Each of the multipliers can be generated from two different models: **open** and **closed**. The intrinsic difference between them is the treatment of household income and personal consumption expenditure. In the *open* model, all final demand components are assumed to be exogenous. Hence the *open* model captures the production-induced effects resulting from a change in final demand. The multipliers generated using the open model are also known as **simple multipliers** or **Leontief multipliers**. This kind of model is described as *open* because at each round of the multiplier process, there are leakage from the system. The leakage consists of payments for imports and primary inputs and the recipients are assumed to make no use of their receipts. Even if a small part of the receipts were spent on goods and services, there would be further multiplier repercussions.

- **In our context, Leontief multipliers will capture the direct and indirect effects of an autonomous change in final demand.**

Conversely, in the *closed* model, the household sector is treated as endogenous to the system. The household sector receiving income from the work done in the production process would spend some of this income on local products. This increase in consumption would in turn increase the level of output of the products. In other words, the *closed* model accounts for both the production-induced effects as well as the consumption-induced effects. The multipliers generated using the *closed* model are commonly known as the **total multipliers** or **Leontief-Keynes** multipliers.

- **In our context, Leontief-Keynes multipliers will capture the direct, the indirect AND the induced effects.**

Therefore, in our calibration of the input-output model, we will derive both the Leontief multipliers and Leontief-Keynes multipliers for output, VA, import and export (hence net foreign exchange earnings), and employment.

4.2. The Four Principal Steps of Modeling

Four principal steps were taken in modeling of economic impact of the exhibition industry in Singapore.

Step 1 - Define the sectors that are directly affected by the exhibition industry and distribute total output into these sectors

- Based on the availability of primary data and secondary data source, the following sectors are identified as the sectors directly involved in or affected by trade exhibitions (Table 5):

Table 5: The Key Industries in Trade Exhibitions

Key players in Trade Exhibitions	Industries in the I-O Table	Industry Code in I-O Table
(1) Exhibition organizers & venue operators	Business & technical services	160

(2) Designers & stand contractors	Business & technical services	160
(3) Freight Forwarders	Freight transport services (shipping line)	139
	Freight shipping agent	140
	Freight transport service (road)	138
	Freight agent (airline)	141
	Forwarding, packing & crating services, Storage & warehousing	142
	Cargo surveying and courier services	143
	Container services (incl rental) and crane services	144
(4) Suppliers	Rental of office machinery & equipment, sound reproducing & recording equipment, etc.	158
(5) Venue operators	Letting & operating of self-owned real estate except hotels, lodging & boarding houses	151
(6) Foreign Exhibitors and Visitors	Singapore airline	141
	Hotels	136
	Food & beverage	135
	Shopping	134
	Sightseeing	168
	Local transportation	137
	Entertainment & recreation	167
	Telecommunication	145
	Medical & health services	164

As discussed before, the first 5 types of players are in the first tier industries of trade exhibitions. They ***actively and directly*** contribute to the trade exhibition events. The type 6 players are in the second tier industry. They derive revenue from the expenditures of exhibitors and visitors. In other words, the first 5 types of players play more active and direct roles in trade exhibitions than the type 6 players. In the following analysis of multiple times of economic impact of trade exhibition, we will thus treat these two groups of industries differently.

- Distribute the total output to all these industries. Specifically, the expenditure data from STB for foreign visitors and exhibitors and numbers of foreign visitors and exhibitors from various exhibitions were used to determine the exhibition-related output of industries of hotel, food & beverage, shopping (retails), sightseeing, local transportation, entertainment & recreation, telecommunication and medical service.[4] The output data for the rest of industries listed in the above Table are from our survey. However, the distribution of output of freight forwarders into the various industries (code 139 - 144 in I-O Table) was done based on the percentage of these industries output in their total in the 1990's I-O table.[5]

Step 2 - Bridging the output of each industry specified in step 1 into the final demand of all industries in the I-O Table.

From the 1990's I-O Table, we identified the final industrial demand from all industries in terms of output of each industry specified in step 1. The obtained output of each industry specified in step 1 was then bridged into all industries in the 173 industries in the I-O Table. Such bridging can be expressed as:

[4] The STB data does specify how much percentage spending from per diem of foreign exhibitors and visitors was on telecommunication and medical services. We believe that spending on such two services could be necessary. We simply distribute the percentage of the residual term "Other" in the STB data into these two services. 60% of the "other expenditure" was distributed to telecommunication and 40% was distributed to medical service. However, it is also likely that these two services were not recorded in the STB data. If so, some measures may have to be taken to consider expenditures for these two services.

[5] The distribution ratios are freight transport service (road) 6.69%; freight transport services (shipping line) 27.76%; freight shipping agent 7.92%; freight agent (airline) 36.28%, forwarding, packaging & crating services, storage & warehouse 6%; courier services, cargo surveying services 14.43%, container services (incl rental) and crane services 0.9%. The member from freight forwarders in the Study Committee may want to have a judgment on the suitability of such distribution ratios from 1990's I-O Table as an approximation for the 2000's situation.

$$FD_k = \sum_{j=1}^{n} Y_j \times B_{jk} \qquad (2)$$

Where *FD* indicates final industrial demand and is for K industries (eventually 173 industries in the I-O table), Y is output of the industries specified in step 1 and is for number of j industries (eventually 18 industries as specified in step 1), B is the percentage of final industrial demand in terms of the related industry's output. Therefore, the result from implementing equation (6) is a vector of final demand for 173 industries in the entire Singapore economy covered in the 1990's I-O table.

Step 3 - Applying the final demand vector to the Singapore economic model verified by 1990's I-O Table.

Impacts are estimated by multiplying the final demand vector by the various sets of multipliers R,

$$I = R * FD_k \qquad (3)$$

where ***I***'s are impacts expressed as changes in output, value added, import requirement, exchange earning and employment. Since there are no matrix for income multipliers and government revenue multipliers, some other information from the I-O Table or secondary source data have to be used in terms of the derived final demand vector to obtain the impact on income and government revenue.

Step 4 - Interpret the estimated result

The estimated result were analyzed from the components of direct, indirect, induced and total impact in terms of the entire Singapore economy as well as the top 10 industries affected the most.

The direct impact and indirect impact are derived from the estimates using Open Model multipliers. The direct impacts are drawn from the estimated result for the 18 industries specified in step1; the indirect impacts are drawn from the estimated result of the rest of 155 industries.

Induced impacts are derived as the difference between the estimated results from using open model and close model multipliers. The total impact is eventually the estimated results from using the close model multipliers.

Some comparisons of the estimated result to the information from some specific cases and international benchmarks were implemented in order to check the reliability of the estimated result and also assess the position of Singapore exhibition industry in the world.

5. The Analysis of the Estimation Results

5.1. The Development of Singapore Exhibition Industry

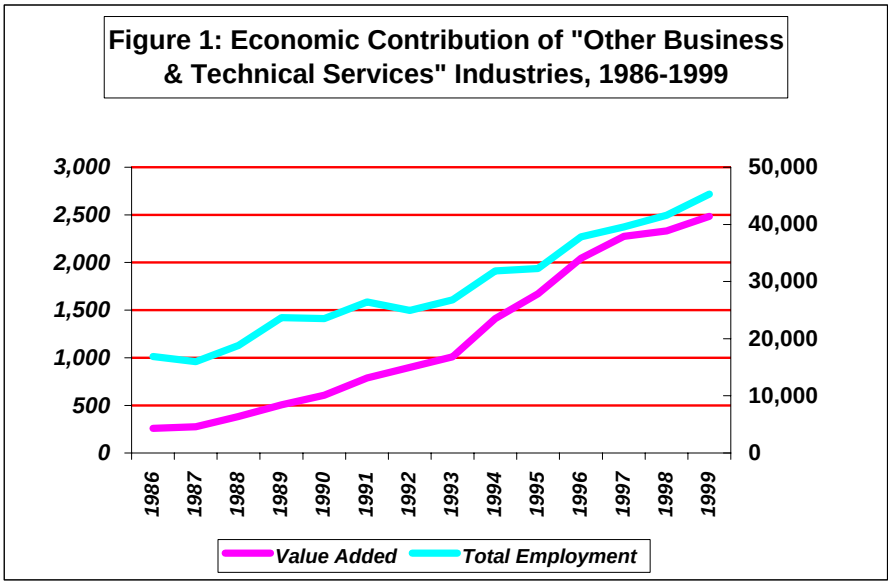
While the DOS designed the Singapore I-O Table in 1983, the industry of exhibition fair and convention organizers was too small to be established as an individual industry in the I-O table. It was then grouped in to the industry of other business and technical services (coded 160, see Appendix VI for the definition of sectors in 1990 I-O Table). As for 1998, output and value added of the industry of exhibition fair and convention organizers consisted of 3.77% and 3% of that of other business and technical services respectively.

However, this industry expanded rapidly over time. Compare the output from exhibition fair and convention organizers in 1998 to that in 1986, the growth rate is about 800%, or an average increase of 6.5% per year. Figures 1 and 2 show the historical trends of employment and value added of the industries of "exhibition fair and convention organizers" and "other business and technical services", three features can be observed:

(1) The two industries have increased substantially in all three indicators;

(2) The growth rates in the three indicators over time are quite similar.

(3) The industry of exhibition fair and convention organizers has demonstrated clear cyclical growth pattern. Employment, output and value added have all fluctuated over time. It is interesting to notice that this industry has on average performed better in the even years than that in odd years. Such pattern may have been largely due to some key exhibition events that have only been hold in even years. On the other hand, the growth in the industry of "other business and technical services" has been rather steady.



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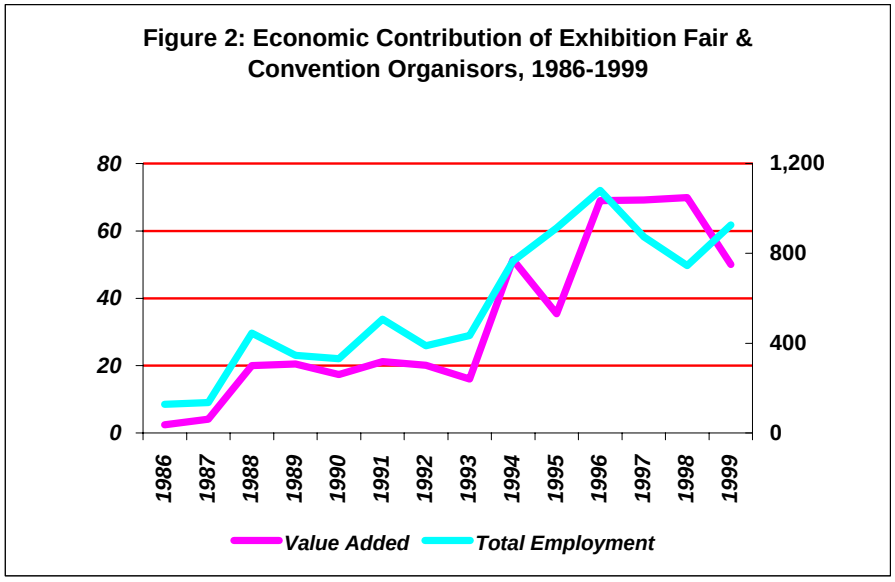

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One may have to notice that the industry of exhibition fair and convention organizers in the above table is just a part of industries directly involved in trade exhibitions. If we define all industries that directly involve in the trade exhibitions as we defined above, the exhibition industry will be much bigger in size. Moreover, the exhibition industry will have substantial economic impact in other economy. Hence, the economic significance of the exhibition industry can never be judged just from the narrowly defined industry of exhibition fair and convention organizers but must be assessed from its overall economic impact. The following estimated result would prove exactly this point.

5.2. Output Effects

Corresponding to the 4 scenarios discussed above, 4 types of output effects are estimated and are reported in Table 6.

Table 6: The Output Effects of Trade Exhibitions

	Scenarios			
	1	2	3	4
Estimated effects from I-O Table (S$ millions)				
Total*	3374.2	3554.8	3923.2	4284.4
Direct				

1st Tier Industries	1113.2	1126.5	1151.8	1178.3
1st & 2nd tier industries	2396.7	2523.2	2787.3	3040.4
Indirect				
Incl. 2nd tier industries	1483.5	1609.0	1871.3	2122.3
Excl. 2nd tier industries	200.1	212.2	235.8	260.2
Induced	777.5	819.3	900.1	983.8
Preliminary data from survey and secondary source data (S$ millions)				
1st tier industries	289.7	289.7	289.7	289.7
1st and 2nd tier industries	589.8	618.3	696.2	753.1
The multiple times of impact (times)				
Total effect vs preliminary data (1st tier industries)	11.65	12.27	13.54	14.8
Total effect vs preliminary data (1st & 2nd tier industries)	5.72	5.75	5.64	5.69
Total effect vs direct effect (1st tier industries)	3.03	3.16	3.41	3.64
Total effect vs direct effect (1st & 2nd tier industries)	1.41	1.41	1.41	1.41

*The total effect may not be added up from direct, indirect and induced effects because of rounding.

The direct and indirect effects are also differentiated according to the distinctions between 1st and 2nd tier industries. This means that two types of direct as well as indirect effects will be produced. Type 1 will count the effects from the first tier industries as direct effect and the effect from the rest of industries as indirect effect. Type 2 will count the effects from both first tier and second tier industries as direct effect and the effect from other industries as indirect effect.

5.2.1. The magnitude measure of economic impact on output

As suggested before, the simply measure of economic impact is the magnitude of total effects. The total effects on output of the 4 scenarios range from S$3.37 billions to S$4.28 billions.

One has to notice that output includes the cost from imports. But imports are leakage from the economy and hence cannot be counted as part of the contribution to economic welfare. However output is a good indicator of economic scale. It is hence interesting to report the output effects as a useful indicator to indicate how the economic size was affected by trade exhibitions.

5.2.2. The multiple times measure of economic impact on output

To assess the multiple times of economic impact of trade exhibition, it is important to identify which part of the activities involved in the trade exhibitions are used to compare the total effects. Four kinds of comparisons are presented in Table 6 by using four kinds of activities:

(1) Total effects vs the 1st tier industries' sales revenue from the preliminary data complied from surveys. As indicated in Table 2, the sales' revenues of the 1st tier industries is about half of the total sales revenues of both the 1st and 2nd tier industries. Using only the 1st industries' sales revenue as the denominator, the derived multiple times of the economic impact is considerably large, ranging from 11.65 to 14.8 over the four scenarios.
(2) Total effects vs the 1st and the 2nd tier industries' sales revenue from the preliminary data. Obviously, the denominator becomes bigger and the derived multiple times of economic impact becomes relatively smaller, ranging from 5.64 to 5.75 over the 4 scenarios, a quite narrow range.
(3) Total effects vs direct effects from the 1st tier industries. As discussed before, due to the interactions between all sectors in the economy, the output of the 1st tier industries will not be restricted to the output directly derived from specific trade exhibitions. The 1st tier industries will also generate some output from other industries in the multiplier process between sectors. Hence, the estimated output from I-O Table for the 1st tier industries will be different from and eventually more than the primary output from the survey data. Moreover, all of the 1st tier industries are aggregated into different industry groups in the I-O Table. For example, the organizers of trade exhibition and designers/stand are grouped into industry of other technical and business services (code 160). The industry of other technical and business services includes 31 industries such as advertising and related services. Since it is impossible to differentiate the output of the 1st tier industries individually from the I-O Table estimates, only aggregate output of these industry groups can be added up as a

proxy for the output of the 1st tier industries. Obviously, such proxy will over-estimate the actual output of the 1st tier industries as the proxy also includes output from other similar industries in the corresponding industry groups that may also generate output from the impact of trade exhibitions. The derived multiple times of multiplier impact will thus be under-estimated to some extend. However, it is expected that the output generated from trade exhibition-related activities from other similar industries may be quite limited. Hence, the over-estimation of output for the 1st tier industries may not be that substantial.[6] The derived times of multiplier economic impact range from 3 to 3.6 over the four scenarios.

(4) Total effects vs the direct effects from the 1st tier and the 2nd tier industries. With the largest denominator used in this case, the derived multiple times of economic impact become the smallest and is about 1.41 for all scenarios.

In general, the various estimates of the multiple times of economic impacts have their own merits but limitations. While the first two are subject to the problem of over-estimation and the last two subject to the problem of under-estimation, the reasonable multiple times of impact should be the one between the two kinds of estimates. However, one must notice that the total effect, i.e. the measure of magnitude of the impact, is the same no matter how the multiple times would differ according to different denominators used in the calculations. Hence one should not put too much emphasis on the measures of various multiple times although it may be somehow convenient to use them as intuitive indicators of the impact. Instead, the emphasis should be the total effect.

[6] In 1999, the total output for the technical and business services (code 160) was about S$7.2 billions in which S$0.15 billions was for trade fairs and conventions. In our estimate, the trade exhibition-related output of the industry (code 160) for 2000 is about S$0.78 billions, the collected preliminary output for organizers and designers/stand are about S$0.26 billions. If consider more output generated the multiplier feedback process for organizers and designers/stand, the final output of direct effect will be more than S$0.26 billions.

5.2.3. The benchmark case

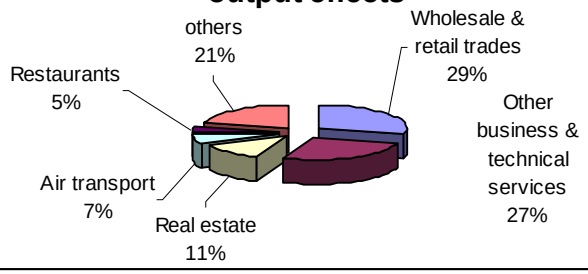
The scenario 2 case based on the moderate assumptions can be treated as a benchmark case. Under this scenario, the measures of economic impact are:

- The magnitude of economic impact on output is S$ 3.37 billions;
- The multiple times of economic impact from the 1st tier industries to the whole economy is 12.27 by using the primary data as denominator and 3.16 by using the estimate from I-O model.
- The multiple times of economic impact from the 1st and 2nd tier industries to the whole economy is 5.75 by using the primary data as denominator and 1.41 by using the estimate from I-O model.

5.2.4. The Industrial Structure of the Economic Impact on Output

The distribution of economic impact among the 173 sectors in the 1990 I-O Table can be identified from the I-O model study. The detailed distributions over the 4 scenarios are reported in Appendix VII. The top 5 industries in the total effects from the scenario 4 are presented in Figure 3.[7]

Figure 3: Totp five industries in output effects



[7] The industrial rankings from other scenarios are quite similar as one can see from the Appendix VII.

From the figure, it shows that the top 5 industries are (2) whole sale & retail trades; (2) other business & technical services; (3) real estate;[8] (4) air transport; (5) restaurants. Their share in the total amounts to 79% percent.

5.3. *Value-Added Effects*

Value-added effects are the most comprehensive measure of economic impact as they indicate the total economic welfare generated from the trade exhibitions. Hence, the estimates of value-added in each scenario are also compared to GDP in 2000. The ratios of value-added and GDP are reported in Table 7 as a simple indicator of relative importance of trade exhibitions in the whole economy.

Table 7: The Value-Added Effects of Trade Exhibitions

	Scenarios			
	1	2	3	4
Estimated effects from I-O Table (S$ millions)				
Total*	1067.0	1125.4	1236.1	1352.9
Direct				
1st Tier Industries	394.7	401.6	414.0	428.0
1st & 2nd tier industries	785.5	827.7	908.0	992.4
Indirect				
Include 2nd tier industries	443.8	482.2	556.4	633.4
Exclude 2nd tier industries	53.0	56.2	62.4	68.9
Induced	228.6	241.5	265.6	291.6
Preliminary data from survey and secondary source data (S$ millions)				
1st tier industries	89.1	89.1	89.1	89.1
1st and 2nd tier industries**	181.4	190.1	214.1	231.6
The multiplier impact (times)				
Total effect vs preliminary data (1st tier industries)	11.98	12.63	13.87	15.18
Total effect vs preliminary data (1st & 2nd tier industries)	5.88	5.92	5.77	5.84
Total effect vs direct effect (1st tier industries)	2.70	2.80	2.99	3.16
Total effect vs direct effect (1st & 2nd tier industries)	1.36	1.36	1.36	1.36

[8] In the I-O Table, the real estate industry is coded 151 that includes the venue operators of trade exhibitions.

Percentage of total VA in GDP (%)	0.67	0.71	0.78	0.85

***** The total effect may not be added up from direct, indirect and induced effects because of rounding.

** Since there is no primary data of value-added for 2nd industry from survey, such value added is estimated. The ratio of value added and sales revenues of the 1st tier industries from survey is applied to the sales revenue of the 1st and 2nd industries (see Table 2) to obtain their value added as reported above.

5.3.1. The magnitude measure of economic impact on value added

The total effects on value-added of the 4 scenarios range from S$1.07 billions to S$1.35 billions. The ratio of these estimated value-added in GDP ranges from 0.67% to 0.85%.

5.3.2. The multiple times measure of economic impact on value added

(1) Total effects vs the 1st tier industries' value added from the preliminary data complied from surveys. The estimates range from 11.98 to 15.18 over the four scenarios.
(2) Total effects vs the 1st and the 2nd tier industries' value from the preliminary data. The estimates range from 5.77 to 5.92 over the four scenarios.
(3) Total effects vs direct effects from the 1st tier industries. The derived multiple times of economic impact range from 2.70 to 3.16 over the four scenarios.
(4) Total effects vs the direct effects from the 1st tier and the 2nd tier industries. The derived multiple times of economic impact is about 1.36 for all four scenarios.

5.3.3. *The benchmark case*

Under the benchmark case of the scenario 2, the measures of economic impact are:

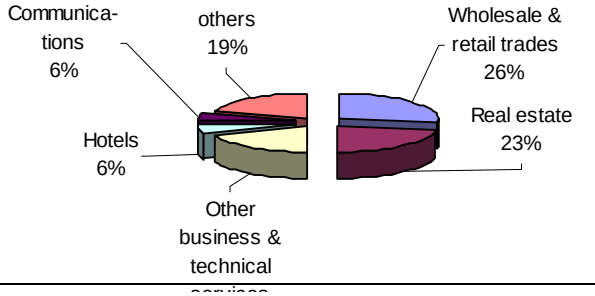
- The magnitude of economic impact on output is S$ 1.125 billions;

- The multiple times of economic impact from the 1st tier industries to the whole economy is 12.63 by using the primary data as denominator and 2.80 by using the estimate from I-O model.
- The multiple times of economic impact from the 1st and 2nd tier industries to the whole economy is 5.92 by using the primary data as denominator and it becomes 1.36 by using the estimate from I-O model.

5.3.4. The Industrial Structure of the Economic Impact on Value-added

The distributions of total value-added effects from scenarios 4 are presented in Figure 4. The top 5 industries are (1) whole sale & retail trades; (2) real estate; (3) other business & technical services; (4) hotels; (5) communications. Their shares in total amount to 81% percent. It is interesting to notice that communication and hotels replace air transport and restaurants in the top 5 ranking, indicating that the two industries are relatively high value-added industries.

Figure 4. Top five industries in value-added effects



5.4. *Net Foreign Exchange Earnings Effects*

The derived results on the net foreign exchange earnings are summarized in Table 8.

5.4.1. The magnitude measure of economic impact on net foreign exchange earnings

The total effects on net foreign exchange earnings of the four scenarios range from S$649 millions to S$825 millions.

Table 8: Net Foreign Exchange Earnings Effects of Trade Exhibitions

	Scenarios			
	1	2	3	4
Estimated effects from I-O Table (S$ millions)				
Total	649.1	679.9	764.1	825.7
Direct				
1st Tier Industries	195.6	196.6	197.6	199.8
1st & 2nd tier industries	658.0	686.8	783.4	841.1
Indirect				
Include 2nd tier industries	277.8	299.9	361.3	405.4
Exclude 2nd tier industries	-184.6	-190.3	-224.5	-235.9
Induced	175.6	183.4	205.1	220.6
The multiplier impact (times)				
Total effect vs direct effect (1st tier industries)	3.32	3.46	3.87	4.13
Total effect vs direct effect (1st & 2nd tier industries)	0.98	0.99	0.97	0.98

5.4.2. The multiple times measure of economic impact on net foreign exchange earnings

Since no primary data of import and export of the 1st and 2nd tier industries are available from the survey and secondary source data, there are only following two cases:

(1) Total effects vs direct effects from the 1st tier industries. The derived multiple times of economic impact on net foreign exchange earning range from 3.32 to 4.13 over the four scenarios.

(2) Total effects vs the direct effects from the 1st tier and the 2nd tier industries. The derived multiple times of economic impact range from 0.97 to 0.99. This rather small numbers of times indicate that the some other sectors except the 1st and 2nd tier industries have to be net importers to support the trade exhibitions. Such point is also reflected in the negative indirect net foreign exchange effect if the 2nd tier industries are excluded from the calculation of indirect effect.

5.4.3. *The benchmark case*

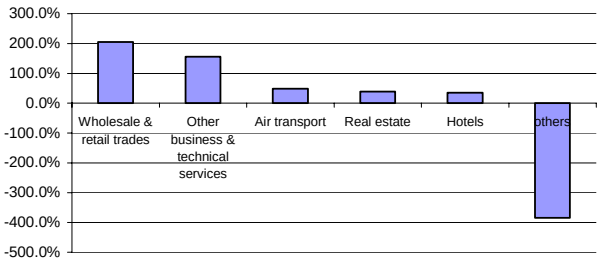
Under the benchmark case of the scenario 2, the measures of economic impact are:

- The magnitude of economic impact on net foreign exchange earning is S$679.9 millions;
- The multiple times of economic impact from the 1st tier industries to the whole economy is 3.46 times.
- The multiple times of economic impact from the 1st and 2nd tier industries to the whole economy is 0.99.

5.4.4. The Industrial Structure of the Economic Impact on net foreign exchange earnings

The distributions of net foreign exchange earning effects from scenarios 2 are presented in Figure 5. The top 5 industries are (1) whole sale & retail trades; (2) other business & technical services; (3) air transport; (4) real estates; (5) hotels. Their shares in total amount to more than 400% percent, indicating that these sectors are net foreign exchange earning sectors while the other supporting sectors must be net importers in the trade exhibition-related activities.

Figure 5: Top five industries in net foreign exchange earnings



5.5. GST and Gross Government Revenue Effects

GST is derived from the estimated value added. Since GST, as a value-added tax by definition, is 3% percent of value-added, the derived GST is hence 3% of the derived value-added. However, attention has to be paid to the fact that such derivation assumes that there is no any tax evasion or tax exemption. The derived results are summarized in Table 9.

Table 9: GST and Gross Tax Revenue Effects of Trade Exhibitions

	Scenarios			
	1	2	3	4
Estimated GST effects from I-O Table (S$ millions)				
Total	74.0	78.2	85.4	93.9
Direct				
1st Tier Industries	27.3	27.6	28.3	29.0
1st & 2nd tier industries	51.7	54.6	59.6	65.4
Indirect				
Include 2nd tier industries	29.6	32.4	37.3	43.1
Exclude 2nd tier industries	5.1	5.4	6.0	6.7
Induced	17.2	18.2	19.8	21.8
The Multiple Times of Economic Impact on GST (times)				
Total effect vs direct effect (1st tier industries)	2.71	2.83	3.02	3.24
Total effect vs direct effect (1st & 2nd tier industries)	1.43	1.43	1.43	1.44

Gross Tax Revenue (S$ millions)	169.5	178.8	196.4	215.0

5.5.1. The magnitude measure of economic impact on GST

The total effects on GST earning of the four scenarios range from S$74.0 millions to S$93.9 millions.

The total effects on gross tax revenue of the four scenarios range from S$169.5 millions to S$ 215.0 millions.[9]

5.5.2. The multiple times measure of economic impact on GST

Since no primary data of GST for the 2nd tier industries are available from the secondary source data and not many companies participated in the survey from the 1st tier industries provided GST information, there are only following two cases:

(1) Total effects vs direct effects from the 1st tier industries. The derived multiple times of economic impact on net foreign exchange earning range from 2.71 to 3.24 over the four scenarios.
(2) Total effects vs the direct effects from the 1st tier and the 2nd tier industries. The derived multiple times of economic impact is about 1.43 for all the 4 scenarios.

5.5.3. *The benchmark case*

Under the benchmark case of the scenario 2, the measures of economic impact are:

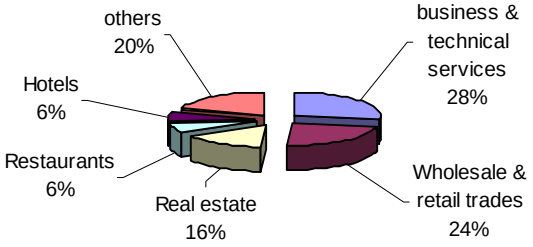
[9] The gross tax revenue is derived according to the derived value added and the ratio of gross tax revenue over GDP in 2000. The ratio is 15.89% in 2000.

- The magnitude of economic impact on GST is S$78.2 millions and on gross tax revenue is S$178.8 millions;
- The multiple times of economic impact from the 1st tier industries to the whole economy is 2.83 times.
- The multiple times of economic impact from the 1st and 2nd tier industries to the whole economy is 1.43.

5.5.4. The Industrial Structure of the Economic Impact on GST

The distributions of GST effects from scenarios 4 are presented in Figure 6. The top 5 industries are (1) other business & technical services; (2) whole sale & retail trades; (3) real estates; (4) restaurants; (5) hotels. Their share in total amounts to 80% percent.

Figure 6: Top five industries in GST effects



5.6. Income and Employment Effects

5.6.1. The magnitude measure of economic impact on income and employment

The total effects on income (remuneration) of the 4 scenarios range from S$0.425 billions to S$ 0.541 billions.

The total effects on employment of the 4 scenarios range from millions to millions 14819 to 18790.

5.6.2. The multiple times measure of economic impact on income

(1) Total effects vs direct effects from the 1st tier industries. The derived multiple times of economic impact on income rang2 from 3.06 to 3.72 over the 4 scenarios.
(2) Total effects vs the direct effects from the 1st tier and the 2nd tier industries. The derived multiple time of economic impact is about 1.41 for all scenarios.

5.6.3. *The benchmark case*

Under the benchmark case of the scenario 2, the measures of economic impact are:

- The magnitude of economic impact on income is S$0.449 billions; the total employment is 15630.
- The multiple times of economic impact from the 1st tier industries to the whole economy is 3.20 times.
- The multiple times of economic impact from the 1st and 2nd tier industries to the whole economy is 1.42.

Table 10: Income (Remuneration) Effects of Trade Exhibitions

	Scenarios			
	1	2	3	4

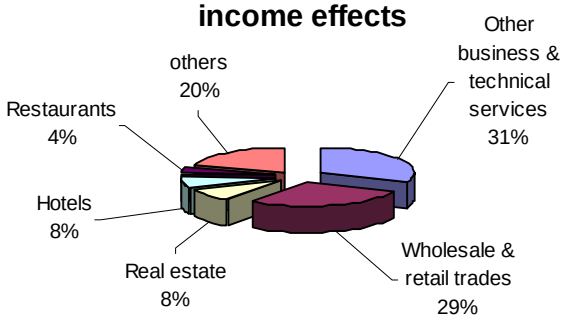
Estimated effects from I-O Table (S$ millions)				
Total	425.4	449.4	493.0	541.0
Direct				
1st Tier Industries	139.2	140.5	142.9	145.5
1st & 2nd tier industries	299.4	316.4	347.5	381.6
Indirect				
Include 2nd tier industries	182.7	199.6	230.5	264.2
Exclude 2nd tier industries	22.5	23.6	25.9	28.2
Induced	103.5	109.3	119.5	131.2
The multiplier impact (times)				
Total effect vs direct effect (1st tier industries)	3.06	3.20	3.45	3.72
Total effect vs direct effect (1st & 2nd tier industries)	1.42	1.42	1.41	1.41
Employment* (Heads)	14819	15630	17168	18790

*: Derived based on the estimated value-added and the national labor productivity in 2000.

5.6.4. The Industrial Structure of the Economic Impact on income

The distributions of income effects from scenarios 2 are presented in figure 6. The top 5 industries are (1) other business & technical services; (2) whole sale & retail trades; (3) real estates; (4) hotel; (5) restaurants. Their shares in total amount to 80% percent.

Figure 7: Top five industries in income effects



6. The Competitive Position of Singapore's Exhibition Industry

Although the study of comparative advantage of Singapore's Exhibition Industry is beyond the objectives of this study, the study group tried to gain some information on this area through the optional questions in the survey forms. Companies were asked to answer the questions such as "the manpower for the industry is adequate" by choosing the answers from "strongly agree" to "strongly disagree". As one can see from Table 11, the questions covers various aspects of the comparative advantages of Singapore's trade exhibition industry. Among the 44 companies participated in the survey, 42 companies replied to these qualitative questions. The results are presented in Table 11.

Table 11. The Comparative position of Singapore's Exhibition Industry

% in total replies

	strongly agree	Agree	Neutral	Disagree	Strongly disagree
The exhibition industry is getting increasingly competitive	61.91	30.95	7.14	0	0
The venue's rental cost is in general internationally competitive	4.76	45.24	35.71	11.9	2.39
Singapore is attractive to international exhibitors	11.9	73.81	9.52	2.39	2.39
Singapore has attracted major international shows in recent years	11.9	64.29	16.67	7.14	0
The overall business environment for the industry is sound	2.39	54.76	26.19	14.27	2.39
The manpower for the industry is adequate	0	33.34	23.81	35.71	7.14
The professionalism in the industry is high	4.76	66.66	14.29	14.29	0
Rules and regulations for the industry are effective	7.31	51.22	31.71	9.76	0
Government bodies (TDB,STB, etc) are playing a vital role	4.76	71.43	21.43	2.38	0
Regional competitions have become a serious concern	30.96	54.76	28.58	7.14	0
Singapore is in a good position to face regional competition	7.14	57.14	28.58	7.14	0

Some key observations can be drawn from the Table:

(1) More than half of the companies indicated "agree" for the following aspects of Singapore's exhibition industry:
    - Singapore is attractive to international exhibitors
    - Singapore has attracted major international shows in recent years
    - The overall business environment for the industry is sound
    - The professionalism in the industry is high
    - Rules and regulations for the industry are effective
    - Government bodies (TDB.STB, etc) are playing a vital role
    - Regional competitions have become a serious concern
    - Singapore is in a good position to face regional competition
(2) Most companies indicated "Strongly agree" on that "The exhibition industry is getting increasingly competitive".
(3) 36% of companies indicated "disagree" on that "The manpower for the industry is adequate".
(4) Considerable companies indicated "strongly agree" on that regional competitions have become a serious concern".
(5) It may be a concern that a considerable companies indicated "neutral" on the following aspects:
    - The venue's rental cost is in general internationally competitive
    - The overall business environment for the industry is sound
    - Rules and regulations for the industry are effective
    - Singapore is in a good position to face regional competition

7. Conclusion

This study is based on the national survey from trade exhibition industries and comprehensive secondary data source on exhibitors and visitors participated in trade exhibitions in 200. The majority of key players in the trade exhibition industry participated the survey and 51 trade exhibitions hold in 2000 are covered by this study.

The input-output approach is used to assess the economic impact of trade exhibition industries in Singapore economy. The collected output data were distributed into final demand of each sector in the 1990 I-O table. The obtained final demand is applied to the multipliers of output, value-added, import and export and income. The estimated value added is used to derive GST, gross tax revenue and employment together with the relevant statistics in 2000.

Referring to the estimates of the benchmark scenario, the trade exhibitions hold in Singapore in 2000 provided the Singapore economy

- **S$ 3.55 billion gross output**
- **S$ 1.13 billion value-added, i.e. 0.71% of GDP**
- **S$ 0.68 billion net foreign exchange earnings**
- **S$ 0.18 billion gross tax revenue and S$78.2 million GST**
- **S$ 0.45 billion income**
- **15630 employment**

The various measures of multiple times of economic impact suggest that the contributions of the trade exhibition industry to the Singapore economy is really tremendous and is eventually not parallel to the relative small size of the trade exhibition industry. In short, the trade exhibition industry has substantial linkage effect to the whole economy, particularly, the whole range of service industries.

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