國 立 交 通 大 學

交通運輸研究所

博士論文

自由貿易港區核心產業的選擇

Selecting Core Industries for Free Trade Zone

研究生：謝慧娟

指導教授：馮正民 博士

中華民國九十九年三月

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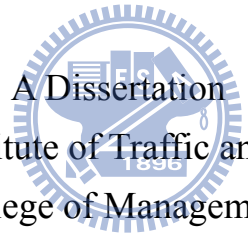

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摘要

隨著產業的快速變化和高度競爭，港口的發展已重新定義其在價值鏈上的功能角色，並逐漸建立港口成為自由貿易港區。為了提升自由貿易港區的競爭力及在自由貿易港區有限的土地上作最有效的運用，選取適當核心產業成為自由貿易港區發展的一項重要議題。

本研究首先由文獻回顧及各國自由貿易港區的比較來闡述自由貿易港區的意義及內涵。由於自由貿易港區核心產業的選定有助於增進自由貿易港區的競爭力，故核心產業的選責宜具有高附加價值，具有高度聯動國內相關產業及在國際市場上具有高度市場佔有率之特性。因此，本研究經由以產業的“附加價值指標”、“市場佔有率指標”、“產業關聯性指標”等三種指標分別選取各自的產業，而後再由“此三種指標選出產業之交集產生自由貿易區的核心產業。

本研究透過所選取的核心產業及核心產業的關聯性產業，建議政府提供相關之政策誘因，吸引其進入自由貿易港區內，並發揮加乘的效果，帶動區內及國內市場的發展。此外，本研究以台灣自由貿易港區為例，分析其核心產業選取的過程。研究成果顯示“卑金屬及其零組件業”、“電子電機業”、“化學及有關工業”為最適合自由貿易港區的產業。

關鍵詞：核心產業、自由貿易港區、附加價值、市場佔有、產業關聯

Selecting Core Industries for Free Trade Zone

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Abstract

The growth of global business has brought about more intense global competition. In order to face this challenge, port's development has redefined its functions and roles in value-driven chains, with ports being gradually established as free trade zones (FTZs). To enhance the competitiveness and efficient use of the limited land area of FTZs, the most critical issue is in selecting suitable core industries within the FTZs.

The study first explores the meaning and concept of FTZs by using literature review and the comparison of FTZs in different countries. One way to enhance the competitiveness of FTZs is to introduce high value-added industries, having strong linkage with domestic industries and high market share in a competitive market to the core industries. This study aims at selecting core industries in FTZs through the intersection set of three indicators, namely value-added, market share, and backward and forward industrial linkage in output analysis.

To attract core industries to move into FTZs in Taiwan, this study suggests some strategic incentives to these core industries and related industries, which may form industry clusters and benefit regional and domestic economic development. It is found from the empirical study that ′base metals and articles of base metals′, ′machinery and electronic components′, and ′products of the chemical or allied industries′ can be selected as the core industries in FTZs in Taiwan.

Key Words: value chain, value-added, input-output analysis, market share, Free Trade Zone

誌謝

終於畢業了，當初因為工作上的關係，業務內容盡是與運籌管理、自由貿易港區等議題，為求進一步瞭解業務的情況下，毅然在工作繁重的情況下報考運研所，期間雖歷經我及先生工作上的變動、懷孕安胎生子，在這漫長的路上，為求家庭、工作、學業的平衡，不讓念書影響我陪伴孩子的時間與品質、不佔用工作時間，因此，伴著我讀書的常是星空滿天及清晨的黎明，這一段漫長的路程其辛苦非外人所能體會。

在學期間，承蒙恩師馮教授正民在研究方向、邏輯思維引導、甚至是工作上的協助、待人處事的方法的悉心指導，並給予學生在工作、家庭、學業無限的包容與體諒，謹此深致謝忱。博士論文計畫書口試期間，承蒙毛教授治國、黃教授承傳等師長惠予詳加細審，並不吝提供寶貴意見；論文學位口試時，陳教授武正、林教授建元、邊教授泰明、黃教授承傳、黃教授台生、等師長的指導並惠賜諸多指正意見，均使本論文更臻嚴謹，受益良多。感謝何小姐則屢屢在百忙中擔任起和老師溝通、聯繫的橋樑，協助處理各項繁鎖事務；所辦洪小姐在退休前夕還趕忙助我辦理口試的各項作業、也謝謝柳小姐的各項協助。而博班同學其華、昱凱、孟佑、世昌、嘉惠、易詩、承憲、沛儒、昭弘、姿慧等在學業上協助或生活上的關懷打氣，均感受深刻。也謝謝智平特別協助向海關索取分類貨品通關資料，這對本篇論文中有關國內自由貿易港區實際貿易資料的分析有相當的幫助。

感謝進修期間家人的支持與陪伴，老公正豪老擔憂我的健康、心疼我在課業與工作間忙碌與沉重壓力；女兒沛婕總乖巧的完成自己的功課，不讓我分心；小女兒沛晞從在肚子裡陪著我參加資格考，到現在活潑可愛、童言童語是我最佳的開心果；感恩我敬愛的父母及家人給予無限的關懷與生活上的支持。

最後謹以此論文獻給我摯愛的家人以及所有關心我、教導我的師長及週遭好友。

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March, 2010, 台北

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Chapter 1 Introduction

1.1 Background

With the growth of global business, firms are increasingly utilizing the global logistics management. For deriving benefit from their value-driven chain, firms apportion the raw material, technology development, manufacturing, warehousing and distribution between different countries while still maintaining close integration in order to obtain the cheapest and most efficient production and optimal resource allocation.

Since 1995, Taiwan government authorities, Council for Economic Planning and Development Executive Yuan (CEPD) launched a very large-scale economic development project: the Plan for Developing Taiwan as an Asia-Pacific Regional Operations Center (APROC Plan). The goals of the project are: (1) to enhance Taiwan's economic liberalization and internationalization; (2) to strength the flows or personnel, goods, and funds; and (3) to attract multinational and domestic enterprise's investments so that develop Taiwan as a base for expanding East Asia market. The implementation of this plan is divided into 7 parts: manufacturing sector, sea transportation center, air transportation center, financial center, telecommunications center, media center and macroeconomic perspective sector. Although APROC plan had adjusted the industrial Structure and improve the efficiency of government, it has had to respond to the tremendous impact of swiftly developing trade and economic relations across the Taiwan Strait. To take advantages on excellent location, high-quality human resources, and comparatively advantage electronic manufacture, the government promoted the Global Logistics Development Plan (GLP). The goal is to make use of the achievements accumulated under the former ′Asia-Pacific Regional Operations Center Plan′ in the area of sea and air transportation, as well as Taiwan's outstanding geographic location and manufacturing-related advantages, to carry out integration and help enterprises establish the island as their global logistics base.

Because Taiwan is an export-oriented country, ASEAN (Association of Southeast Asian Nations) plus three (China, Japan, and South Korea) will form Free Trade Area.

Their Common Effective Preferential Tariff (CEPT) scheme will treat Taiwan's treading. Taiwan was hard to sign other agreement under special political situation with Mainland China. In order to change this treatment, CEPD launched the Free Trade Zone Act to capture the trading with other Asian market in 2003. In this policy, CEPD wants to create the situation which production would move from previous OEM (Original Equipment Manufacturing), ODM (Original Design Manufacture) contract manufacture toward ODL/GL (Original Design Logistics/ Global Logistics) management. CEPD plans special zones that are 'inside national territory but outside customs' to create an excellent environment for transnational business operations by lowering barriers to the flow of goods, commerce and people. These special zones combine the functions of seaports and airports with meeting all the needs for supply-chain management to offer the function of 'logistics, transshipment, and value adding' and to strengthen users' competitiveness. In FTZs, they provide some special feature of the system as follows (CEPD, 2007):

1. Efficiency side

- Free flow of goods: exempt from customs checking, inspection, and escort; adoption of reporting or monthly reporting system.
- Convenient business entry: convenient entry visa for business people, with facilities provided for exhibition and trade activities.

2. Service side

- Single-window administrative service: each FTZ has a single administrative services and management authority.
- Special coordinating mechanism: an FTZ Coordinating Committee is specially charged with deliberating on related policy and coordinating inter-zonal affairs.

3. Functional side

- Practical organizational form: can set up in a zone as a branch, office, operations department, etc.
- Diversified operational scope: can carry out rearrangement, processing, fabrication, etc.

4. Cost side

- Relaxation of foreign-working hiring ratio: foreign workers may constitute up to 40%of employees.

- Tax preferences: exemption from or reduction of related taxes and fees.

However, the results were weaker than expected. First, few firms move into FTZs. And the trading volume was too little. The type of value-added transshipment is still limited. These result are worthy of our serious reconsideration

1.2 Motivation and Objective

Ports, as important nodes in global supply chains, are now frequently transformed to Free Trade Zones (FTZs) to create added value. Examples for such FTZs include the Ports of Singapore, Yokohama (Japan), and Busan (Korea). As with many roles and functions, various activities and services can be performed by and within ports. Bichou and Gray (2004, 2005) observed that a modern-day port is more than a service provider to ships and cargoes. In addition to its traditional role as a sea/land interface, a port is not only a good location for strengthening value-added logistics but also for providing services for information, trade, and even leisure and property development.

Most FTZs are located within or adjacent to ports. Goods in these areas are approved for displaying, storing, warehousing, collecting and distributing, unpacking, assembling, labeling, packing, sorting and fabricating or processing with other material for transshipment to other countries. Before leaving FTZs for production or consumption in taxation areas of the host country, these goods are free of taxes and customs duties. Because FTZs are highly related to ports, identification of the core industries of FTZs is multi-facet and both port and non-port business activities need to be considered simultaneously. Although the previous research limited the core industries of ports to cargo handling only (Haralambides and Veenstra,2002), the World Bank (2007) suggested that the value-added services, including value-added logistics and value-added facilities, should be involved in port activities to determine the core industries.

For carrying out this policy of strengthening value-added logistics in Taiwan, the 'Act for the Establishment and Management of Free Trade Zone' was legislated in 2003. Although FTZs have been established in four seaports and one airport, the outcomes of investment promotion and operational benefit have not been as encouraging as expected so far. The firms which sign the Letter of Intent and really move into FTZs are limited, and most of them are the firms transformed from shipping companies. What's wrong with the policy of FTZ? What kinds of industries will be the most suitable core industries of FTZs? How to appropriately select and attract core industries/firms into FTZs becomes one of the most crucial issues. The aim of this study is trying to identify the indicators and select core industries.

1.3 Research Issue

For selecting core industries, this study gets back to the original purpose of FTZ. We discuss the relationship between FTZ and ports, the meaning of FTZ, and difference between different FTZs in different countries. After analysis of the most benefit of FTZs, we set up the selection indicators of core industries and try to make Taiwan case for example. Here are two major issues as follows:.

Issue 1: Although there are different strategic and policies in different countries, we try to compare their differences in detail.

Issue 2: Although there is too little real operating data, we try from macroeconomic perspective to analyze the core industries which could match with the purpose of FTZ.

1.4 Dissertation Framework

This dissertation is organized as follows:

Chapter 1 is the introduction, which gives an overview of this research in term of background, motivation and objective of this dissertation. Chapter 2 contains a brief review of the definition of FTZ and comparisons FTZs in different countries. Chapter 3 outlines the major research concept and identifies the selection indictors. Chapter 4 takes Taiwan as an example. The final chapter concludes the research and provides suggestions for future policy amendments. The flow chart of this dissertation is shown in Figure 1.1.

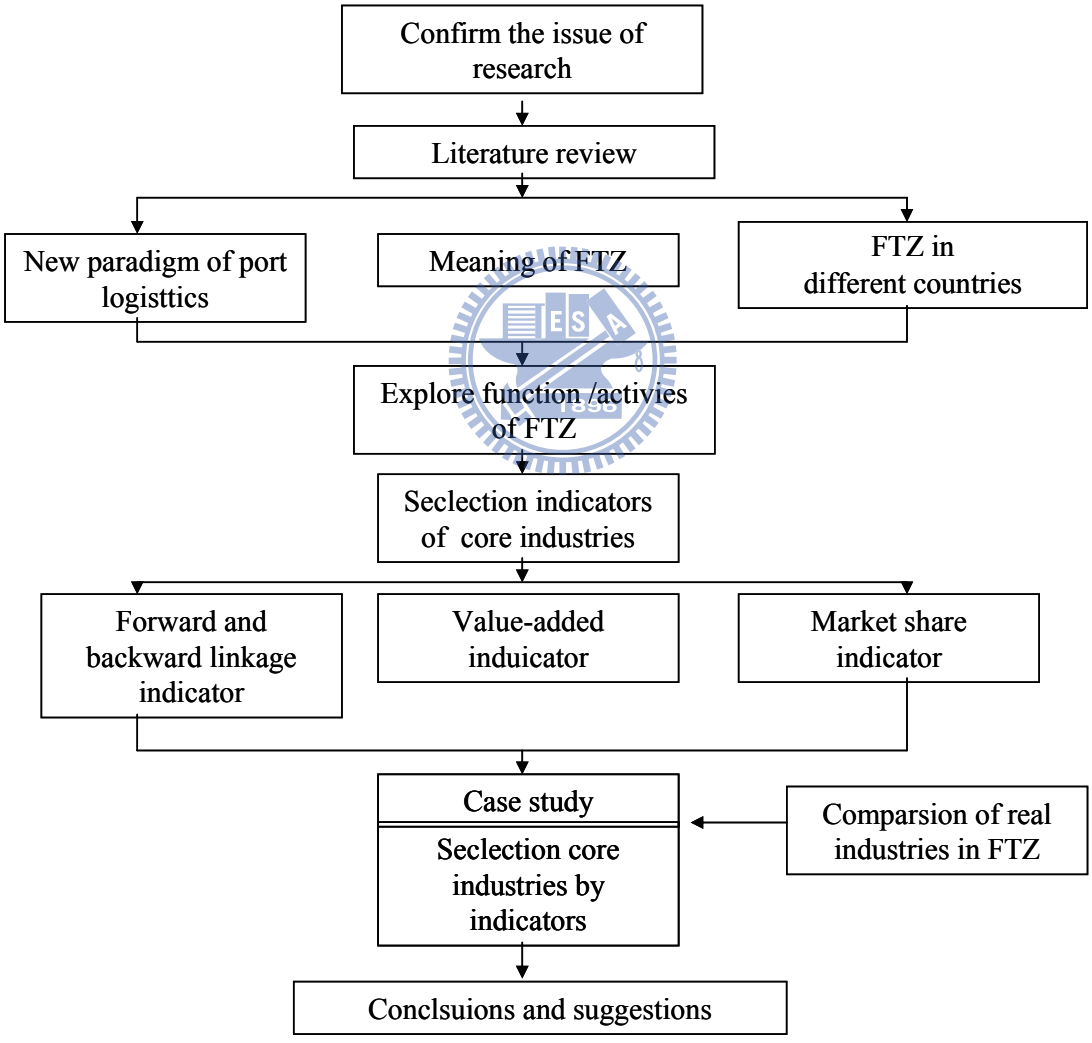


Figure 1-1 Flow-chart of Dissertation

Chapter 2 Literature Review

2.1 New Paradigm of Port/Airport Logistics

Most FTZs are located near port; lots of them are within port hinterland. Port hinterland is one of most important concepts in transport geography. Traditional spatial concepts of port hinterlands and forelands along with the related port-marketing terminology have become less relevant. Ports are influenced by the globalization, deregulation and privatization. The paradigms of ports were still changed. Before 1960s the ports were the morphological framework. In 1960s and 1970s, ports focused on the operational efficiency framework. And in early1980s, ports were as economic units and focused on 'economic principles' framework. Between 1980s and 1990s, most researches showed that port governance and policy framework were most important. Recently, port shifted into a new paradigm as elements in value-driven chain system. UNCTAD (1999) also defined four- type generations, in which first and second generation ports are related to ship/shore and industrial interfaces, with second generation-types being reliant more on capital than labor. Third generation ports are a product of the unitization of sea-trade and multimodal cargo packing, which has led to the development of ports as logistics and intermodal centers offering value-added services. Four generation ports are mainly the result of port potential and functional change. Such classifications exemplify not only the functional evolution of ports, but also the diversification of port activities.

According to Bichou and Gray (2005), while a port can have many roles and functions, a variety of activities and services can also take place within ports, and different port operations create different value-added services. In traditional ports, the activities focus on cargo handling services, but port services have gradually edged towards handling logistics services. In order to show their competitive advantage, such ports have moved toward productivity-advantage leadership, or moved upwards, towards value-added service leadership. Moreover, they have integrated added value and logistics services within the port area (as seen in Figure 2-1). Nowadays, a number of ports have responded to this trend by focusing on value-added services as a means of gaining a competitive edge. Furthermore, many countries build Free Trade Zones within or close to ports to extend pure

logistics into a maritime logistics and manufacturing function, and thereby take advantage of trading within ports.

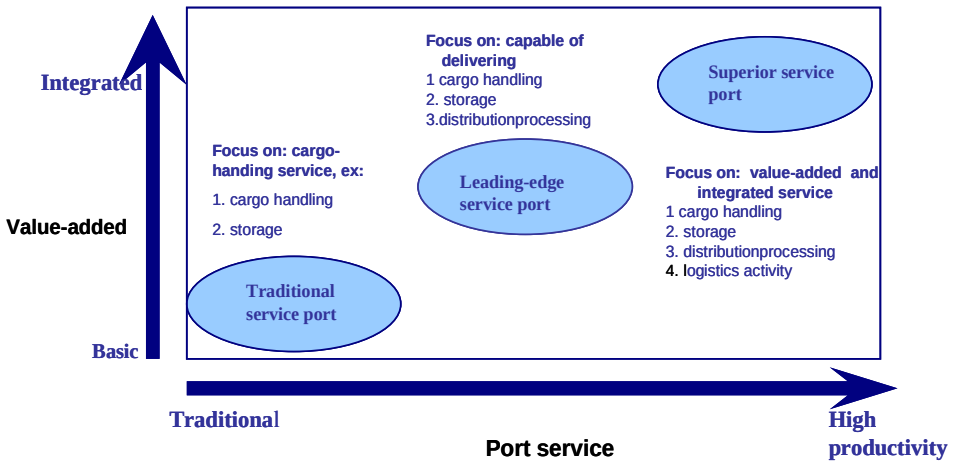


Figure 2-1 Matrix of Competitive Advantage and Service Function

Additionally, the growth of global business has made the value of maritime logistics services to the competitiveness of port. Different scholars have considered the concept of port value chain (such as Robinson, 2002; Bichou and Gray, 2004; 2005) and maritime /port logistics (Panayides and So, 2005; Panayides, 2006). Robinson (2002) argued that in the context of value networks, competition takes place along value chains as opposed to between individual ports. Robinson (2006) also noted that competitive advantage does not necessarily mean the maximization of profits, and the advantage could be gained in the long run at break-even or better than break-even point. Ports are one element involved in freight movement in end-to-end pathways or logistics pathways, and the notion of logistics pathways connotes a sequential set of separate logistics ′operations′, for example, warehouse, depot operation, shipping, trucking, and freight forwarding that deal with the end-to-end movement of freight. In fact, firms are increasingly competing not as individual firms but also within chains or supply chains; and supply chains, rather than individual firms, compete with supply chains. So, ports do not compete simply on the basis of operational efficiency or location, but on the basis that they are embedded in chains that offer shippers greater value (Robinson, 2006). Furthermore, the more value pools, the more set of functions are integrated into the landside logistics operations. In other words, integrated value-added services in the FTZs depend on ports providing more value

pools. The concept of value networks in port environments argues that competition takes place among value chains as opposed to among individual ports. Port value chains thus are not limited on logistics channels, but can also be divided according to transportation system into route, forwarder of transportation and customer clearance, loading/unloading etc. All functions are integrated with deliverer (Bichou and Gray, 2005). Ports play an important role in integrating all three types of channel. Many organizations are involved or potentially involved in logistics and supply chain integration within and around ports, in the role of logistics channel facilitators (ocean carriers, land-based carriers, port operators, freight forwarders, port agents, etc.), trade channel members(shippers), and supply channel associates (manufacturers and retailers). Therefore, Bichou and Gray (2004; 2005) indicate that ports can provide more roles and perspective from integration within the role of logistics, trade and supply channel. These roles could be described as follows:

a. From a logistics channel standpoint, ports are very important node since they service as an intermodal/multimodal transport intersection and operate as a logistics center for the flow of goods (cargo) and people (passengers).
b. From a trade channel perspective, ports are a key location whereby channel control and ownership can be identified.
c. From a supply channel approach, ports not only link outside flows and processes but also create patterns and processes of their own. At this level, ports are one of the few networking sites that can bring together various members in the supply channel.

This new approach extends the traditional port system to an ′integrated channel management system′ where the port stands as a key location linking different flow and channels with their members.

Another concept in maritime /port logistics is that maritime transport concerns the transportation of goods and /or passengers between two sea ports. A supply chain consists of the series of activities and organizations that materials (raw materials and information) move through on their journey from initial supplier to final customer. Notably, maritime logistics is the concept of integration of physical (intermodal), economic/strategic (vertical integration, governance structure) and organizational (relational, people and process integration across organizations) (Panayides, 2006). It is crucial that logistics and other

added value services be provided at the right time and place to enhance production and delivery efficiency. The FTZ simply can serve this purpose.

Generally, ports are involved with both port and non-port business activities. Although some studies, for example, Haralambides and Veenstra (2002), limit the core business of ports to cargo handling only, the World Bank broadens port activities to include a range of value-added services (including both value-added logistics and value-added facilities). Nevertheless, port industries can be classified into two traditional types (Huang, 2006): (1) Port dependent industries, including shipping, fishery, ship repairing, international shipping companies, etc. and (2) Port related industries, including containerizing, customs clearance, trading and manufacturing. Following the functional change of ports, the activities of ports now place emphasis on a high degree of global production and the need for value-added logistics (VAL) services. These services include labeling, assembling, semi-manufacturing and some kinds of integrated services which combine logistics and industrial activities. However, most of these industries might tend to cluster within ports, and spatial clustering of such industries may enhance the competitive position of ports. A lot of research has been carried out regarding the link between industries and international competitiveness (Robinson, 2006; Rugman, 1991), and various subsidiaries or lower-cost, leading-edge clustering might have more international market scope (Birkinshaw and Hood, 2000).

Porter (1991) proposed a value chain analysis that divided all activities in the value chain into two kinds of activities: (1) Primary activities: referring to activities directly relating to production and sales, which create the largest profit for firms. These activities include inbound logistics, operations, outbound logistics, marketing and sales and after-sale services. Given the purpose of FTZs to create maximum added value to transshipment, the primary activities of FTZs are activities that could create added value to transshipment. (2) Support activities: referring to activities which support the primary activities. As for FTZs, support activities are firm infrastructures which support the whole value chain. Once the high value-added industries locate in FTZ, their major related industries might also locate within FTZ area in order to support their core activities. Hence, FTZs create maximum transshipment through these kinds of core industries and their related industries within FTZs. Due to limited space of a FTZ, some related industries may locate in other bonded area or

domestic tax area to neighbor with those core industries.

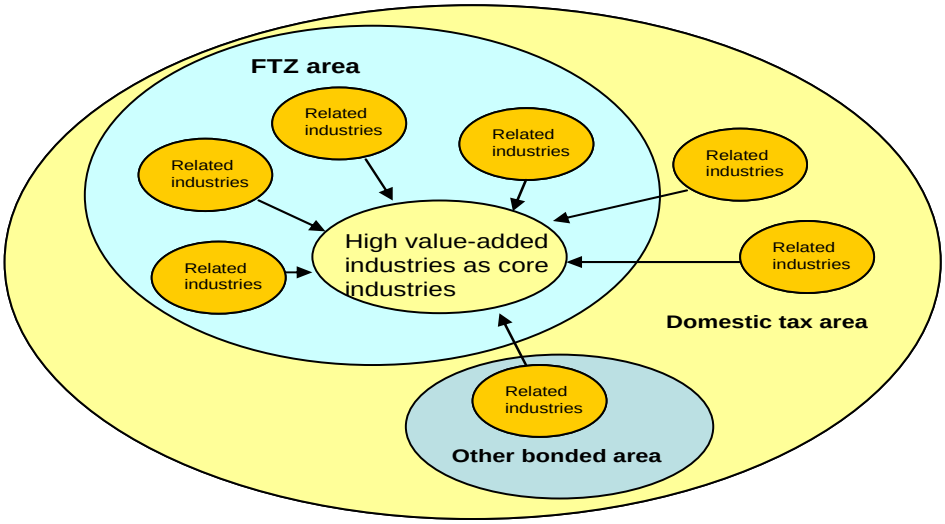


Figure 2-2 Relationship between Core Industries and Other Related Industries

2.2 The Meaning and Concept of FTZ

2.2.1 The Meaning of FTZ

The world currently has over 850 Free Trade Zones (FTZs). Governments in Europe and the Americas, and in nearby Singapore and Hong Kong, are using free ports to offer commercial trade, industrial processing, technology development and logistics services in a single place. The name varies according to purpose and function, and could include foreign trade zones, free ports, transit zones, free perimeters, export processing zones, special customs privileges, special economic zones, etc. And these similar zone are shown in Table 2-1. All these zones are ′special zone′, and all are designed to create a situation in which goods could flow freely, attract foreign investment, and boost economic development. Free Trade Zone is an enclosed area in a seaport, an airport, or some other point areas where goods could be stored or processed, re-exported, assembled, manufactured, and offered more value-added logistics services (Firoz et al.,2003; Mathur and Ajami,1995; Pan,2005; Tansuhaj and Jackson, 1989; The World Bank, 2007; UN,1996) (as shown in Table 2-2). The purpose of FTZ, nowadays, is to enhance value-added processing, transshipment and just-in-time delivery for the largest profit.

Within FTZ, the potential benefits of FTZs for investors include: (1) no customs duties for goods entering FTZs; (2) preferential tariff treatment for parts assembled into finished products in FTZs and then entering the domestic market; (3) free and safe flow of goods in FTZs; (4) permissible transport of goods among different FTZs; (5) abundance of raw material; (6) cheap labor (Firoz et al., 2003; Tansuhaj and Jackson, 1989). Firms may seek good FTZ access to a port of entry to transportation domestic or foreign markets to optimize costs of manufacturing and of distribution and customer service caused by site location (Mathur and Ajamis, 1995). Enterprise can pursue high value-adding processing, and goods can be efficiently exported from nearby ports through simplified custom clearance (Calabro, 1982; Firoz et al., 2003; Mathur and Ajami, 1995).

One of the reasons for FTZ not located everywhere is that FTZ within or adjacent to ports has the direct transshipment and transportation cost advantage. The other is that FTZs are designed as special zones of ′a country within a country′ for all countries, because

of special tax and customs design.

Originally, FTZs were used for storage and trade, but recently the focus has shifted to manufacturing, processing and assembly. Merchandise entering FTZs is free of customs duties and quotas, and can be stored without time constraint. According to the definition of United States International Trade Commission (ITC), FTZ is an independent, bonded area in which merchandise for re-export is treated differently from that in ordinary customs territory, and merchandise may be admitted to the zone, without being subject to customs duties, unless and until the merchandise enters the domestic market. Mathur and Ajami (1995) observed that enterprises can pursue high value-adding processing and enjoy preferential treatment, though these benefits are offset by higher rent and administrative expenses. Following the value-adding process, goods can be efficiently exported from nearby ports through simpler custom clearance. Firoz *et al.* (2003) argued that trade restrictions have minimal effects on FTZs.

Additionally, Firoz *et al.* (2003) described FTZs as providing transportation, insurance, finance, and communication services. Therefore, FTZ can be created with several functions, including trade, finance, warehousing, logistics, value-added service, transshipment and manufacturing. FTZs in Taiwan offer all of these functions. Enterprises of FTZ in Taiwan are divided into FTZ and non-FTZ-enterprises according to their logistics activities, and offer different taxation rates and fee schedules. The detail analysis is described in section 2-2-2.

As above mention, all FTZ are intended to improve the competitive advantage of their respective regions. Porter (1990) observed that value chain could be used to analyze the resource of enterprise competitiveness. Value chain analysis can be applied to divide industries according to whether they are engaged in primary or support activities. Primary activities are the main source of profit for enterprises. Primary activities are what Hafreez *et al.* (2002) termed core-competences or core businesses. From a value-chain point of view, the competitiveness of FTZ lies in selecting the most suitable core business for transshipping and maximizing added value. Therefore, it is necessary to redefine port activities for ports that FTZs located from a value-chain perspective.

Generally, the enterprises on Foreign Direct Investment (FDI) determinants or location choice are concerned with the establishment of FTZ. For example, Woodward and Rolfe (1993) analyzed export-led companies and found that numbers of FTZ influence

their choice of location when investing in the Caribbean. Head et al (1995) gathered data on Japanese enterprises investing in America between 1980 and 1992 and found a positive correlation between enterprise in investing and the location of FTZ. Mathur and Ajami (1995) and Brenes et al. (1997) also indicated that firms seeking to locate their operations in FTZ should take several factors into account, including the quality of available manufacturing and warehousing facilities, access to air and sea ports, available transportation modes, onsite customs offices to expedite and simplify imported raw material clearing, and infrastructure quality. UN (2005) discussed FTZs aim to attract foreign investment, which is thought to have benefits in employment and growth. It is argued that FTZs promote a 'critical mass' of economic activity around ports. While past international experience with FTZs is mixed, successful FTZs are usually characterized by quality infrastructure, a supportive government, lighter regulation, a strong export focus, tax and customs exemptions and long-term stability. By contrast, some FTZs are failed by poor geographical location, weak government commitment, operational difficulties, poor management and inadequate promotion. Some researchers have indicated that the five criteria respondents consider most important for FTZ are political stability, corporate tax incentives, efficient government administration, labor and energy costs (Chen, 2003; Yang, 2003; Lu and Yang, 2006). Hu and Chen (1998) assessed investment in the Okinawa FTZ and found that both FTZ and new industry parks need research and government support, lower electricity, water and labor costs, and incentive which include tax and finance and construction with complete infrastructure. However, although these key successful factors are the most important determinants of productivity, the question of which industries are most suitable for stationing within a FTZ has not yet been considered. While, it is the most important activity in FTZ is to promote a highest value-added logistics industry (UN, 2005). Feng and Hsieh (2008) noted from a logistics point of view that FTZ competitiveness should depend on selecting the optimal core industries in terms of transshipping and adding value. Just as Robinson（2006）observed, the larger the number of value pools, the more sets of functions are migrated via landside logistics operations. Thus the management strategies used for FTZ should first decide the core industries to make advantage of resources, location and trading activity of FTZs.

We needed to realize character of FTZs activities before we tried to select core

industries. For pursuing the value-chain, we adopted Porter's (Porter, 1991) theory and divided all activities in the value chain into two kinds of activities: (1) Primary activities: referring to activities directly relating to production and sales, which create the largest profit for firms. These activities include inbound logistics, operations, outbound logistics, marketing and sales and after-sale service. Given the purpose of FTZs to create maximum added value to transshipment, the primary activities of FTZs are activities that could create added value to transshipment. (2) Supporting activities: referring to activities which support the primary activities. With regards to FTZs, the supporting activities are provision of related services to support whole value chain. In this study, we attempt to identify the primary activities or core industries which could create added value to transshipment.

Table 2-1 Literatures on Free Trade Zone

Authors	Year	Main discussion/ definitions
UNCTAD	1996	a freeport as a designated area within a port or airport where goods can be imported, stored or processed and re-exported, free of all customs duties.
Firoz	2001	FTZ is a ′country within a country′ from the customs point of view.
Firoz et al.	2003	FTZs as enclosed and policies areas in seaport, airport, or some other inland point where goods of foreign origin may be brought in for re-export by land, water, or air without the payment of customs duty. Usually these zones allow foreign traders to store, exhibit, sample, build, blend, mix, sort, re-pack, and manufacture various commodities within the zone zrea.
UN	2005	a FTZ is focused on international trade, especially value-added logistics activities involving light manufacturing and processing. The zone is outside of customs territory, and is a very similar to an Export Processing Zone. FTZs aim to attract foreign investment, which is thought to have benefits in employment and growth. It is argued that FTZs promote a ′critical mass′ of economic activities around activity around port. This is self-sustaining and also attracts further business.
ESCAP, UN	2003	FTZs are generally defined as secured area adjacent to ports in

Authors	Year	Main discussion/ definitions
		which goods can be stored for prolonged periods without Customs duties, excise tax or inventory tax being paid on the goods. FTZs allow the goods owner Customs entry at its discretion, and complete access to the FTZ at all times. Customs Service appraisal and classification of the goods can be done either at entry to the FTZ, or at open exit into the market, whichever the manufacturer prefers. Duty is paid only when the goods are released into the territory. There is no limit on storage time. At no additional Customs expense, a FTZ operator may store, sell, exhibit, break up, repack, assemble, distribute, sore, grade, clean, mix with foreign or domestic goods, destroy, label and manufacture within the FTZ.
FTZ Board	1983	The purpose of a FTZ is to help domestic industries take advantage of a zone and defer customs duties until goods are ready to be marketed in the country where the FTZ is situated. It also has a 'pipeline effect', in instances when the normal custom channels are congested due to the more complex processing involved with components parts, the movement of raw material through FTZ may saves a great deal of time.
Tansuhaj, S.T., Gentry J.W.	1986	FTZ is a small fenced off area within a country where foreign and domestic goods may enter in order to be stored, distributed, combined with other foreign and/or domestic products, or used in manufacturing operations. When foreign goods are re-exported without entering the US customs territory, they are not subject to quotas, duties, or federal and state laws concerning excise or inventory taxes.

Table 2-2 Special Zones for Economic Development

Name of special zone	Definition and purpose
Foreign Trade Zone (EPZ)	➢ Foreign trade zones are established under the Foreign Trade Zones Act and the general regulations and rules of procedure of the Foreign Trade Zones Board contained in 15 CFR part 400. This part 146 of the Customs Regulations governs the admission of merchandise into a foreign trade zone, manipulation, manufacture, or exhibition in a zone; exportation of the merchandise from a zone; and transfer of merchandise from a zone into Customs territory
Special economic zone (SPZ) or free economic zone(FEZ)	➢ A special or free economic zone covers a large area, including residential areas and hospitals, schools and other business and supporting facilities and infrastructures. It promotes FDI by providing a good business environment with several incentives, such as a global standard level of labour regulation, allowance of repatriation and reduction of taxation for foreign investment, all of which might not be controlled under domestic regulation but under specially designed regulation appropriate to the nature of the facility. ➢ Within this type of zone almost all economic activities are allowed and the zone is not outside of customs territory. ➢ Sometimes other special zones, such as a FTZ, can be established within this zone. ➢ This type of zone is like a microcosm of a country.
Export processing zone (EPZ)	➢ EPZs are a common initiative used by many developing countries in an attempt to facilitate economic development. ➢ An export processing zone can be seen as a traditional zone acting as a manufacturing/processing works for exports, and considered as outside of customs territory. ➢ Industry sectors within this type of zone are usually labour intensive and low skills industries such as producing garments, textiles, shoes, timber, plastics and electronic components using low cost labour. ➢ In general, domestic sales of products manufactured within this zone are limited. Some percentage of products can be sold in the domestic market. ➢ The area covered is relatively small in size, up to two or three square kilometers.
Industrial zones	➢ An industrial zone is a platform for a manufacturing industry and

Name of special zone	Definition and purpose
	provides industrial clusters. ➢ Domestic manufacturers and a few foreign investors establish their factories to take advantage of relatively good supporting facilities for manufacturing. For FDI, this type of zone often is transformed into an exclusive foreign investment zone for manufacturing. ➢ In general, this type of zone is not outside of customs territory.
Distribution zone	➢ Within a distribution zone logistics activities are carried out with public warehouses. Usually this area is not considered as outside of customs territory. ➢ Inland container depots (ICD) are included this type of zone, but ICDs are generally outside of customs territory. ➢ Distribution zones are usually dedicated to consolidation and distribution and located in strategic inland areas to cover several domestic markets and to provide transportation to other transport nodes such as seaports, airport and rail stations quickly, conveniently and easily.
Costal Open Cities (COC)	➢ There are 14 COCs in China. These C OCs are important for both the current economic development and for the potential future economic development. These COCs are selected due to their strategic location. They are either close to a major foreign country, or have political significance for China. Within these COCs, SEZs are located. For examples, In Guangzhou, which is a COC, three SSEZs are located: Shenzhen, Zhuhai and Shantou. Guangzhouis the capital of the Province of Guandgdong. The tax rate in COCs cannot exceed 15%. These COCs have power to approve individual projects in larger neighboring cities within projectd costs of less than $100 million.

Source: 1. UN, 2005

2. http://ia.ita.doc.gov/ftzpage

3. Sargent and Matthews, 2001.

2.2.2 FTZ in Taiwan

The concept of FTZ in Taiwan is followed the policy of ′Global Logistics Development Plan (GLP)′ in 2000. The policy of GLP is to take Taiwan's advantages on excellent location, high-quality human resources, and comparatively advantage electronic manufactures. The government authorities, Council for Economic Planning and Development Executive Yuan (CEPD), thought that logistics management or supply chain management might have become highly important for multinational enterprises to enhance Taiwan's global competitiveness. Although GLP might eliminate problems encountered by enterprises in the process of global logistics development, the enterprises need one defined zone which offered the lowest limit in the process of global logistics management. The first concept is to sign the Free Trade Agreement with major trading countries and to capture the growing Asian market. Under the special political situation with Mainland China, it is difficult issue to make any Free Trade Agreement. The CEPD structured another special zone to attract multinational enterprises to establish their headquarters, especial value-added operation centers, within FTZs. At first its objectives are as follows: (1) to extend the existing results of the Global Logistics Plan and to continuingly promote liberalization and internationalization; (2) to face the challenges from other neighboring countries' FTZ; (3) to enhance the operating efficiency of harbors and airports and to bolster the development of high value-added trade activities; and (4) to facilitate the movement of foreign business personnel in and out of FTZ and reshape Taiwan's environment as the operations centers for international enterprises. It has been emphasized that one of the most important factors to promote the FTZ program is to eliminate the customs clearance barrier. Within FTZs, they offer four major functions as follows: (1) single-window operation; (2) free flow of commodities; (3) management autonomy; and (4) attracting business activities (as shown figure 2-1).

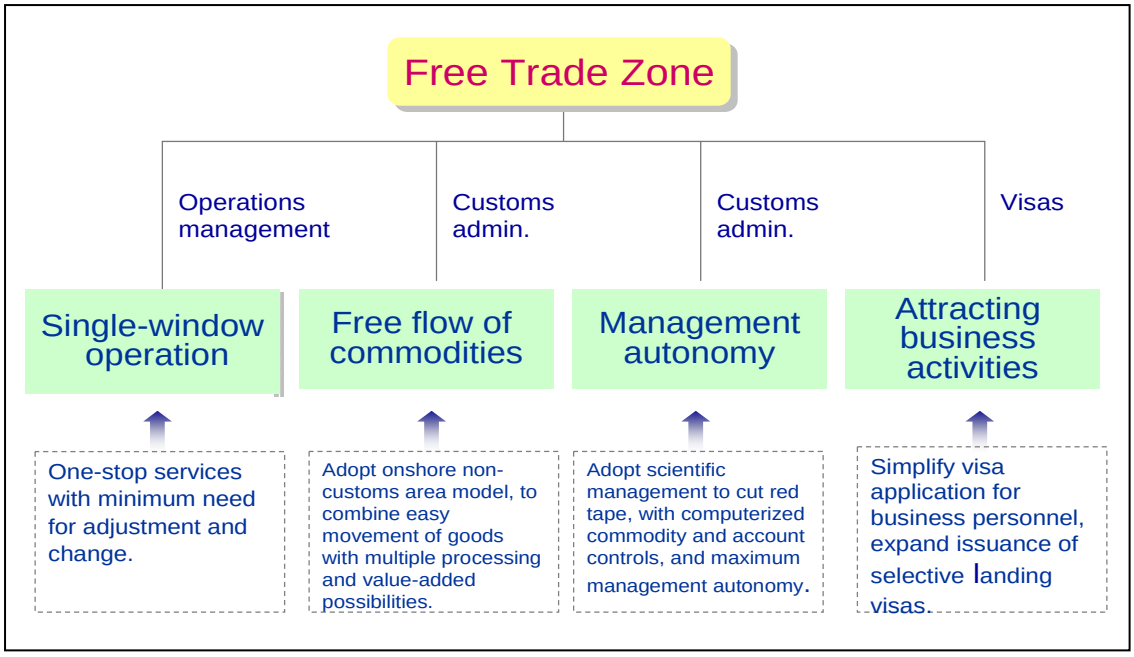


Figure 2-2 Concept of FTZ in Taiwan

Source: CEPD

After all, 'Act for the Establishment and Management of Free Trade Zones' was promulgated on the Taiwan government on 23 July 2003. This Act is enacted for the purpose of developing the mode of operation for a global logistic and management system, effecting aggressive promotion of trade liberalization and internationalization, facilitating the smooth flow of personnel, goods, finance, and technology, upgrading the national competitive power, and furthering the national economic development. According the act, FTZ is referred to an area which is situated within a controlled district of an international airport or an international seaport under the approval of government (the Executive Yuan), or of an adjacent area demarcated as a controlled area, and an industrial park, Export Processing Zone, Science-Based Industrial Park, and other areas approved by the Executive Yuan for the establishment of a controlled district for the purpose of conducting domestic and foreign business activities where the comprehensive goods tracking system can be connected with the controlled district of an international airport or seaport by means of technological facilities. Therefore, the 'adjacent area' is to any of the following circumstances:

(1) A piece of land whose joining width with the land of a controlled district in an international airport or an international seaport is 30 meters or more;

(2) A piece of land being separated from a controlled district in an international airport or an international seaport by a road or a water-way in between, but still suitable for the formation of a controlled area; or

(3) A piece of land which may be connected with a controlled district in an international airport or an international seaport by a dedicated road having a length of less than one kilo-meter.

The concept of FTZ in Taiwan is that goods in these areas are approved for displaying, storing, warehousing, collecting and distributing, unpacking, assembling, labeling, packing, sorting and fabricating or processing with other material for transshipment to other countries. And, before leaving such FTZs, these goods are free of customs duties and will not be subject to tariff rules and import restrictions, unless they leave the FTZs for use or consumption in taxation areas of the host country. Additional, the domestic tax areas can stimulate local economies through supporting the productive activities (as shown in Figure 2-3).

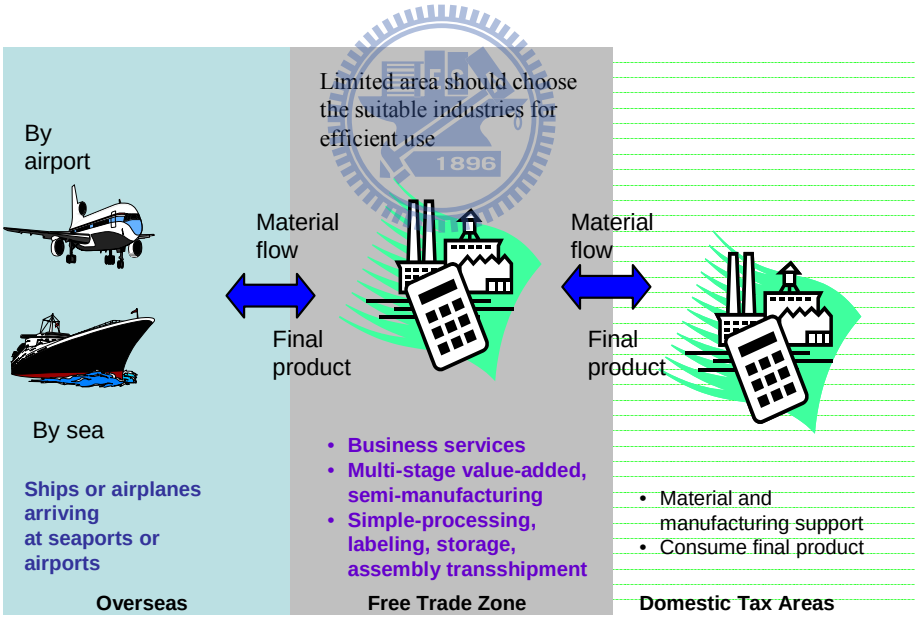


Figure 2-3 Interaction between Free Trade Zone and Other Areas

Within FTZ, the enterprises are classified into two kinds. One is 'Free trade zone enterprises'. The other is 'Non-free-trade-zone enterprise'. 'FTZ enterprises' are referred to the enterprises which have been approved to engage in trading, warehousing, logistics, collecting and distributing (cargo of) containers, transiting, transshipment, forwarding,

customs clearance, assembling, sorting, packaging, repairing and fabricating, processing, manufacturing, displaying, or technological service within a FTZ. 'Non-FTZ enterprises' are referred to any financial, stevedoring, catering, hotel, business conference, transshipment, and other enterprises which are not free port enterprises, but have been approved to operate within a FTZ. FTZs provide some incentives to attract enterprises (as shown in Table 2-3).

Table 2-3 Incentives of FTZ in Taiwan

Incentives	Implementation Items
value-added process	● Outsourcings process in outside special area (export process zone, bonded area, etc.) ● Allow in in-depth value added processing
Duty and tax exemption	● FTZ enterprises are exemption from customs duties, commodity tax, sales tax, tobacco and wine exercise tax.
Simplify visa application for business personnel	● Visa-exemption for 21 countries. ● Landing visa for 24 countries. ● Emergency cases shall be first approved and forwarded by FTZ administration.
Ease of Financial operations	● Permitting setup of holding companies for offshore investment. ● Allowing OBUs to handle foreign-currency transactions.
Simplify customs	● Within national territory, but outside the customs territory: the lowest customs checking, inspecting, and cargo tracking and escorting.

2.2.3 The Comparison of FTZ among Different Countries

FTZs in different countries have different content and fulfill different functions. All FTZs aim to provide a liberal logistics center facilitating convenient trade of goods. The details of FTZ in different are shown as follows:

1. Hong Kong

Hong Kong follows the economic policy of free enterprises and free trade. There are no import tariffs and excise duties are levied only on four categories, including locally manufactured or imported tobacco, alcoholic liquors, methyl alcohol and hydrocarbon oils. A tax is also payable on first registration of motor vehicles. The Customs and Excise Department is assigned the tasks of fighting smuggling, collection of government revenues on dutiable goods, the detection and deterrence of narcotics trafficking and abuses of controlled drugs, and the protection of intellectual property rights.

For health and safety reasons, five kinds of commodities are subjected to licensing control of the Director-General of Trade and Industry according to the 'Import and Export Ordinance', the 'Reserved Commodities Ordinance', the 'Ozone Layer Protection Ordinance' and their subsidiary legislation. Import license is required for radioactive substances and irradiating apparatus. Import and export licenses are required for the following commodities: (a) Pharmaceutical products and medicines (b) Reserved commodities (c) Strategic commodities (d) Ozone depleting substances.

Except for the above regulations, Hong Kong has no trade barrier. Any company, regardless its ownership, can operate in Hong Kong freely. It is very easy to set up a new company in Hong Kong in six working days. Hong Kong has a simple tax system and the profit tax is one of the lowest in the world (Shen and Yeung, 2004).

2. Singapore

FTZs in Singapore were first established in 1969 to facilitate entrepot trade in dutiable goods. Firms in FTZ benefit from various advantages provided by the 'Free Trade Zones Act'. Singapore has seven free trade zones (FTZ), six for seaborne cargo and one for air cargo, within which a wide range of facilities and services are provided for storage and

reexport of dutiable and controlled goods. Goods can be stored within the zones without any customs documentation until they are released in the market. They can also be processed and re-exported with minimum customs formalities. FTZs in Singapore are primarily for transshipment cargoes, and the key characteristic of Singapore is that the whole country is similar to FTZs. This means that in examining the concept of an FTZ with reference to Singapore, the whole country system needs to be considered (UN, 2005).

All dutiable goods imported into or manufactured in Singapore are subject to customs duty and/or goods and services tax (GST). The broad categories of dutiable goods for customs duty in Singapore are intoxicating liquors, tobacco products, motor vehicles and petroleum products. GST is a tax on domestic consumption within Singapore. It is paid at the rate of 5% whenever customers buy goods or services from GST-registered businesses within Singapore. The FTZs provide 72 hour free storage for import/export of conventional and containerized cargo and 14 day free storage for transshipment/re-export cargo. The rental cost of FTZ facilities within port area is relatively expensive due to scarce land. Most logistics companies have facilities in FTZs both inside and outside the port, but relatively small space in the FTZs inside the port for goods requiring quick action.

3. Japan

A total of 22 Foreign Access Zones (FAZs) scattered throughout Japan offer air and sea ports close to regional markets, which helps traders to reduce transportation time and costs within Japan. Each FAZ offers a comprehensive range of facilities to efficiently handle imports at all stages, from customs clearance to product sorting, processing and distribution. In addition, FAZ-resident companies realize additional benefits bu cooperating in joint importing, ordering and marketing. Each FAZ is equipped with special facilities for import-related activities, including exhibitions, fairs, conventions, commercial negotiations and seminars, all of which help to expand opportunities for business development. Import-related information and proxy services are also available.

In order to reduce the rate of joblessness and promote industry and trade, Okinawa in Japan planned Special Free Trade Zone. The applicable law is ‘Okinawa Promotional Special Measures Law’ in 1999. The designated area is approximately 122ha (Approx. 89.6ha available for business use not including roads and green space). In SFTZ, it

provides some incentives as follows:

- *National Tax incentives:*
  - ✓ For newly established business within the SFTZ with 20 or more full time employees, 35% of income earned will be exempt from corporate tax, corporate business tax and corporate residence tax for the first 10 years following establishment.
  - ✓ For businesses installing or expanding facilities worth more than 10 million yen within the SFTZ, 15% of machinery and equipment costs and 8% of building costs will be deducted from the corporate tax (max 20% of corporate tax, carryover for up to 4 years, with a ceiling of 2 billion yen in investment amount).
  - ✓ For businesses installing or expanding facilities worth more than 10 million yen within the SFTZ, 50% of machinery and equipment costs and 25% of building costs will be approved as special depreciation.
- *Duty*
  - ✓ When shipping products to the domestic market after processing or manufacturing using raw materials from overseas, businesses can choose whether the duty will be applied to the raw materials or the products, with some exceptions.
  - ✓ The approval fee for bonded storage facilities, bonded factories, bonded exhibition facilities and general bonded areas will be reduced by half.
- *Local Tax*：For business installing or expanding facilities worth more than 10 million yen within the SFTZ,…
  - ✓ a portion of the business tax will be exempted for 5 years.
  - ✓ a portion of the real estate acquisition tax will be exempted (only the portion which is directly used for the business).
  - ✓ a portion of the fixed property tax will be exempted for 5 years (only the portion which is directly used for the business).
- *Subsidy for employment of young Okinawa:* a subsidy is granted to business operators who establish promises in Okinawa (limited to those established at a cost of 3 million yen or more) involving the long-term employment of three or more residents of Okinawa under the age of 35.
  - ✓ Amount of subsidy: 1/4 of the amount calculated using the method set by the

Minister of Health, Labor and Welfare (1/3 for small and medium enterprise owners).

- ✓ Period of subsidy: One year (A subsidy for the second year may be granted if the employee retention rate is high).
- ✓ Maximum amount: 1,200,000 per year per person.

➢ *Subsidy for employment development:* a subsidy is granted to business operators who establish promises in Employment Development and Promotion Regions (all areas of Okinawa Prefecture until March 31,2010) involving the employment of three or more residents of the region. The grant is made based on the number of workers and the cost of establishing the premises.

- ✓ Amount of subsidy: Fixed amount (300,000 to 2.5 million yen) per year.
- ✓ Period of subsidy: Three years (five years when specific requirements are met).

4. Korea

The government of Korea has also prepared a special tax incentive package for foreign-invested companies that locate in Fee Economic Zone (FEZs) to promote a key element of its plan to transform Korea into a Northeast Asia hub. Incheon International Airport (IIA) ranks third in air freight worldwide and tenth in passenger traffic in 2008 after just three and a half years of operation. The government continues working toi develop Busan New Port and Gwangyang Port into mega-ports as port of its Northeast Asian hub master plan. The surrounding areas will be developed into a logistics, assembly, trade and international business base. The three FTZs are being developed as Northeast Asian epicenters of business, logistical and high-tech services. Incheon FEZ, as air logistics business complex is built near IIA, including a 991,800 square meters customs free zone and a 495,900 square meters international business zone. By building new ports and logistical complexes in the surrounding areas, Busan and Jinhae FEZs are being developed to become Northeast Asian maritime logistics centers. An industrial complex for high-tech cutting-edge machinery, material and auto parts manufacturers are built in the vicinity of this FEZs to serve as a manufacturing center for southeast Korea complete with full R&D support services. The Gwangyang Bay FEZ is being developed into a maritime trans-shipment hub for cargo to China by building ports and logistics parks in the

surrounding area. The Yulchon Industrial Complex is being developed to include a petrochemical, auto parts manufacturing and steel mill industrial cluster. The government is striving to make FEZ business conditions more convenient for foreign investors and improve living conditions. In January 2004 the government announced a five-year plan to improve the management and living environment for foreign companies and workers. The government is in the process of completing 49 of the business-related tasks and 102 that involve living conditions. Mid- to long- corporate tax rates are being lowered to meet or beat those in competing countries. FEZ authorities are working to recruit world-renowned schools, hospitals and leisure facilities to provide non-Koreans residing there with high-quality services. FFEZ authorities are also engaged in inter-Korean economic cooperation and multinational negotiations that will create impetus for Northeast Asia to become a global economic hub.

Table 2-4 Incentives in Korea FEZs

Sectors	Sector Benefits
Tax breaks	● Corporate tax exemptions for the first 3 years and a 50% reduction the following 2 years (for investments of more than US$50 million, a 100% exemption for the first 7 years and a 50% reduction the following 3 years) ● A flat 17% income tax for foreign CEOs and executives at foreign companies ● Capital goods import tariff exemption for 3 years ● Acquisition, registration, property, and aggregate land tax exemptions for the first 3 years and a 50% reduction for the following 2 years
Financial support	● Companies that locate in FEZs will either be exempt from or subject to reduced land fees. ● Financial assistance for the construction of such facilities as hospitals and schools to make life more convenient for foreigners.
Deregulation	● Minimal land-use regulations governing factory construction and enlargement (currently applicable to Seoul metropolitan area). ● Lift restrictions on entering businesses reserved for SMEs (small and medium enterprises). ● Direct foreign currency payments for ordinary transactions of less than US$10,000 allowed.
Employment and labor-management	● Unpaid weekly holidays allowed (currently paid) ● Exemption from obligatory employment of veterans, the disabled, the elderly

Educational improvements	● Schools can be established by foreign investors. ● Domestic residents can attend foreign schools.
Foreign hospitals and pharmacies	● Foreign-financed hospitals and pharmacies for foreigners allowed
Foreign broadcasting	● The ratio of cable network foreign broadcasting retransmission channels expanded from the current 10 to 20%
Administrative support	● English allowed for processing of public documents. ● Foreign Investment Ombudsman's office will be established

Source: UN, 2005

5. China

Since 1980, China has established five special economic zones (SEZs) such as Shenzhen, Zhauhai and Shantou in Guangdong Province, Xiamen in Fujian Province and the entire province of Hainan. In 1984, China further opened 14 coastal cities to overseas investment: Dalian, Qinhuangdao, Tianjin, Yantai, Qingdao, Lianyungang, Nantong, Shanghai, Ningbo, Wenzhou, Fuzhou, Guangzhou, Zhanjiang and Beihai. In 1985, the state decided to expand the open coastal areas, extending the open economic zones of the Yangtze River Delta, Pearl River Delta, the Xiamen-Zhangzhou-Quanzhou Triangle, Fujian, Shandong Peninsula, Liaodong Peninsula, Hebei and Guangxi into an open coastal belt. In 1990, China decided to open the Pudong New Area in Shanghai and other cities along the Yangtze River Valley. In 1992, the State Council had opened 13 border cities, counties and towns, and opened all the capital cities of the inland provinces and autonomous regions. In addition during the 1990s China also established 15 FTZs, 56 state-level economic and technological development zones, and 53 new and high-tech industrial development zones. In these zones, they provide some incentives as follows:

- *Tax incentives:*
  - ✓ The prime income tax rate for foreign-invested enterprise (FIE) is 15% of profit.
  - ✓ The national government has standardized most preferential policies for FTZs, including a package of tax incentives.
  - ✓ For the first two years of operations, companies are exempt from enterprise income tax. During the next three years, companies are taxed at 50% of the normal FIE tax rate of 15%. After five years, in-zone enterprises pay the full FIE tax rate.
  - ✓ If more than 70% of the finished product is re-exported outside China territory, any

remaining product is taxed at a reduced rate based on the original imported components.

- *Customs duty incentives:*
  - ✓ There are duty exemptions on all construction or infrastructure imports necessary for production and on all equipment, parts, and components imported for self-use.
  - ✓ Imports entering the FTZ from outside China proper are exempt from customs duties and VAT (value-added tax); customs duties and VAT are assessed only after the finished products leave the FTZ for regions outside the bonded area.
  - ✓ All finished goods 'imported' from the FTZ into China proper will have customs duty and VAT assessed based on a ratio of locally sourced inputs to imported components.
- *Local level incentives:*
  - ✓ Each zone can, and often does, offer its own incentives on top of the central government ones.
  - ✓ Local authorities can establish land-use or utility incentives and may also decide to exempt in-zone enterprises from local income tax.
- *No participation limit:*
  - ✓ FTZs remain the only locations in which a foreign company may establish a wholly foreign-owned trading company; initially these wholly foreign-owned companies did not possess trading rights (the right to import and export). To sell products in mainland markets, these companies were required to engage agents with trading rights to handle customs procedures for transactions with the non-FTZ enterprise. This changed in June 2003 when the State Council, the Ministry of Commerce and Customs, issued a notice allowing enterprises in Futian-Shatoujiao, Tianjin, Waigaoqiao, and Xiamen Xiangyu FTZs to register for the right to conduct domestic trade without using an intermediary with trading rights, and the notice leaves the drafting of detailed application rules to the zones.
- *Bonded Commodities Exchange Market or exhibition centre:*
  - ✓ FTZs offer a Bonded Commodities Exchange Market or exhibition centre through which in-zone enterprises sell their products to Chinese buyers and distributors for sale in mainland markets.

- ✓ Exchange market administrators clear the goods through Customs and issue VAT invoices.

Like other special zones, FTZs in China provide other advantages in addition to the preferential policies:

- *simplified and efficient administrative structure*
- *one-stop service for official procedure settlement*
- *top-flight infrastructures*
- *professional service system on a par with international standards*
- *catering actively to the individual and diversified demands of different investors*
- *tailor-made service and the readiness to help investors overcome difficulties*
- *strategic locations.*

6. Philippine

The government promotes the establishment of world-class, environment-friendly economic zones all over the country to respond to demands for ready-to-occupy locations for foreign investments. At the helm of this strategy is the Philippine Economic Zone Authority (PEZA), a government corporation established through legislative enactment known as 'The Special Economic Zone Act of 1995'. FTZ in Philippine is an isolate policed area adjacent to a port entry (as a seaport) and /or airport where imported goods may be unloaded for immediate transshipment or stored, repacked, sorted, mixed, or otherwise manipulated without being subject to import duties. However, movement of these imported goods from the free-trade area to a non-free-trade area in the country shall be subject to import duties. But all FTZ belonged to ECOZONES. ECOZONES are selected areas with highly developed or which have potential be developed into agro-industrial, Industrial tourist/recreational, commercial, banking, investment and financial centers. An ECOZONES may contain any or all of the following: Industrial Estates (IEs), Export Processing Zones (EPZs), Free Trade Zones, and Tourist/Recreational Centers. The Incentives for Enterprises are as follows:

- Income Tax Holiday (ITH) or Exemption from Corporate Income Tax for five years, extendable to maximum of eight years;
- After the ITH period, a special 5% Tax on Gross Income, in lieu of all national and

local taxes;

- Exemption from duties and taxes on imported capital equipment, spare parts, supplies, raw materials;
- Also breeding stocks and/or genetic materials or the equivalent tax credit on these items, when sourced locally;
- Domestic sales allowance equivalent to 30% of total sales;
- Exemptions from export taxes , wharfage dutes, imports and fees;
- Permanent resident status for foreign investors and immediate family members;
- Employment of foreign nationals;
- Simplified import and export procedures;
- Other incentives under Executive Order 226 (Omnibus Investment Code of 1987), as may be determined by the PEZA Board.

7. Netherlands

There is no free trade zone or free port in Netherlands in the sense of territorial enclaves where commodities can be processed or reprocessed tax-free. However, There are a lot number of customs warehouses and free warehouses at designated places and international airports where goods in transit may be temporarily stored under Customs supervision. Goods may be repacked, sorted or relabeled. A customs warehouse means any place approved by and under the supervision of the Customs authorities where goods may be stored under the prescribed conditions. A customs warehouse may be either a public or a private warehouse. A public warehouse is a customs warehouse available for use by any person for the warehousing of goods, whereas a private warehouse is reserved by the warehouse keeper. Customs will accept applications for approval of different types of warehouses as follows:

- Type A: A public warehouse available to any person for the warehousing of goods under the responsibility of the warehouse keeper.
- Type B: A public warehouse that has one warehouse keeper who may in principle allow anyone to use the space. Type B warehouses are intended primarily for transit storage suppliers. The person whose name is on the declaration placing the goods in the warehouse is liable to Customs for them and must provide a guarantee for them.

Customs will supervise the entry, storage and removal of the goods in Type B warehouse by means of both storage documents that it retains and physical supervision. Type B warehouses must be located near a Customs office.

- Type C: A private warehouse reserved for the warehousing of goods by the warehouse keeper. The warehouse keeper is synonymous with the depositor, although does not have to be the owner of the goods. Only the warehouse keeper is allowed to store goods and is liable to Customs for the goods in storage by way of a guarantee. Customs supervises the goods mainly on the basis of records but also carries out physical controls. The types of goods and the level of detail in the records determine the frequency of these controls. The more specific the data, the less the need for physical controls. Because of the controls required, type C warehouses must generally be located near a Customs office.
- Type D: This warehouse is similar to a type 'C' warehouse, but the declarant has the option of having the goods assessed for duty either on the basis of their value on being placed in warehousing or at the time of release for free circulation. Type D warehouses, like type C, are private warehouses. They are intended solely for goods stored by the warehouse keeper and are mainly used for commercial storage or for building up stocks. The warehouse keeper is liable to Customs for the goods in storage. The difference between Type D warehouses and other types is that for all other types of customs warehouses, the customs value and quantity of the goods are determined when they are removed from the warehouse. In Type D warehouses the status of the goods on placement in the warehouse is decisive. However, deviations from this principle are possible if ware housekeepers so request. Customs supervises the goods on the basis of the stock records and financial records. These records must therefore meet high standards. Random physical controls also take place. Type D warehouses may be located anywhere in the country.
- Type E: A private warehouse, similar to Type C. However, the Type E authorization allows goods to be stored in a number of different locations. Type E warehouses are intended solely for goods storage by the warehouse keeper. Like Type D they are mainly intended for commercial storage and for building up stocks. Again the warehouse keeper is liable to Customs for the goods in storage. Customs supervises

the goods in Type E warehouses primarily on the basis of the financial and stock records, with limited supplementary physical controls. The ware housekeeper's records must therefore meet high standards. His organization must also have separation of duties and internal control measures. The warehouse keeper may store goods in multiple locations. His records must show what goods are located in which location. As a rule, Type E warehouses may be located anywhere.

8. America

Foreign-trade zones are designated sites licensed by the Foreign-Trade Zones (FTZ) Board (Commerce Secretary is Chairperson) at which special Customs procedures may be used. These procedures allow domestic activity involving foreign items to take place prior to formal Customs entry. Duty-free treatment is accorded items that are reexported and duty payment is deferred on items sold in the U.S. market, thus offsetting Customs advantages available to overseas producers who compete with producers located in the United States. Subzones are special-purpose zones, usually at manufacturing plants. A site which has been granted zone status may not be used for zone activity until the site or a section thereof has been separately approved for FTZ activation by local U.S. Customs officials and the zone activity remain under the supervision of the Bureau of Customs and Border Protection, U.S. Department of Homeland Security. FTZ sites and facilities remain within the jurisdiction of local, state or federal governments or agencies (http://ia.ita.doc.gov/ftzpage/ftzinfo.html).

Except for direct delivery procedures provided for in Sec. 146.39, all merchandise covered by a Customs Form 214 may be retained for Customs examination at the place of unlading, the zone, or another location, as designated by the port director. The port director may authorize release of the merchandise without examination. If a physical examination is conducted, the Customs officer shall note the results of the examination on the examination invoices. The range of benefits that can be available through free trade zone-type programs includes:

- Duty Exemption - No duty is paid on goods imported into and then re-exported from a free trade zone. The exemption can also apply to goods that are consumed, scrapped, or destroyed within the zone. (Exemption of duties on re-exported merchandise

generally eliminates companies' need to use 'duty drawback' programs.)

- Duty Deferral - Cash flow savings result from payment of customs duties only when goods 'enter' a country's customs territory, rather than when they are 'admitted' into the country's free trade zone.
- Logistical Benefits - Companies using free trade zones may have access to streamlined customs procedures and other related savings.
- Inverted Tariff Savings - Manufacturers may be allowed to pay a lower finished-product duty rate (rather than the individual duty rates applicable to imported components used in the manufacturing process) when they enter the finished product into the country's customs territory.
- Tax Savings - Merchandise and activity in free trade zones may be exempt from a range of taxes.

9. Comparison among Different Countries

To review FTZs in different countries, most countries have placed their FTZs in special zones, generally inside or nearby port/airport, for examples, Japan, Singapore, Korea, Taiwan, Philippine. All these countries are regulated by various special laws providing different customs clearance benefits, personnel entry and exit requirements, and tax incentives (Feng and Hsieh, 2008). The operation of FTZs in Hong Kong and Singapore has high administrative efficiency. They offer 24 hours customs clearance, provide convenient entry for people, and provide single-window administrative services and special promotional mechanisms. In Taiwan, an FTZ is an area located within a controlled area in an international airport or an international seaport. The goal of FTZ in Taiwan is set for achieving competitive advantages via high value-added transshipment. Taiwan can use its advantage in high value-added manufacturing and design with convenient logistics and minimal trade limitation in FTZs to create new international trade opportunities between Taiwan and Mainland China in the future.

With the location, Hong Kong and Netherlands are the most special cases. Hong Kong is a Special Administrative Region of China. 'One country, two systems' has been practiced in Hong Kong. The whole of Hong Kong is a single economic trade entity. Hong Kong

follows the economic policy of free enterprises and free trade. There are no import tariffs and exercise duties are levied except for four categories, including locally manufactured or imported tobacco, alcoholic liquors, methyl alcohol and hydrocarbon oils. The bonded area of the Netherlands could be located with approval in all parts of the country, if it follows and maintains accordance with customs clearance regulations. Most other countries have placed their FTZs in special locations, generally inside or nearby port/airport control areas or in industrial park. Taiwan has five FTZs, all of which are in port or airport control areas. However, according to Taiwanese law, FTZ could be located in an adjacent and controlled area or in an area with goods tracking system which connects with controlled districts of international ports/airports through technological facilities (also seeing in section 2-2-2).

With regard to scale, scale is generally not a major factor, but most FTZs exceed 30 hectares in size. The FTZ of Okinawa in Japan has an area of 122 hectares, while Waigaqiao, a bonded zone in China has an area exceeding 1600 hectares.

Regarding legal issues, with the exception of Hong Kong, where the FTZ is regulated simply by the general law, most FTZs are regulated by various special laws providing different customs clearance benefits, personnel entry and exit requirements, and tax incentives.

Regarding tax preferences, the waiving of customs duty for re-export products is a basic incentive. Just as Firoz *et al.* (2003) describe when goods enter FTZ, duty is free so long as goods stay there. Both Hong Kong and boned areas in China have no customs duty. Hong Kong has the most attractive incentives, with no customs duty, VAT, or profit taxes (also call income taxes in other country). Meanwhile, FTZs in Japan, the Philippines, the United States and Korea eliminate custom duty. Finally, the Philippines, Korea, China and Japan eliminate income tax.

Regarding management, the operation of ports or airports in Hong Kong, Singapore and Netherlands has high administrative efficiency. Hong Kong, Singapore and Netherlands all offer 24 hours customs clearance and provide convenient entry for people. Additionally, some countries provide single-window administrative services and special promotional mechanisms.

Most important issue is related with goods flow and processing, lots of countries focus

on re-export and simple value-added processing (labeling, repacking and assembling). This could create most benefit of special zone. Korea and Taiwan also focus on multi-stage value-added processing and manufacturing. Taiwan emphasizes that adding value via a multi-stage approach or in-depth processing creates unique competitive advantage for FTZs in Taiwan. A report (IOT, 1999) revealed that a single transshipped container of cargo generates US$1,625 in added value. In comparison, a transshipped container of cargo that undergoes simple processing generates US$4,750 in added value. Moreover, a transshipped container of cargo that undergoes multi-stage value-added processing creates US$18,500 in added value. Taiwan can use its advantage in high value-added manufacturing and design with convenient logistics and least trade limitation in FTZs to create new international trade opportunities between Taiwan and Mainland China in the future.

Table 2-5 Difference of FTZs between Taiwan and Other Countries

Factors	Country/Characteristic
Location	Hong Kong: All area is free port. Singapore: Within port/airport Japan: In Okinawa, near port Korea: Within port/airport China: Near port/airport or manufacturing site (bonded area) Philippine: An isolated policed area adjacent to a port and/or airport. Netherlands: Distribution center, permitted in whole country. America: Near port/airport. Taiwan: An area near or within port / airport
Legal	Hong Kong: The Basic Law Singapore: Free Trade Zone Act Japan: Okinawa Promotional Special Measures Law China: Administration Order (bonded area) Philippine: The Special Economic Zones Act(ECOZONES) Korea: Free Economic Zone Act (FEZ) and Comprehensive Investment Initiatives Netherlands: Community provision of and National provisions of the Netherlands America: Foreign Trade Zone Act Taiwan: The Free Trade Zone Act
Preferential Taxes	Hong Kong: 1. No VAT 2. No customs duty 3. Only profit tax. Singapore: 1. No customs duty or Customs permit. 2. No GST 3. No excise duty. 4. Adopt Major Exporter Scheme (MES) Japan: Reduce corporate tax China: 1. Exemption from customs duty for most imported goods. 2. Income tax of 15% throughout the whole country 3. No corporate tax for production companies during their first two years and 50% tax rebate during their 3rd to 5th years of operations.

Factors	Country/Characteristic
	Philippine: 1. Exemption from national and local taxes. 2. Member of ASEAN, with preferential tariffs 3. Exemption of 98% customs tariffs before 2010. 4. Preferential access to developed markets such as the U.S. Korea: 1. Reduction of corporate tax 2. Reduction of individual income tax and five-year tax exemption for foreign engineers. Netherlands: 1. No customs duty 2. No VAT 3. Income tax based on the level of activity. America: 1. Customs duty: maybe deferral, elimination of duty, tariff relief, or ad valorem, 2. Income tax: most states exempt all FTZ merchandise from inventory taxes. Taiwan: 1. Exempt from customs duties, commodity tax, tobacco and wine tax, tobacco health and welfare surcharge, trade promotion service charge, and port dues. 2. Zero-rated business tax on sale of services within FTZ. 3. Zero-rated business tax for domestic procurement 4. Zero-rated business tax for operator outside FTZ transporting goods and storing therein under instructions of foreign customer and obtaining foreign exchange.
Administrative	Hong Kong: 1. Using risk management, customs checking classified by origin country. 2. 24hrs customs services provided by EDI Singapore: 24 hrs service, clearance by TradeNet System, and no clearance within zones Japan: Reduction of land cost. China: 1. No customs control, clearance data provided to supervise. 2. 24hrs customs clearance 3. No customs inspection, all goods finish customs

Factors	Country/Characteristic
	Philippine: One stop shop center for registration Netherlands: 1. 24hrs services provided by EDI. 2. Different type of bonded warehouse: e-type, c-bac etc. Different type of bonded warehouse: e-type, c-bac etc. America: 1. Form 214 must be completed for all cargo and permission must be given by the port authority. 2. Direct delivery permitted before 30 days. 3. No time constraints on storage Taiwan: 1. 'Inside national territory but outside customs' for flow of goods, commerce and people. 2. Single-window administrative services.

Source:

1. Republic of the Philippine Congress of the Philippines Metro Manila Third Regular Session.

2. Free Trade Zones Act, The Statutes of the Public of Singapore.

3. Welcome to a Business Paradise: Industrial Site Promotion Guide, Okinawa Special Free Trade Zone, http://www.pref.okinawa.jp/zone

4. Council for Economic Planning and Development (2003), Discussion of Free Trade Zone in practice –using Netherlands, Singapore, and Hong Kong as example.

5. Council for Economic Planning and Development (2000), Free Port Planning in Taiwan and related analysis and research in other countries.

6. web site: http://www.flyrichmond.com/ftz207, http://ia.ita.doc.gov/ftzpage/ftzpage/ftzinfo.html, http://www.gov.sg/customs/trade/maintrade.html

7. Shen and Yeung, 2004

2.3 Summary

According to previous literature, a FTZ can strengthen the competitiveness through the following features:

1. Location: most FTZs are located in an enclosed area which is within or adjacent to a port or an airport for easy access.
2. Purpose: it is set up for regional economic development.
3. Service: it is an area which is a ′country within a country′ with less restrictions regarding operation control and trading, including customs clearance by EDI, no customs inspection, and no time constraints on storage, thereby allowing free flow of commodities.
4. Management: It provides flexible services and single-window services. For example, it provides 24 hrs services, and single-window administrative services.
5. Operational cost: it provides basic service facilities, and gives different incentives to reduce operational cost of firms within the FTZs. For example, no VAT, exemption from custom duty, reduction of corporate tax.
6. Most liberalization strategies are regulated by a special law.

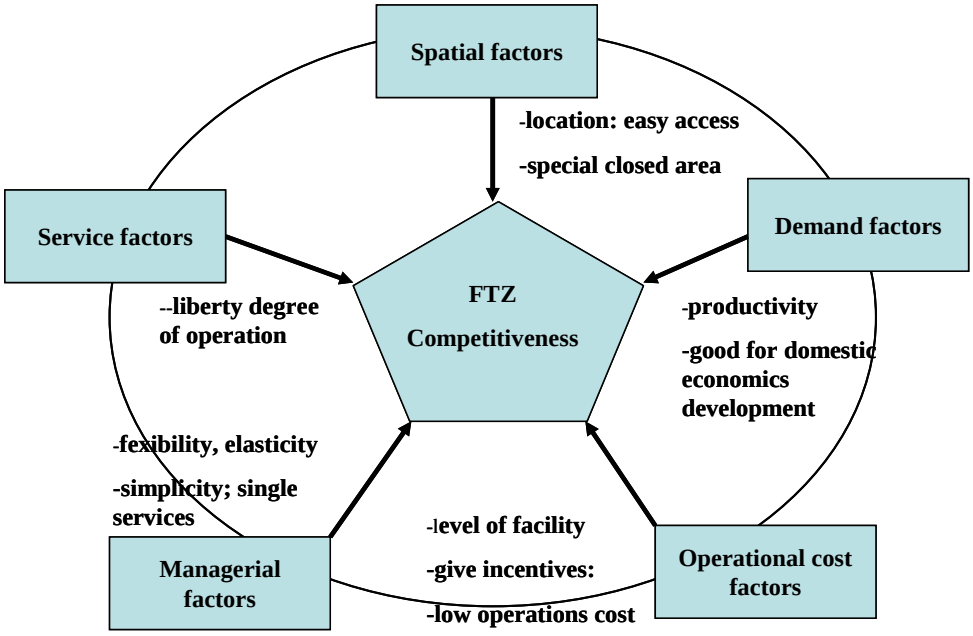


Figure 2-4 Influential Factors of FTZ Competitiveness

Chapter 3 Research Methodology

3.1 Research Framework

Although the types of activities in FTZs have been defined, the most suitable industries expected to help raise the overall performance of the area have to be identified since the land area of FTZs is limited. However, the majority of research on FTZs has focused on trading gain (Facchini and Willmann, 1999), location choice (Basu, 1996), key factors of success or willingness of entering FTZs (Chen, 2003; Pan, 2005; Yeung, 2006). Little is known about what industries are most beneficial to FTZs.

Regarding the selection of core industries, there are many selection methods in the literature, including Porter's Diamond Model (Hafeez *et al.* 2002), Double Diamond Model (Moon and Lee, 2004; Rugman and D'Cruz, 1993), and Cognitive Maps (Kwahk and Kim, 1999). In fact, the Diamond Model focuses on inside and outside resources or the technological ability of a single enterprise or industry. Because the consensus of factor set considered in selection is unavailable, scholars choose different methods of competitiveness for evaluation instead of Diamond Model, such as Total Factor Productivity (TFP), Revealed Comparative Advantage (RCA), or Data Envelopment Analysis (DEA). Both TFP and DEA methods need to examine the variables of input factor and output performance to assess the performance of target industries. However, the data for both methods are not applicable to Taiwan's FTZs in the current stage of development. The theory of cognitive maps could help to facilitate consensus elicitation toward common organization goals. Specifically, Cognitive maps identify causal values of causal connections through experts' questionnaires. Cognitive maps need to be tested and verified after getting the causal values, this method remains to be applied in future research because of lack of real data. Compared with other researchers, Walters and Lancaster (2000) did not choose the core industries directly, but inversely assesses the performance of supply chains or value chains in order to select activities that are keys to value-adding.

The major goal of FTZs is to maximize the value-added transshipment in the value chain processing. While FTZs in Taiwan have a limited area located within or adjacent to a port, how to choose the suitable industries in FTZ is a critical issue. To increase

transshipment added value of FTZ industries, to benefit domestic industry development and to enlarge the market share of FTZ industries among the competition ports. This study references Salin (2006), and specifies the following selection principles based on the goals of FTZs (as shown in Figure 3-1).

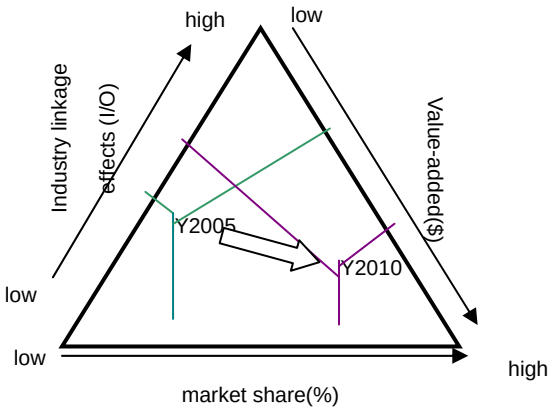


Figure 3-1 Selection Indicators for Core Industries

Based on these objectives, the major industries in this study focus on manufacturing industries which could create really new value. And three principles for the selection of core industries into FTZs are described as follows:

(1) Industries that can create high value-added transshipment within FTZ.

(2) Industries that can produce a large positive impact on market share.

(3) Industries that are closely interrelated with down-stream and up-stream industries and can thus enhance domestic industry developments.

According to the above principles, the core industries for FTZs could be defined as the intersection set obtained from three indicators of high value-added, high forward and backward linkage and high market share (as shown in Figure 3-2). The quantitative measurements of the three indicators are discussed as following sections.

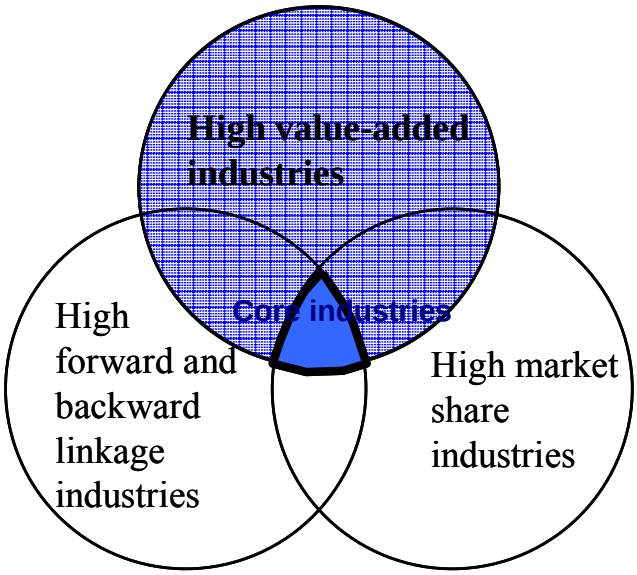


Figure 3-2 Intersection Set of Core Industries Using Three Indicators

3.2 Selection Indicators of Core Industries

According to the above principles, the detail indictors are described as follows:

1. Value-added Indicator:

Since industries in FTZs are involved with international trade, this study uses the rate of value-added transshipment based on the principle (1). Furuichi (2004) measures the rate of import trading cost rate as the indicator of selecting competitive port. The rate of import trading cost is defined as follows:

$$\text{The rate of import trading cost} = \left(CIF_{ij} / FOB_{ij} - 1\right) \quad (1)$$

where CIF_{ij} refers to the transport cost of export goods from country *i* to country *j*.

FOB_{ij} represents the value of goods after value-added activity from country *i* to country *j*.

In this equation, the higher rate is, the higher transport cost in import goods.

International Monetary Fund (IMF) defines FOB (free on board) values to include the transaction value of goods and the value of services performed to deliver goods to the border of the exporting country. CIF (cost, insurance, and freight) values include the transaction value of goods, the value of services performed to deliver goods to the border of the exporting country and the value of the services performed to deliver goods from the border of the exporting country to the border of the importing country. And export FOB is thus in practice the same as 'export at the frontier of the economic territory'.

The United Nations (1998) recommends that the value of imported goods be CIF and the value of exported goods be FOB. Chasomeris (2003) pointed out that the factor CIF/FOB has several drawbacks. One of which is measurement error; the CIF/FOB factor is calculated for those countries that report the total value of imports at CIF and FOB values, both of which involve some measurement error. The second concern is that the measure aggregates over all commodities imported, so it is biased if high transport cost countries systematically import lower transport cost goods. Finally, the measure aggregates over the different sources of supply, so for each importer there is a single CIF/FOB measure, not a full set of CIF/FOB measures for imports from each supplying country (Chasomeris, 2003). Following the above literatures, CIF/FOB may not be a perfect indicator. However, it's an

easy way to understand and measure added value of transshipment. And most important is the data of FOB and CIF can be available and obtained in national trading data. To achieve the competitiveness objectives of FTZs, this study propose to choose core industries in FTZs through a criterion of the rate of value-added transshipment within the FTZs (as seen in Figure3-3). In order to analyze whole industries of value-added transshipment, we defined the indicator of added value for identifying core industries in FTZs as follows:

$$\text{The rate of value-added transshipment} = \left(FOB_j - CIF_j\right) / FOB_j \qquad (2)$$

where CIF_j refers to import costs for industry j

FOB_j represents the value of re-export goods after value-added activity for industry j.

The added value of each industry category of transit goods are computed based on Taiwan trading standard in which the import portion adopts CIF, whereas the export and re-export price is FOB obtained from the statistics data of Taiwan international trade. The higher the rate of value-added transshipment for industry j, the higher potential to be selected as the core industry.

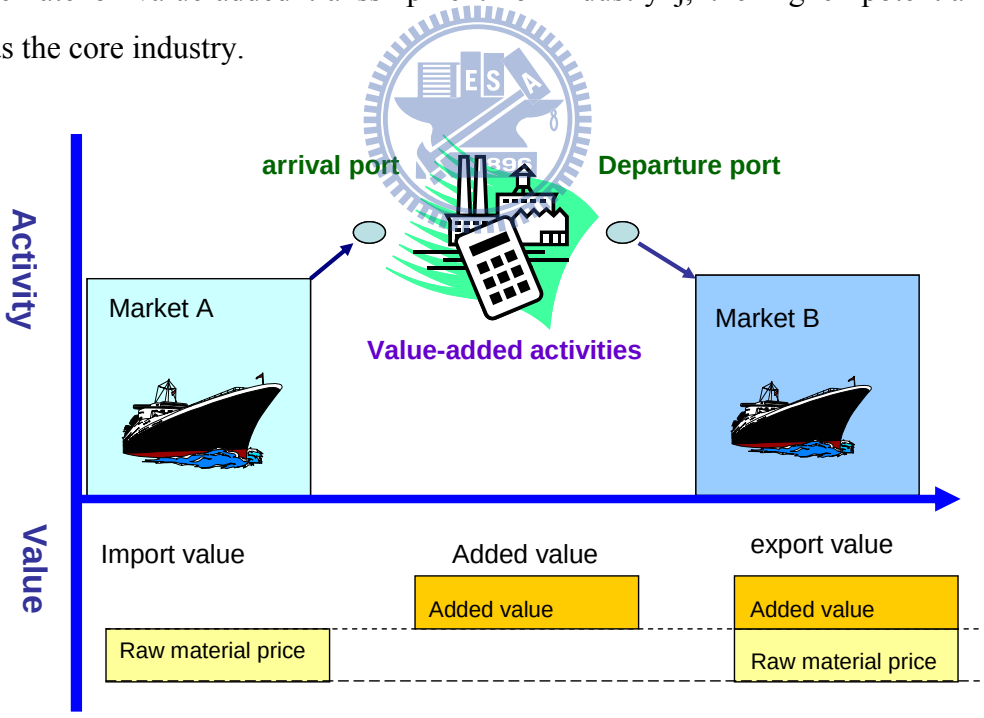


Figure 3-3 Concept of Value-added Transshipment

2. Market Share Indicator

Based on the principle (2), the candidates for the core industries into FTZs should have the potential to create a higher market share among competition ports in the study area. Equation 3 expresses the indicator of market share:

$$S_{ij} = \frac{F_{ij}}{\sum_{i=1}^{n} F_{ij}} * 100\% \qquad (3)$$

where S_{ij} and F_{ij} denotes the market share and the freight volume of industry j in port i, respectively. n denotes the total number of competing ports. Traditionally, the freight volumes are employed as one of indicator to evaluate the competitiveness among ports. In this study, the competition ports are selected primarily based on the freight volume of high potential developing ports in East Asia region, particularly in China. These competition parts include Ningbo, Shanghai, Guangzhou, Shenzhen and Xiamen with the growth rates higher than 15% (Table 3-1). The higher the market share, the higher potential to be selected as the core industry.

Table 3-1 The Cargo Growth Rate of Competition (Cargo) Ports

unit：10,000TEU

Rank of 2005	Port	County	Cargo		Growth Rate(%)
			2005	2004	
1	Singapore	Singapore	2319	2133	2.8
2	Hong Kong	China	2260	2198	8.7
3	Shanghai	China	1808	1456	24.2
4	Shenzhen	China	1620	1365	18.7
6	Kaohsiung	Taiwan	947	971	-2.5
15	Ningbo	China	519	401	29.6
18	Guangzhou	China	468	331	41.6
23	Xiamen	China	334	287	16.4

Source: Containersation International, 2006

3. Forward and Backward Linkage Indicator

The input-output impact coefficients table $(I-A)^{-1}$, also known as the Leontief (1936) inverted matrix, is utilized to analyze the industries interrelatedness. In the input-output analysis, there are two relationships among industries. The backward linkage denotes the relationship between each individual industrial and industries providing input materials. Oppositely, forward linkage refers to the cross-industry relationship between each individual industry and those product consumers. Generally, the contribution of each industry to the total industries is assessed by the degree of interrelationship. Decision makers select the industries with both relatively high backward and forward linkage as the leading industry placed on the high priority list for investment and development.

The elements of the Leontief inverse incorporate both direct and indirect connections between sectors. Therefore, a measure of backward linkage of sector j would be given by the sum of elements of the direct and indirect coefficients matrix, $(I-A)^{-1}$, where A is the direct-input coefficient matrix. Similarly, a measure of the direct and indirect forward linkage of sector i is given by the sum of the *ith* row. Those elements in $(I-A)^{-1}$ are denoted as b_{ij}, and b_{ij} is the inter-industry interdependent coefficient in the matrix.

The sum of column elements in the Leontief inverted matrix is used to measure the backward linkage effect, whereas the sum of row elements is used to calculate the forward linkage effect:

$$BL_j = \sum_{i=1}^{n} b_{ij} = i*(I-A)^{-1} \quad , \ \forall j \qquad (4)$$

Where $$A = \begin{bmatrix} a_{11} & \cdots & \cdots & a_{n1} \\ a_{12} & \ddots & & a_{n2} \\ \vdots & & \ddots & \vdots \\ a_{1n} & \cdots & \cdots & a_{nn} \end{bmatrix} \qquad (5)$$

$$FL_i = \sum_{j=1}^{n} b_{ij} \quad , \ \forall i \qquad (6)$$

where BL_j and FL_i refer to the coefficients for backward linkage and forward linkage respectively, The normalization is generally denoted as：

$$RB_j = \frac{\sum_{i=1}^{n} b_{ij}}{\frac{1}{n}\sum_{i=1}^{n}\sum_{j=1}^{n} b_{ij}} \qquad (7)$$

$$RF_i = \frac{\sum_{j=1}^{n} b_{ij}}{\frac{1}{n}\sum_{i=1}^{n}\sum_{j=1}^{n} b_{ij}} \qquad (8)$$

where n represents the total number of industry categories. RB_j and RF_i are the normalized coefficients for backward linkage and forward linkage respectively. RB_j is also known as the index power of dispersion, and $RB_j > 1$ indicates that j industry's backward linkage value is greater than the mean standard for all industries. Similarly, RF_i is also known as the index power of response, and $RF_i > 1$ indicates that i industry's forward linkage value is greater than the mean standard for all industries.

Hirschman (1958) defines key industries as those for which both indices are greater than the average linkage for the whole economy since these industries dominate through their forward and backward linkages (Hirschman, 1958). Industries are divided into four categories based on the performances of forward and backward linkages and depicted in Table 3-2. The meaning of each category is described as follows:

Category Ⅰ：The index values of sensitivity of dispersion and the index of power of dispersion are greater than the mean value for all industries. This signifies that not only such industries can drive other industries, but also would accommodate the development of other industries, and can be said to be indispensable industries. Hence, such key industries can drive the overall economic development.

Category Ⅱ：The index value of sensitivity of dispersion is high, but the index value of power of dispersion is low. This type of industry can encourage the development of other industries. This type of industry is quite indispensable in developing other industries.

Category Ⅲ：Both the index values of sensitivity of dispersion and the index of power of dispersion are smaller than the mean value. This type of industry itself is less likely to drive other industries, and also less likely to be affected by the

development of other industries, and is the industry with the lowest relevancy effect.

Category Ⅳ：The index value of power of dispersion is high, but the index value of sensitivity of dispersion is low. The industry itself is less prone to be affected by other industries, but is highly likely to drive the development of other industries.

Table 3-2 Inter-industry Interdependency Linkage

Type of Linkage Impact		Backward Linkage Impact (index of power of dispersion)	
		High	Low
Forward Linkage Impact (index of sensitivity dispersion)	High	Ⅰ	Ⅱ
	Low	Ⅳ	Ⅲ

Source: Hirschman, 1958.

In this study, industries performing simultaneously high backward and forward linkage indices are determined as candidate core industries in the study area. Accordingly, the core industries are selected from industries i with both high forward and backward linkages. To combine the forward (RF) and backward linkage (RB) as one indicator, this study simply adds them up to one indicator, namely total linkage (TL). The higher the total linkage, the higher potential to be selected as the core industry.

$$TL_i = RB_i + RF_i \qquad (9)$$

Chapter 4 Selection of Core Industry

In order to measurement of core industries, this study table Taiwan's real data as an empirical study. The potential core industries obtained from the above three indicators are discussed respectively as follows:

4.1 Measurement of Indicator

1. Added Value Indicator

The rate of value-added transshipment can be computed from equation (2) based on Taiwan domestic re-export industries categorized in 2005 (DGBAS, 2005)[1]. To determine the core industries, a sharp change of value-added rate among those industries, that is the cutting point and the threshold of 15%. And the threshold of the rate of value-added transshipment is set at 15% following the study of Liou (2007). It is found in Table 4-1 that the industries exceeding the threshold value, including ′chemical products and industries related thereof′, ′leather and products thereof′, ′base metals and articles of base metal′, ′footwear, headgear; umbrellas; feathers and their products′, ′precision instruments and equipments′, ′machinery and electronic component equipments′ and ′miscellaneous products′ , which are identified as candidates of core industries into FTZs. This empirical finding of core industries in this paper is similar to the high value-added industries in the Pearl River Delta (Gui *et al.*, 2006).

The value-added rate of machinery and electronic component equipments is slightly below that predicted (only 15%), which signifies that this industry in Taiwan is also a labor-intensive one needing an industrial upgrading, and has limited added value. Nevertheless, Liou (2007) found that re-export schemes offered in Hong Kong provide some peripheral services and raise the transportation trade prices (i.e. price markup), therefore, even the re-export price markups of Hong Kong are lower than 35% (not high enough to alter the rules of origin for merchandise, and their mean value is around 22%, still, the price markup is higher than that for the added value of Taiwan. Thus, transshipment

[1] Due to the data resource, here we used the newest data of DGBAS in 2005.

value-added operations in Taiwan still have room for growth.

Table 4-1 Industries with High Rate of Value-added Transshipment

Industry	Value-added indicator
Products of the chemical or allied industries	16%
Leather and products thereof	17%
Footwear; headgear; umbrellas; feathers and their products	16%
Base metals and articles of base metal	16%
Machinery and electronic components	15%
Precision instruments and equipments	20%
Miscellaneous (toys, games and sports requisites)	16%

Note: These industries categories are classified into 21 industries by Harmonized System (HS)

Source: Compiled from the website of Directorate General of Customs, ROC.

2. Market Share Indicator

The industries in Taiwan having a market share exceeding 50% include ′mineral products′, ′plastics and products thereof′ and ′precision instruments and equipment′. Since most market shares of industries are below 30%, market share at 40% are thus utilized in this study as the threshold value. Based on equation (3) and the defined threshold value, it is found in Table 4-2 that ′mineral products′, ′plastics and articles thereof′, ′precision instruments and equipment′, ′chemical products or industries related thereof′, ′base metals and articles of base metal′, ′machinery and electronic components′, and ′transportation equipment′ are candidates of core industries for FTZs in Taiwan. These potential core industries are consistent with the categories recognized as primary exports industries in Taiwan

Taiwan is competitive in above industry categories, and our findings regarding market share are consistent with what is generally recognized as the industry categories of primary exports in Taiwan.

Table 4-2 Industries with High Market Share among Competing Ports

Industry	Market share indicator
Mineral products	53.3%
Products of the chemical or allied industries	45.2%
Plastics and articles thereof	60.0%
Base metals and articles of base metal	49.3%
Machinery and electronic component	48.5%
Transportation equipments	40.1%
Precision instruments and equipments	60.4%

Note: These industries categories are classified into 21 industries by Harmonized System (HS)

Source: Compiled from the China Commerce Yearbook 2005, Yearbook of Shanghai Foreign Economic Relations and Trade Statistics, Yearbook of Xiamen Special Area Statistics, Yearbook of China Economy and Trade Statistics, website for Directorate General of Customs, ROC.

3. Forward and Backward Linkage Indicator

The forward and backward linkage indicator of Input/Output analysis is computed from equation (7), (8), (9) and government data in Taiwan in which 49 categories are included. These industries categories are classified by Department of Budget, Accounting and Statistics of the Executive Yuan (DBGAS), and the 49 categories data is standardized. Due to the data limitation, this study is assumed that regional I/O ratio of FTZ is same as national I/O ratio. The industries with both the forward and backward linkage performance value higher than the average value of all industries belong to Category I in Table 3-2 and are selected as the core industries.

Based on the total linkages of forward and backward linkage indicator from 49 industries are shown in Table 4-3, 'industrial chemicals', 'Iron and steel products', 'electronic components and parts', 'miscellaneous metals', 'plastic', 'process foods', 'plastic and rubber products' and 'miscellaneous chemical manufactures' are selected as candidate of core industries in FTZ.

Table 4-3 Industry with High Forward and Backward Linkages

Industry	Total linkages
Industrial Chemicals	4.28
Iron and Steel Products	3.31
Electronic Components & Parts	2.92
Miscellaneous Metals	2.73
Plastic	2.51
Process Foods	2.37
Plastic & Rubber Products	2.31
Misc. Chemical Manufactures	2.26

Note: These industries categories are classified into 49 industries by Department of Budget, Accounting and Statistics of the Executive Yuan (DBGAS)

4. Intersection Set of Core Industries Using Three Indicators

The potential candidates of core industries selected from three indicators have been discussed above. To obtain the final list of core industries, this study uses the simple scoring approach. If an industry classified as a core industry for an indicator, we give one point for that industry. The maximum point for an industry will be 3 points due to three indicators. An industry with 3 points implies that it is simultaneously with high potential for promoting domestic industries, high market share and high value-added transshipment in the international trading of Taiwan. Three industries with 3 points, including ′base metals and articles of base metal′, ′products of the chemical or allied industries′ and ′machinery and electronic components′ in table 4-4, are finally determined as the core industries for FTZs in Taiwan.

Table 4-4 Score of Each Industry

Industries\ indicators	Value-added	Market share	Forward and backward linkage	scores
Base metals and articles of base metal	1	1	1	3
Machinery and electronic components	1	1	1	3
Products of the chemical or allied industries	1	1	1	3
Precision instruments and equipments	1	1		2
Plastic and products thereof		1	1	2
Leather and products thereof	1			1
Footwear; headgear; umbrellas; feathers and their products	1			1
Miscellaneous	1			1
Transportation equipment		1		1
Mineral products		1		1
Process Foods			1	1

There are two industries with 2 points, including ′precision instruments and equipments′ and ′plastic and products thereof′. If we recalculated the rate of value-added transshipment of all trading data of FTZ in 2007, the result showed that the rate of value-added of ′precision instruments and equipments′ still kept in high value-added in 19%. The percent of re-export value of ′precision instruments and equipments′ is lower than 1% (only 0.99%), however, its export value lists on the third of Taiwan major export industries. If we could re-create the opportunity of industry ′precision instruments and equipments′ in re-export in the long term, it seems that the industry of ′precision instruments and equipments′ may be the potential industry to be the core industry. As for the industry ′plastic and products thereof′, its market share is the highest industry (60%), but its re-export value is tiny (under 1%).

After all, the industries of ′base metals and articles of base metal′, ′products of the chemical or allied industries′ and ′machinery and electronic components′ are finally determined as the core industries for FTZs in Taiwan. Due to the limited data, this result was obtained assuming all FTZs under same operational situation (for example, same working condition, offered same infrastructure, same operational cost) and same industrial trend. In fact, each FTZ are located on different area and with different function. If there are more detail regional data, we may distinguish detail categories of industries in different FTZ.

Once the core industries are identified, the most important thing is to attract these core industries to move into the FTZs. The related industries, such as buyer-supplier relationships, shared-resource relationships and competitor/collaborator relationships of core industries may also move around the core industries and form industry clusters. Since just-in-time inventory management and time-to-market responsiveness are elements of competitiveness and productivity, the shorter of distance from loading dock to loading dock or from desk to desk is better. Similarly, the flow of information that directs the flow of goods and services improve as distance decreases (Anderson, 1994). All these relationships benefit from geographic proximity. If close physical relationships are important in the effective operation of a cluster, then it follows that industry clusters are important in regional development.

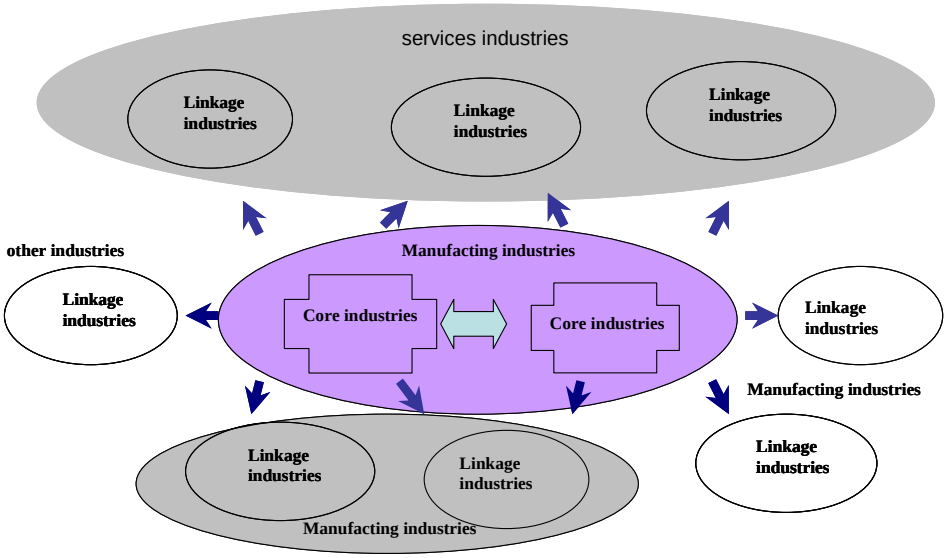


Figure 4-1 Different Related Industries Enjoy the Benefit of Cluster

For example, the machinery and electronic components industry is one of the core industries. However, this industry is a large category, and includes machinery and mechanical appliances, electrical machinery and equipment, sound recorders and reproducers, television, etc. However, actual firms in the Taiwan FTZs include many flash memory firms, LCD firms, and computer peripheral firms. Hence, analysis of their related industries should be performed before clustering the industries, and their related industries are shown as follows:

1. Computer peripheral industries: there are many logistic companies in seaport FTZs and airport FTZs.

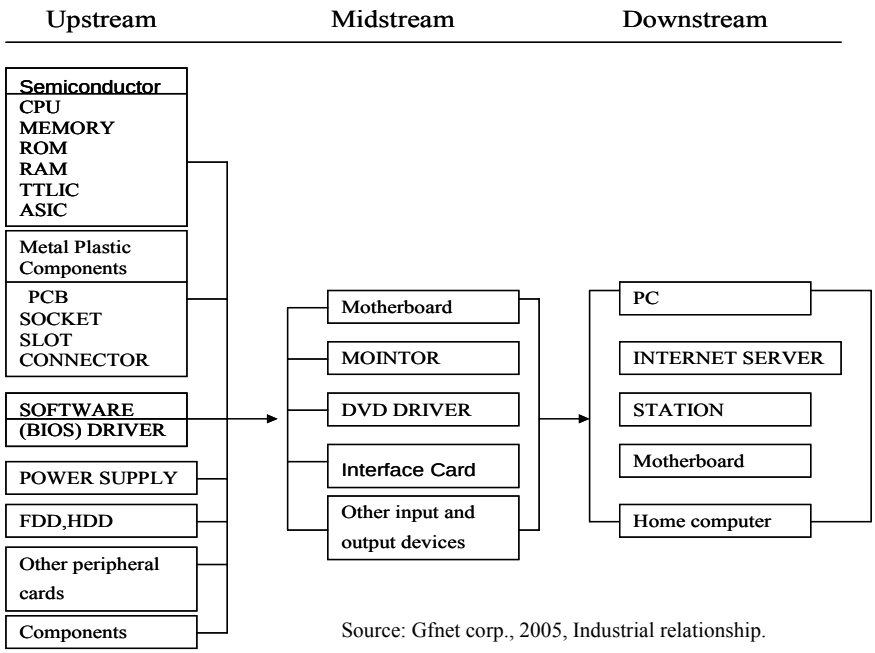


Figure 4-2 Relationship Graph of Upstream and Downstream Industries of the Computer Peripherals Industry

2. Flash memory industries: there are many such companies in the airport FTZs because of the necessity of fast delivery.

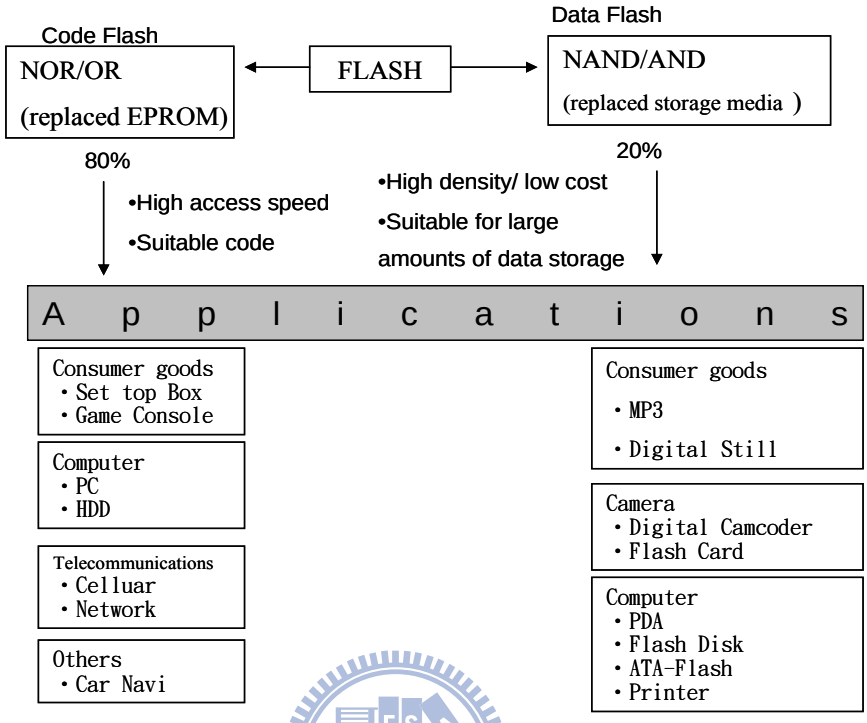


Figure 4-3 Applications of Flash Memory Products

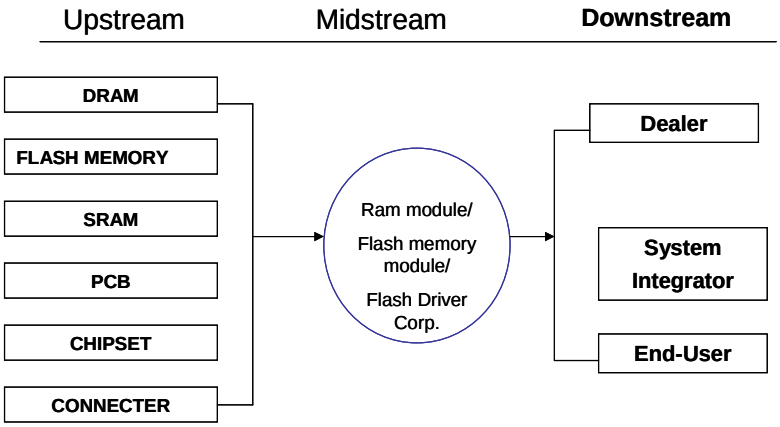


Figure 4-4 Upper and Lower Relationship of Memory Module and Memory Card

3. LCD industries:

There are some such companies in the airport FTZs. A report provided by the most

prominent investing company, DisplaySearch Corp., announced that the top 4 TFT-LCD companies are AUO Optionics Corporation, LGDisplay, Samsung, and Chi Mei Optoelectronics (now renamed Chimei Innolux Corporation). And many interviews with experts showed that there may be more LCD related companies as potential FTZ industries.

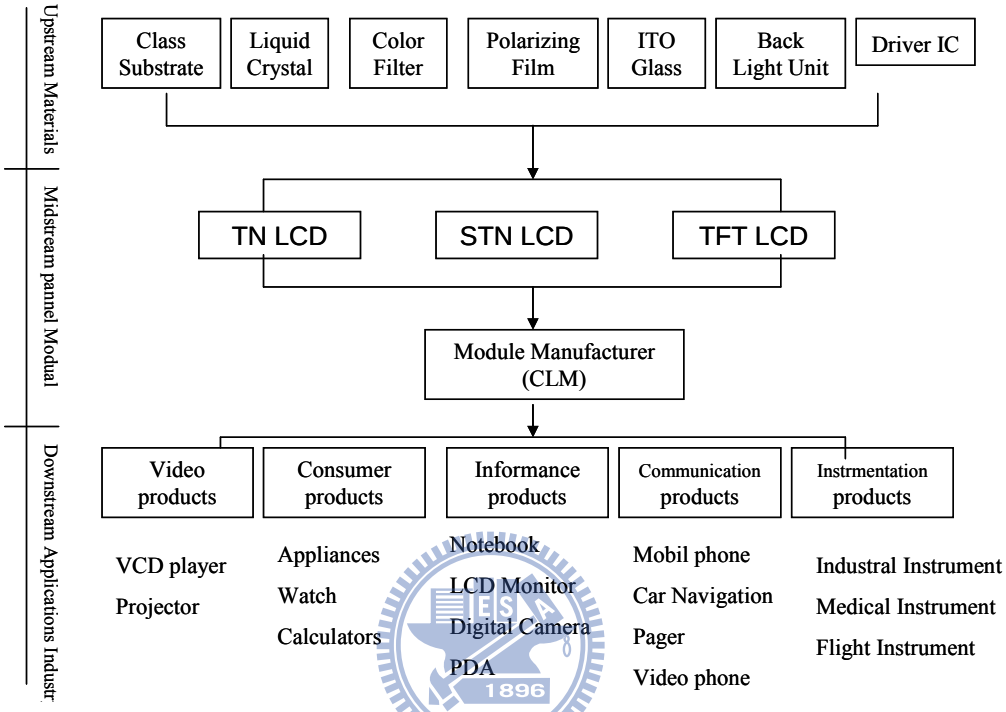


Figure 4-5 Upstream and Downstream of LCD Industry Relationship Graph

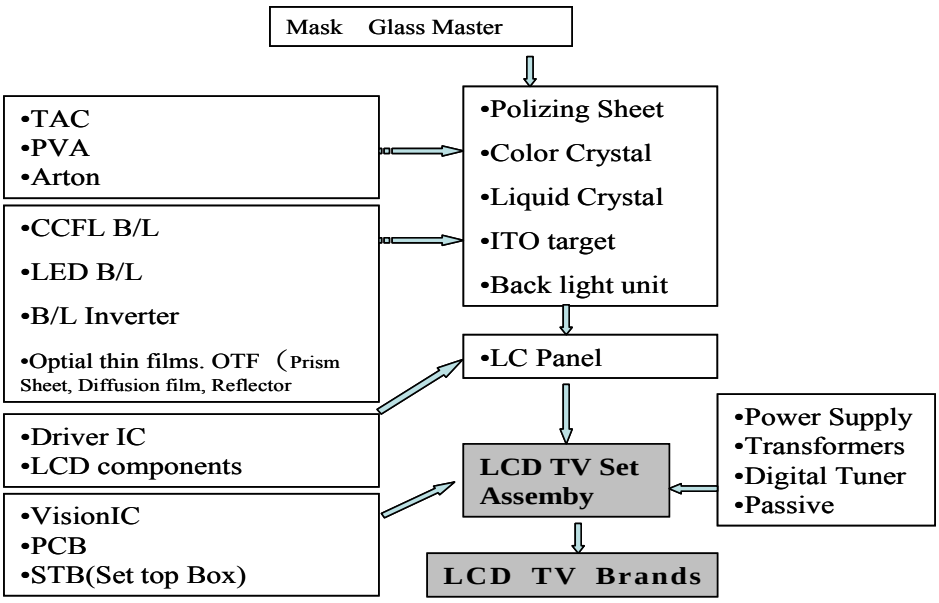


Figure 4-6 Value Chain of LCD TV

Source: Wealth Magazine, 2006; Gfnet corp., 2005.

4.2 Real Industries in Taiwan's FTZ

Compared with real industries in Taiwan's FTZ, there were some different. Up to the end of 2009, there were five authorized FTZs in Taiwan. From the first FTZ is permitted (2004) to the collected data year (2008), there are only 4 years. Although there are not enough statistics data, this study still tries to show real operating situation in Taiwan's FTZ. As shown in figure 4.7, there are four seaports: Keelung, Taipei, Taichung and Kaohsiung; and one airport: Taoyuan. However, the outcome of investment promotion and operational benefits have not been as encouraging as expected so far, and there are still only a limited number of operating enterprises within the FTZs. There are two types of logistics companies that have established operations in the FTZs. One type are logistics companies transformed from shipping companies, and the other type are logistics companies expanded from subsidiary logistics departments of manufacturing industries, and this type of company usually only handles cargo from the parent company. However, the FTZs in Taiwan attract shipping and logistics services which were formerly handled within the ports rather than new companies. Furthermore, real trading data or industries of the FTZs is limited and the volume of trading is extremely low when compared with their related port.

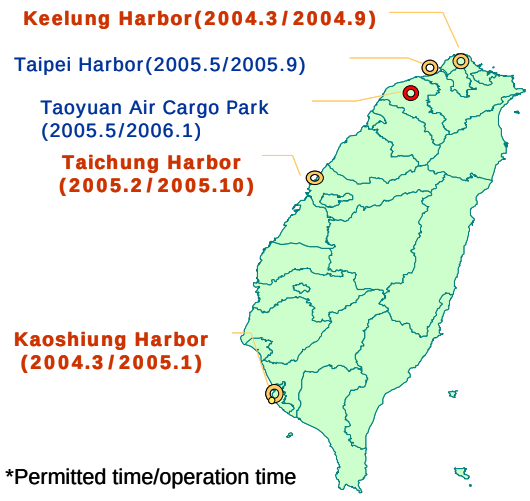
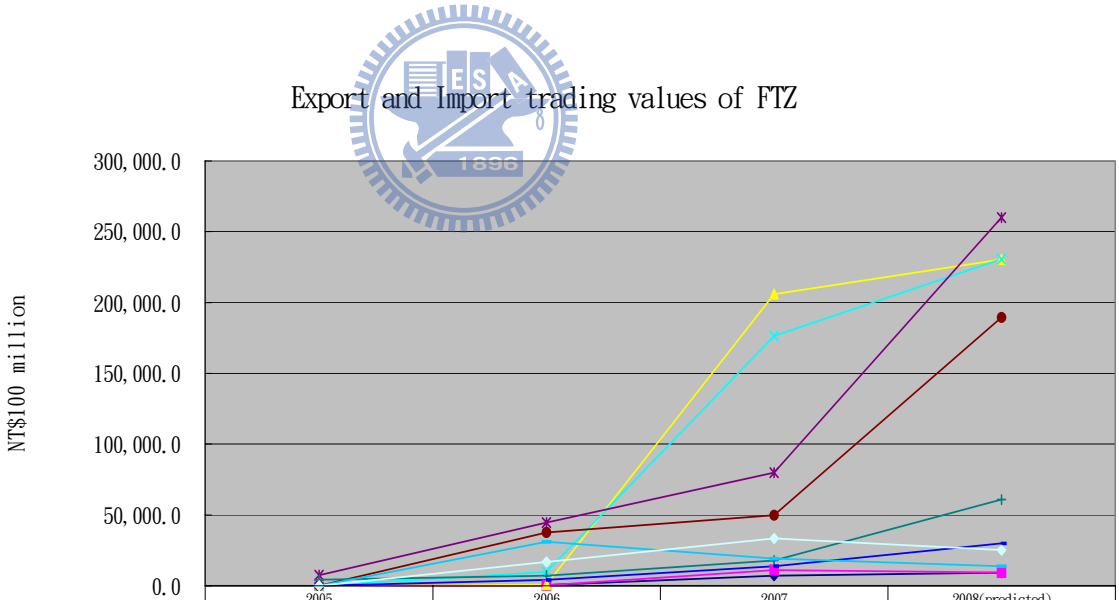


Figure 4-7 FTZs in Taiwan: Permitted Locations

Table 4-5 Operating of FTZ Enterprises in Taiwan in 2008

Operating of FTZ enterprises in Taiwan			Compared with it's related port
FTZ area	Number of Firms	Volume of cargo (10000 ton)	Volume of cargo (10000 ton)
Keelung Harbor	10	1.96	2989.49
Taipei Harbor	2	4.80	905.28
Taichung Harbor	26	118.19	5220.31
Kaoshiung Harbor	25	11.95	14672.89
Taoyuan Air Cargo Park	33	0.59	149.31
total	96	137.49	23937.28

Source:
1. Center for Economic Deregulation and Innovation, Council for Economic Planning and Development, 2009
2. Ministry of Transportation and Communications, 2009



	2005	2006	2007	2008(predicted)
Import of Keelung	0.0	501.9	7,131.9	9,162.2
Export of Keelung	0.0	310.2	11,063.4	9,250.4
Import of Taoyuan	0.0	827.5	205,968.4	230,443.4
Export of Taoyuan	0.0	9,862.5	176,402.4	230,576.0
Import of Taichung	7,496.3	44,610.5	79,873.8	259,973.5
Export of Taichung	0.0	37,682.8	49,808.3	189,462.5
Import of Kaoshiung	4,279.0	7,153.1	17,825.1	60,783.8
Export of Kaoshiung	11.8	4,098.2	13,753.2	29,818.9
Import of Taipei	47.4	31,012.4	19,193.3	13,734.6
Export of Taipei	0.0	16,791.1	33,370.4	25,187.4

Figure 4-8 Trading Volume in Different FTZs

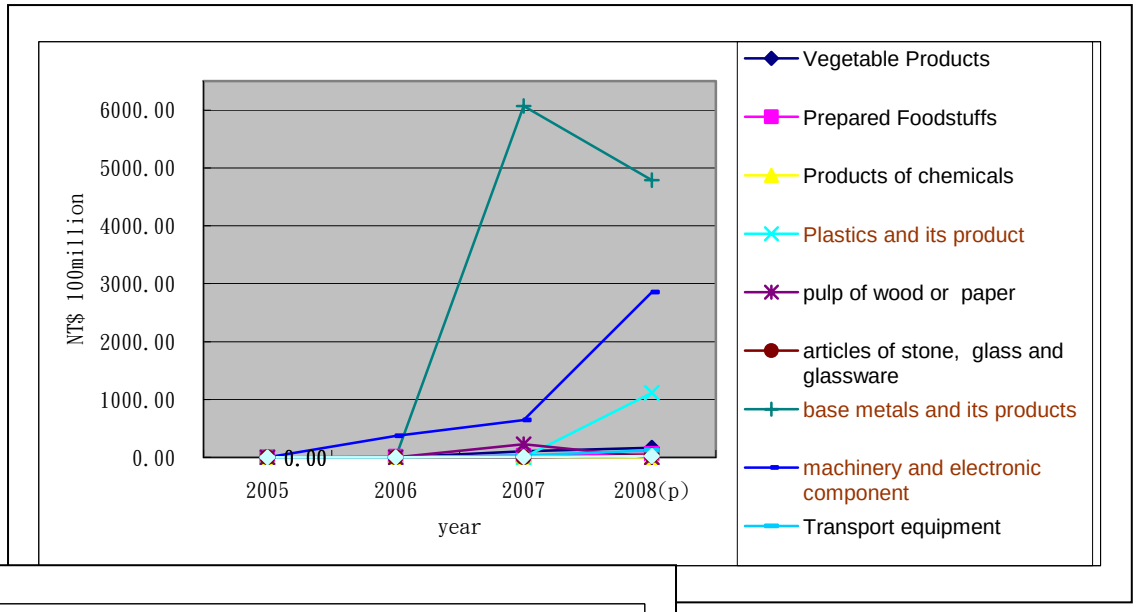


Figure 4-9 Import Volume and Industries in Keelung FTZ

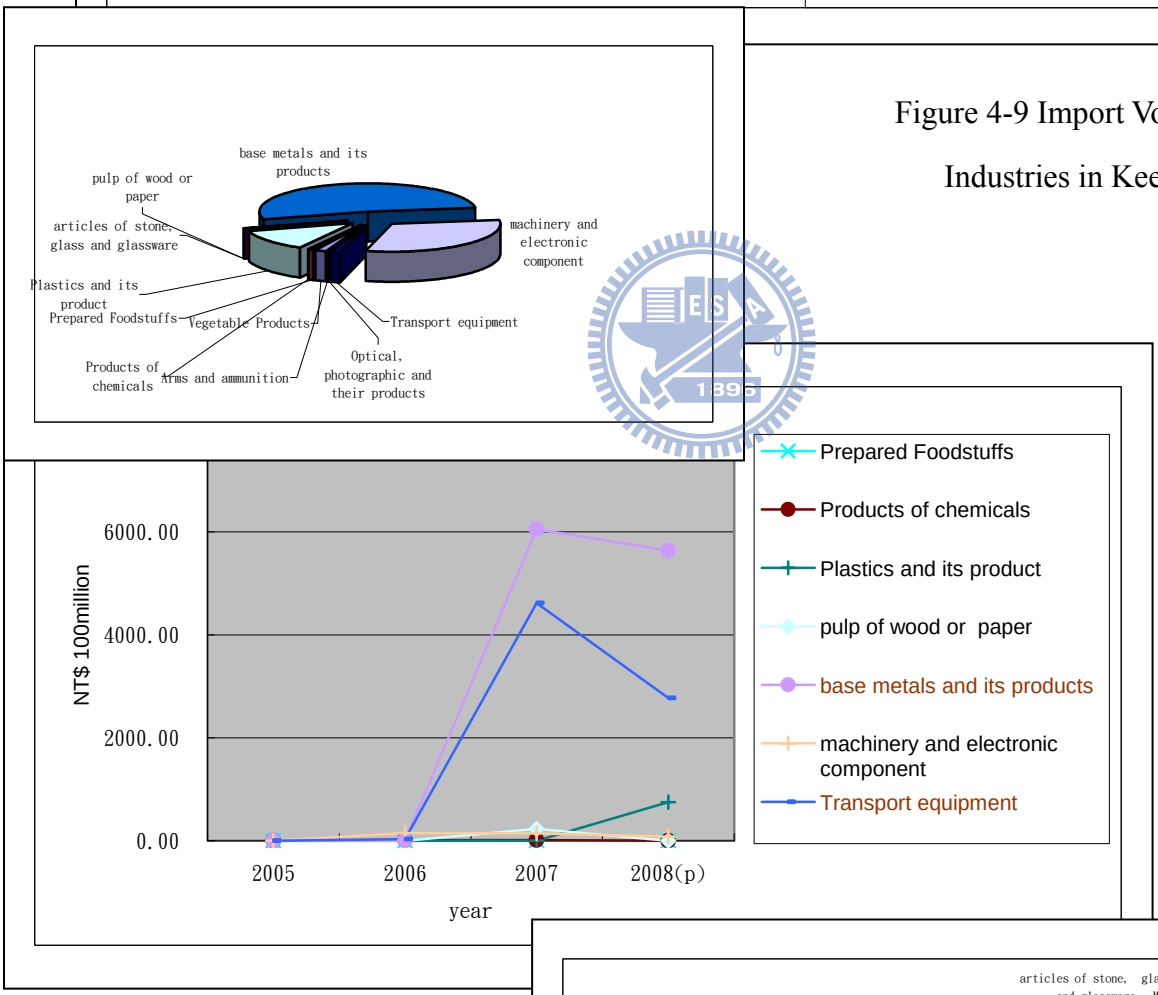
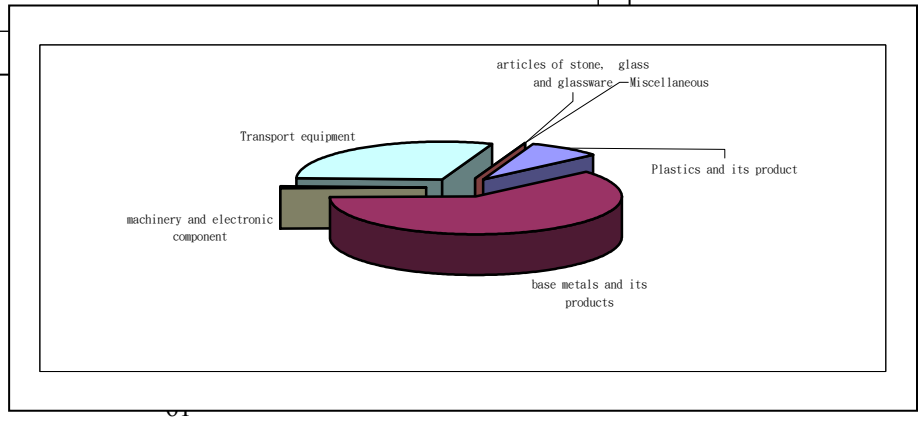
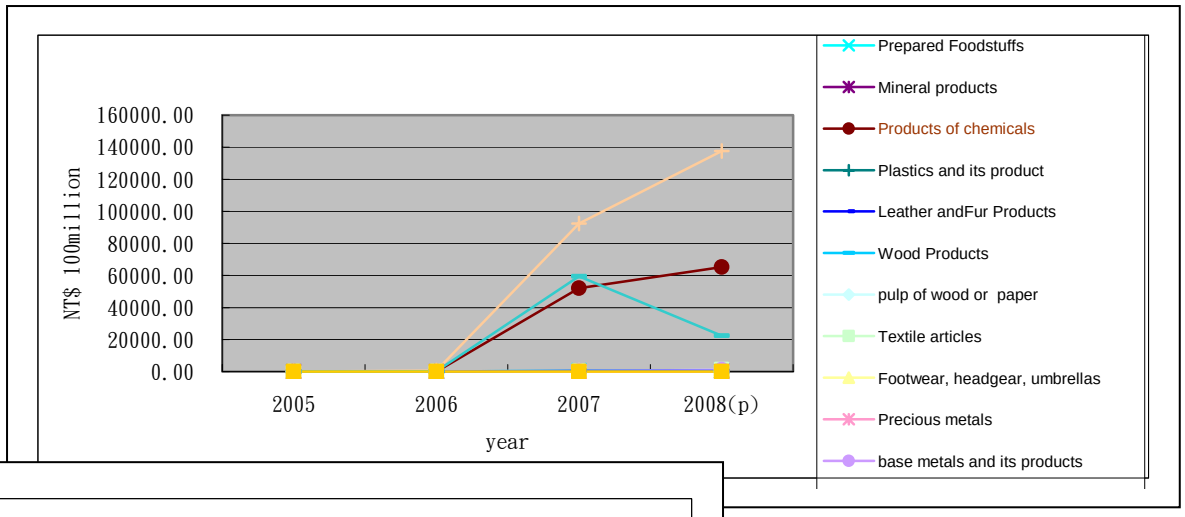


Figure 4-10 Export Volume and Industries in Keelung FTZ





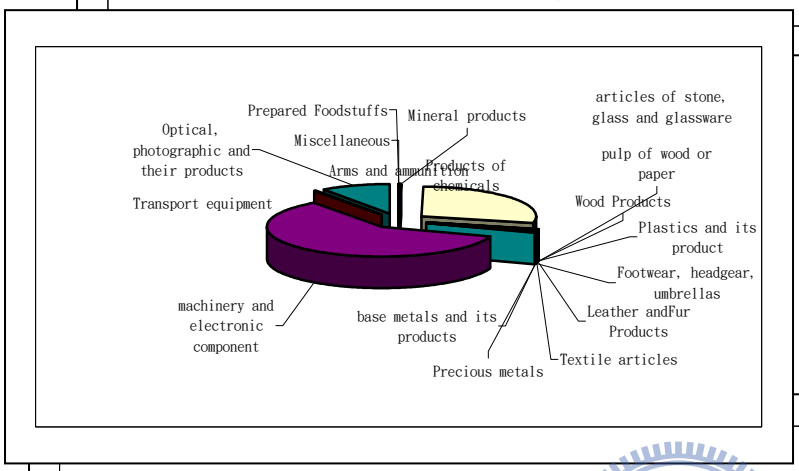


Figure 4-11 Import Volume and Industries in Taoyuan FTZ (Air)

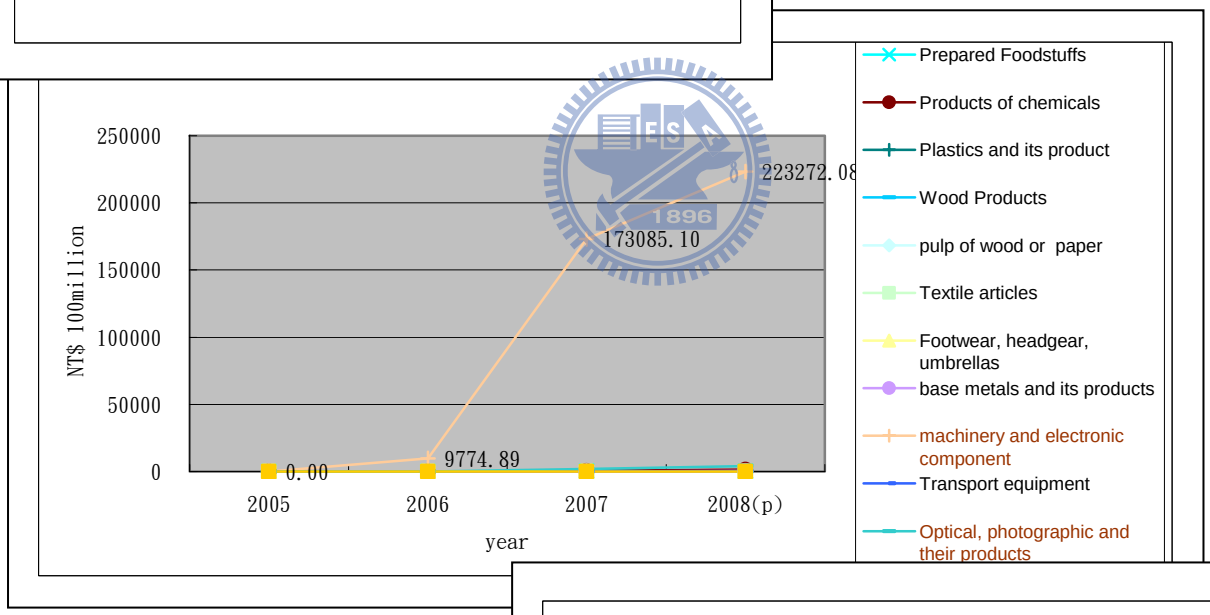
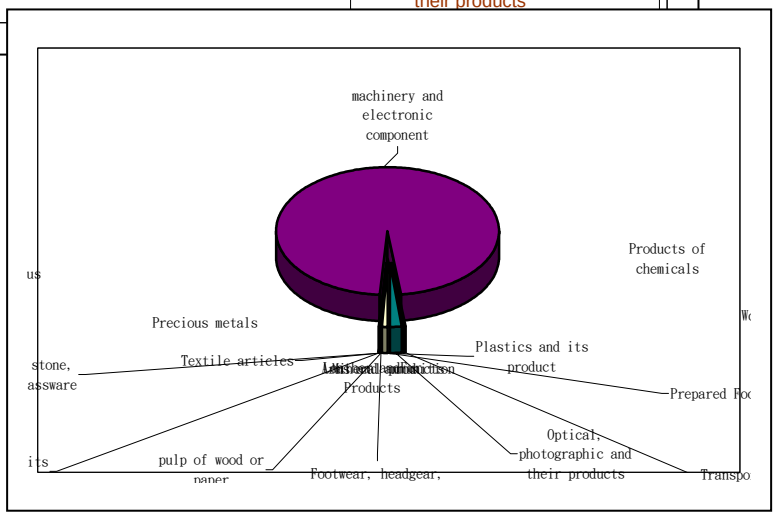
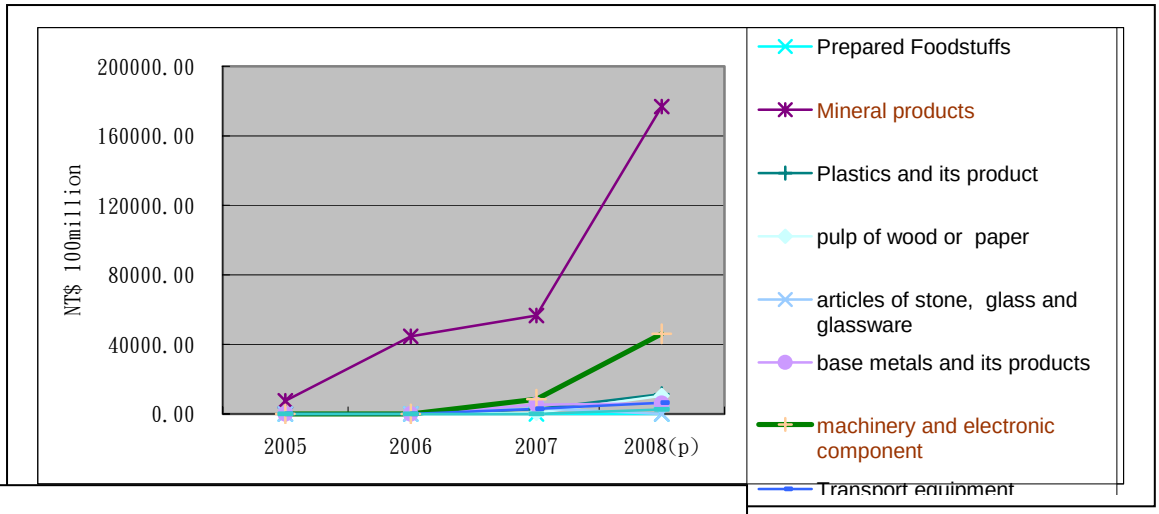


Figure 4-12 Export Volume and Industries in Taoyuan FTZ (Air)





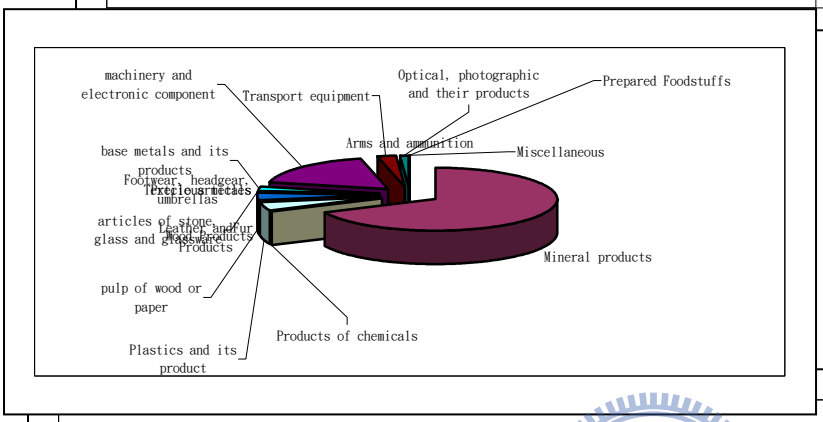


Figure 4-13 Import Volume and Industries in Taichung FTZ

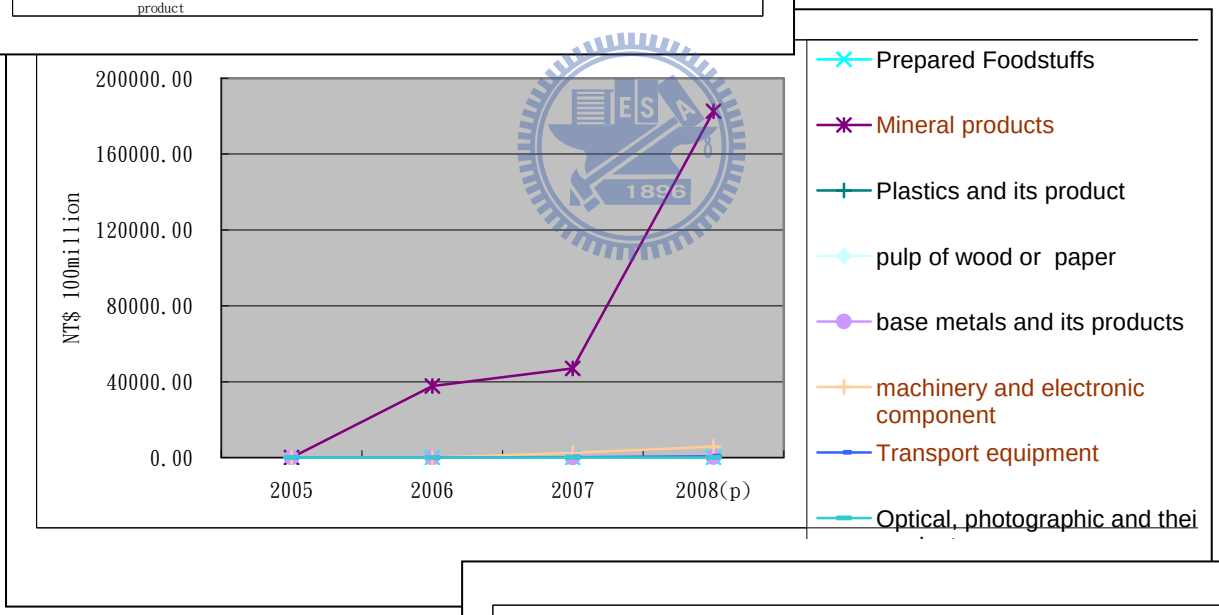
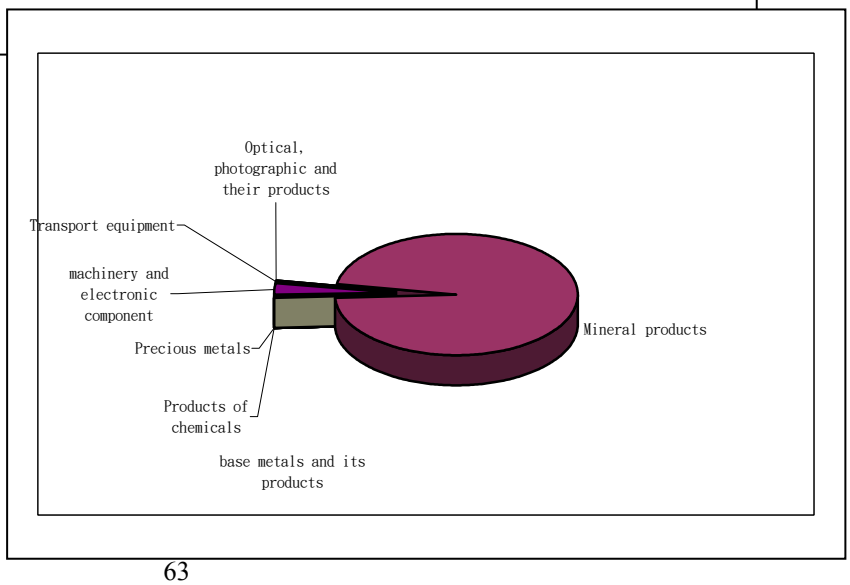
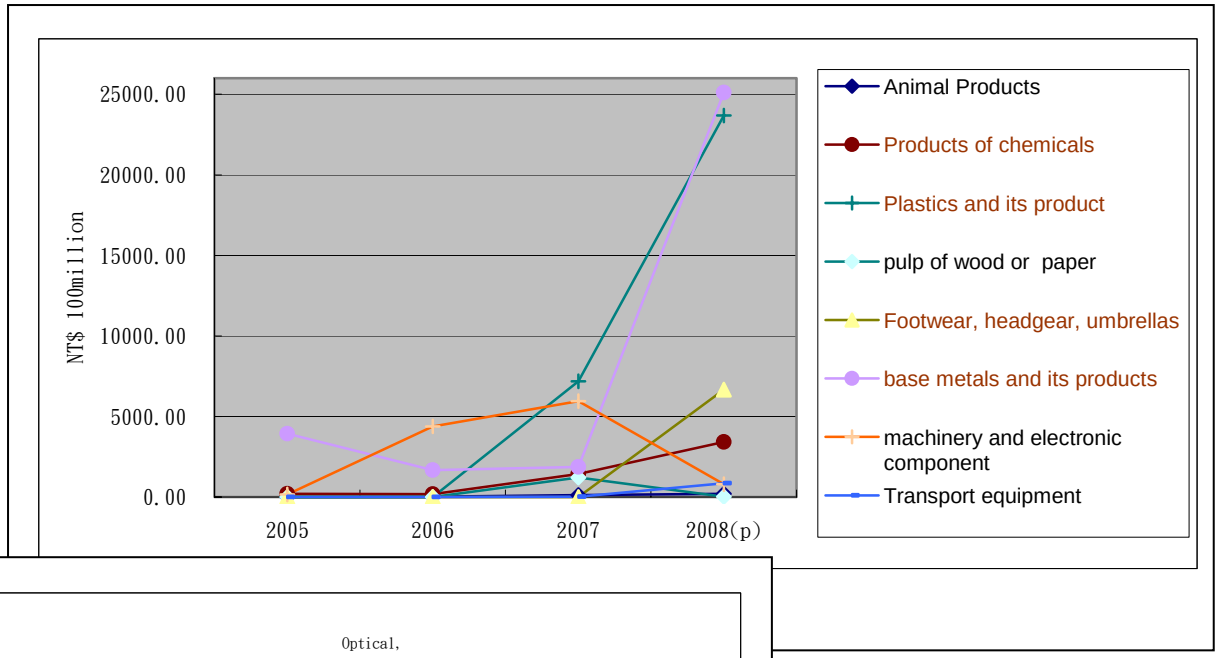


Figure 4-14 Export Volume and Industries in Taichung FTZ





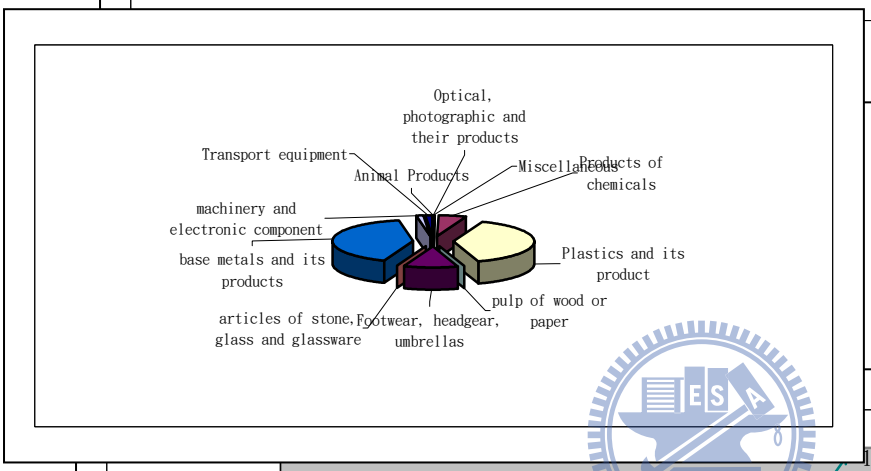
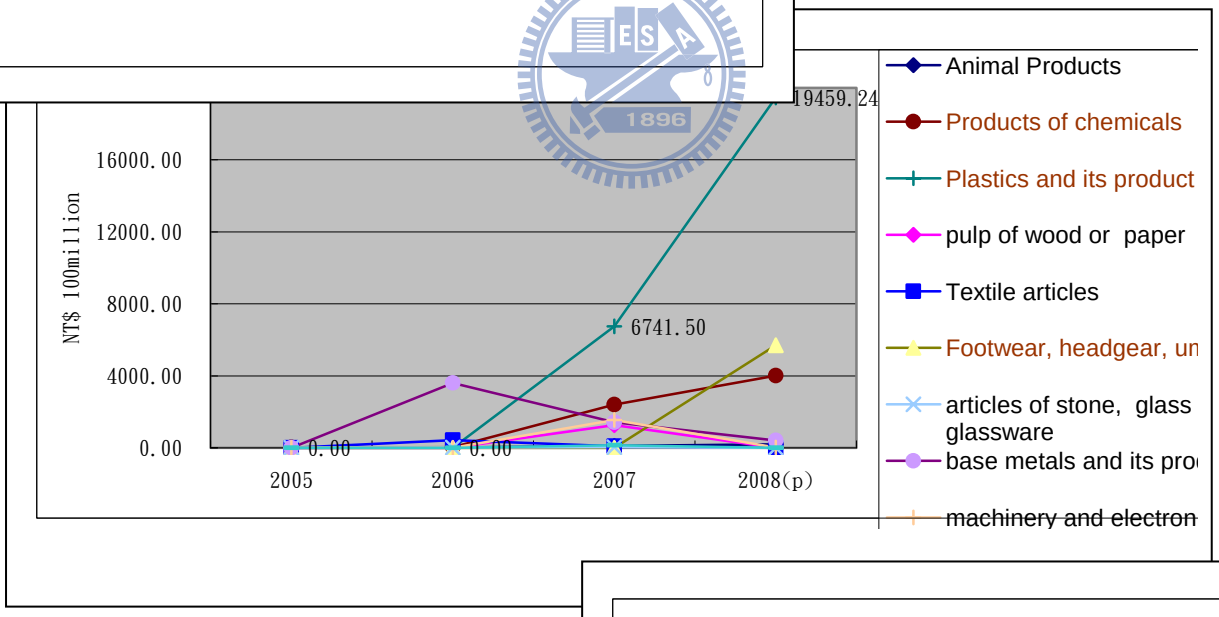


Figure 4-15 Import Volume and Industries in Kaoshiung FTZ



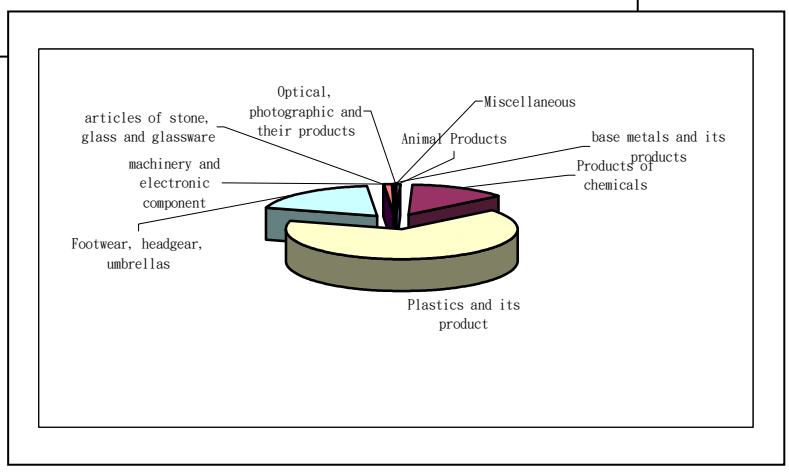
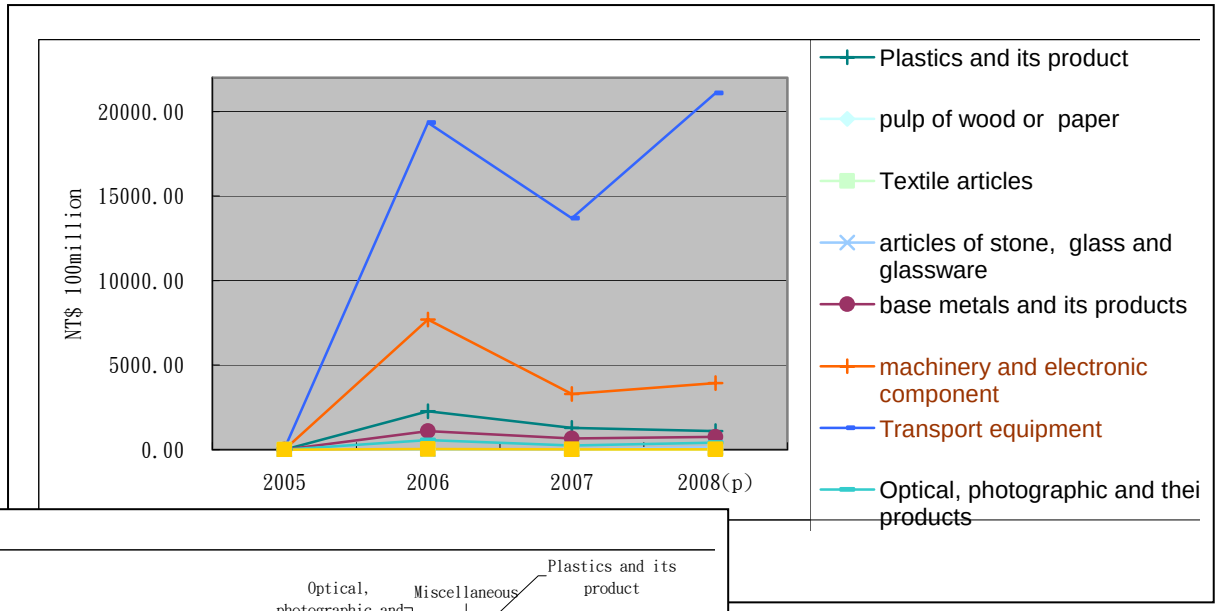


Figure 4-16 Export Volume and Industries in Kaoshiung FTZ



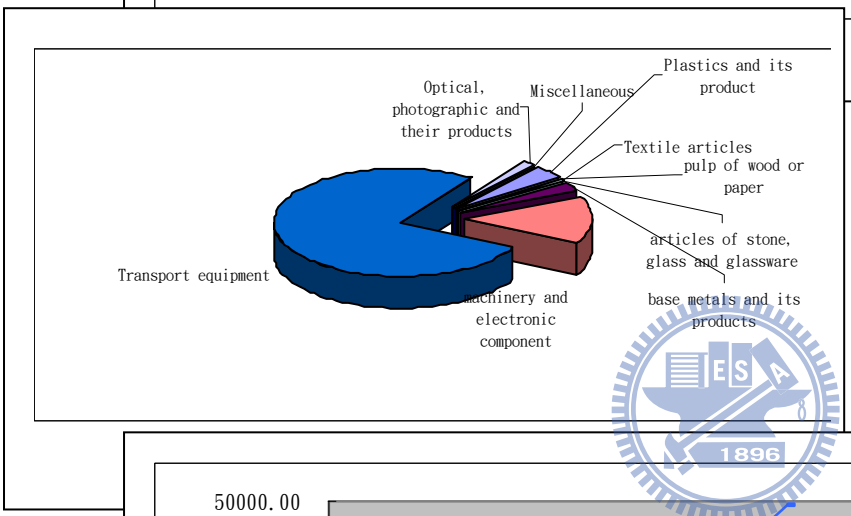


Figure 4-17 Import Volume and Industries in Taipei FTZ

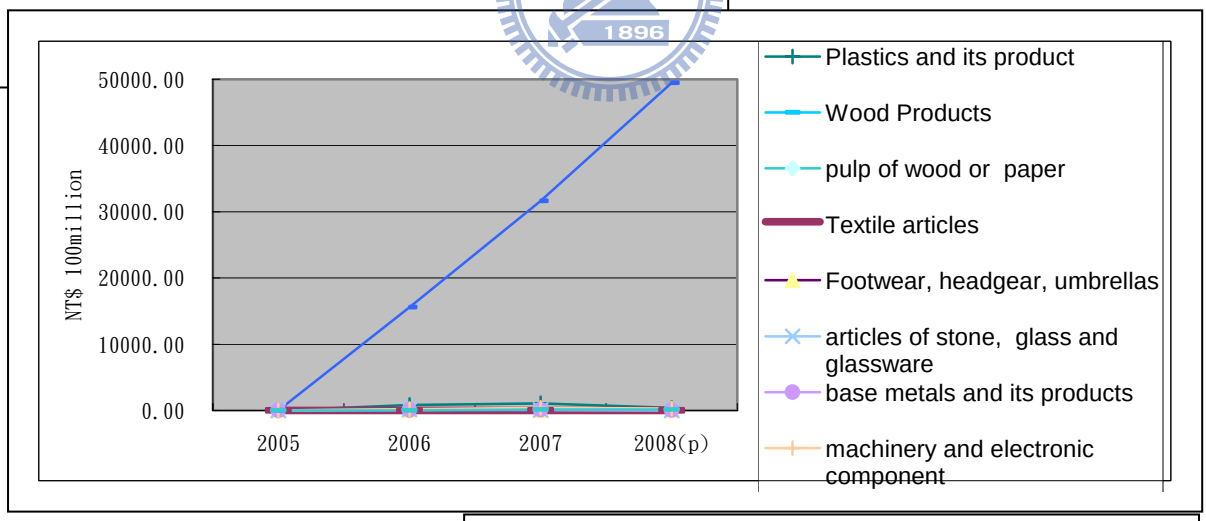
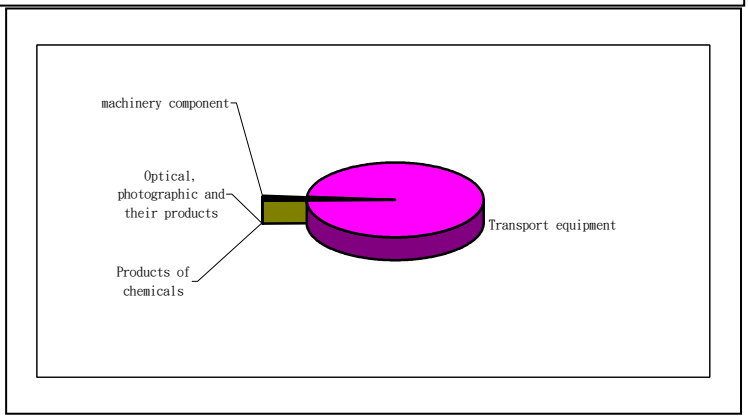


Figure 4-18 Export Volume and Industries in Taipei FTZ



It is difficult to perform statistic analysis on the operational data regarding FTZs because it covers a period of less than 4 years. According to real trading data, the major industries in the Keelung FTZ are ′base metals and its products′ and ′transport equipment′ (as shown in Figure 4-9 and Figure 4-10). In the Taoyuan FTZ, the major export and import industries are ′machinery and electronic components′, such as semiconductors, DRAM, electronic products, communication products, photographic equipment, and monitors (as shown in Figure 4-11 and Figure 4-12). There are specialized firms in the Taichung FTZ, the major firms being oil logistics and golf car logistics corporations. (as shown in Figure 4-13 and Figure 4-14) There are more categories of firms in the Kaoshiung FTZ, the major industries being ′plastic and its products′, ′base metals and its products′, and ′machinery and electronic components′ (as shown in Figure 4-15 and Figure 4-16). There are very few firms located in the Taipei FTZ (only 2 firms), the major industry being car equipment logistics corporations. (as shown in Figure 4-17 and Figure 4-18). In most of the FTZs, the real industries are limited to only one major industry, and no industry clusters are formed as I discussed in my literature review.

Although five FTZs have established in Taiwan, there were few companies move into FTZs. Lots of them are the traditional maritime firms in seaport FTZ. It might be offered too few incentives to attract FDI or domestic companies. It might be too little hinterland to operate. Government should check the strategic plan of FTZ and modify ‘Act for the Establishment and Management of Free Trade Zone’. Then, give more incentives or special services which could lower the operating cost of companies or enhance their efficiency thereby enabling companies to operate more easily and prove smoother logistics. So, their cooperation partners (supplier or demander) might cluster in or near FTZs.

If the data for detail industry categories are available, it is suggested in the future study that the core industries should be selected from detail industry categories. The empirical study conducted in this study is based on the current industries data and assumed no change in industrial tendency. Since there may be some future potential industries that did not show up in the statistical data or under new technological innovation, the future research may include the potential industries in anticipated way.

4.3 Managerial Implications

In order to combine research result and real policy, there are some suggestions as follows:

1. Realizing the real operating problem of company within FTZ

Within FTZ, the operators still have some limited. For examples, the employees have 3% restriction about aboriginal workers. Foreign workers may constitute up to 40% of employees and could get convenient entry visa for business people, although foreign workers still need permitted visa. Each FTZ has a single administrative services and management authority, but administrative service is only within a joint office, but isn't authorized by the law. All areas offer to all business, but the authority didn't offer land assistance. All these problems need to find new solutions.

2. Attracting core industries and related industries to move into FTZ.

Analysis of core industries and their related industries has shown that the most important issue is how to cluster these core industries and their related industries. The key step for the government is to organize a strategic plan and provide some incentives for these core industries and their related industries. The incentives suggested in this study are as follows:

(1) Deregulate limitation on the rate of added value of product manufacturing (originally set at 35%) in the FTZs, and then allow the final products be labeled as ′Assembled in Taiwan′.

(2) Allow core industries in the FTZs to outsource part manufacturing activities to outside areas.

(3) Give tax exemption to logistics firms who handle cargo management of international orders.

(4) Provide preferential land tax, and other taxation incentives, including exemption of customs duty and VAT (value added tax).

(5) Provide administrative assistance to land use arrangement in the FTZs.

However, these incentives should be introduced carefully. Those companies with

pollution manufacturing are not suitable for the FTZs. We need to choose those core industries which could provide quick response to logistics management. By providing such incentives, not only will it encourage core industries to locate within the FTZs, but also enable effective clustering of entire related industries. As a result, competitiveness of the FTZs will be enhanced, encouraging economic development of their respective region.

Chapter 5 Conclusions and Suggestions

5.1 Conclusions and Contributions

The growth of global business and international trade has brought about the elimination of national boundaries, and companies can now shorten their supply-chain while enhancing their value-chain. Facing a competitive environment, FTZs around the world are no longer limiting themselves to traditional port activities. Instead, such FTZs are reconsidering value-chain processes to enhance FTZ competitiveness. The purpose of this study is to redefine the function and port-related activities of FTZs and determine core industries to move into the FTZs for enhancing the competitiveness of FTZs. After comparisons of different countries and different definition of literatures, the major purposes of FTZs are to create value-added processing, to enhance domestic industries and to expand market share.

To meet this purpose, we used three indicators to select and identify the core industries. Three selecting indicators include high value-added transshipment, high market share within international market, and high linkage with domestic industries. The international or domestic firms within the selected industries are all welcome to move in FTZs. Through analyzing three indicators of rate of value-added transshipment, forward and backward linkage, and market share, this study has found that the industries of ′base metals and articles of base metal′, ′machinery and electronic components′, ′products of the chemical or allied industries′ are core industries that could benefit most to FTZ competitiveness.

This study assumes no change in industrial tendency. However, there may be other potential industrial if technological innovation or change in industrial structures alters industrial trends. If there is new technological innovation or change, it may be new potential industries.

Due to the data limitation, this study assumes that there is no difference of core industries among the FTZs. All FTZs are under same operational situation (for example, same working condition, offered same infrastructure, same operational cost) and same industrial trend. In fact, each FTZ are located on different area and with different function.

If there are more detail regional data, we may distinguish detail categories of industries in different FTZ. According to the result of analysis, only some parts of the real industries of FTZs are the same as the core industries shown in the study. Some parts are the same as the regional industries. The reason of the above results may be that there are not enough statistics data in the short operating time of FTZ. Regardless of what kinds of real industries move into FTZ, this study indicates one way to select the most suitable industries following the industry trend. It is also suggested that government should provide some incentives such as tax reduction, logistics infrastructure and administration assistance to these core industries and their related industries. The authority also could be further co-operation with the industry. Through understanding the real value-added process of re-exports, the authority may solve the operational problems to enhance the value-added activity. As a result, it might be: not only core industries located within FTZ, but also all their related industries would gather in close proximity. Their cooperation partners (supplier or demander) might cluster in or near this area.

5.2 Suggestions

1. More detail regional data are needed to find different core industries of each FTZ

It is better to analyze their original regional trading data which proprietors offer to Customs along with original data, not after being classified. Then, the value-added will be the real profit. Due to the data limitation, this study assumes that there is no difference of core industries among the FTZs. However the real situation is not. Each FTZ is located in different area. There are different regional industries to support FTZ. Besides, the logistics operation between the airport-related FTZ and port-related FTZ is different. In the further study, we had better define the function of each FTZ, and use more detail trading data and regional I/O data to select the core industries of each FTZ.

2. Analysis of related industries

Based on the core industries, follow-up studies may analyze related industries which support the core industries. And analysis of the linkage within the value-chain between core industries and related industries may enable more effective clustering of the industries.

This study has tended to focus on selection core industries based on the major purpose of FTZ, rather than on the real value-chain of industries in Taiwan. The follows studying may do research based on the potential export-led industries and their value-chain. Before doing that, the research must make sure what kinds of the industries will be the industrial trend and potential benefit of industries.

3. Analysis the performance of industries cluster

If the industries have clustered, it could analyze the industrial complex and its spatial clustering, especial industrial linkage and spatial linkage. Try to find regional drivers industry and its follower. Then, not only individual companies benefit form it, but also regional economic will enhance their competitiveness.

4. Analysis the competitiveness between different bonded area and FTZ

In Taiwan, the other bonded areas may offer a similar competitive environment as the

FTZs. Top enhance national competitiveness the integration of these bonded area could be considered in the future.

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