

The Impact of International Logistics Parks on Global Supply Chains

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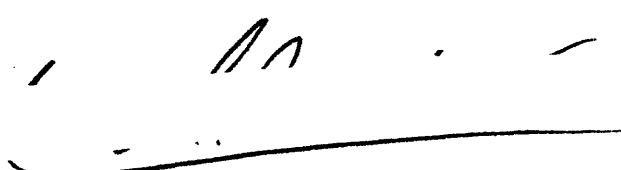
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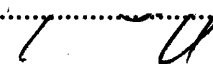
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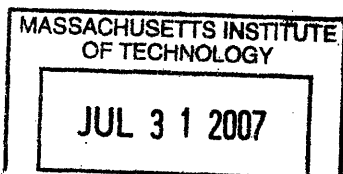
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Abstract

With the globalization of industries since the 1980's, logistics parks have emerged as a solution for the consolidation of operations and logistics services for global companies. In the beginning, logistics parks were limited to enabling companies to centralize their operations using shared warehousing and transportation infrastructures; however, these logistics parks now additionally offer a range of value-added services to enhance the supply chain.

Most of these logistics parks were developed in the past decade, and there is little research on these facilities and the value-added services they are providing. The impact of these services on the global supply chain is also not well understood. Managers of logistics parks from around the world were interviewed and surveyed about the general infrastructures at their parks, and about the value-added services they provide for the companies operating at their facilities.

Elements of the physical infrastructure and value-added services were grouped and ranked based on their impact on supply chains, and attractiveness to customers. The physical location and infrastructure of these facilities represent the most important factors in selecting logistics parks; however, other value-added services are gradually gaining importance and attractiveness due to increasing customer requirements and supply chain complexities. To cope with this change, logistics parks must carefully select the value-added services that are the most attractive to their customers, and which have the most positive impact on their supply chains.

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To my Parents

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1 Introduction

The world is currently going through the second major wave of economic and industrial globalization. A fundamental difference between the first wave of globalization that preceded World War I and the current one lies in the impact of trade in goods. As a result of this trade-based wave of industrial globalization, logistics have become a key element of the entire trade chain. Because of this trend, logistics parks have emerged as a strategic solution for the consolidation of operations and logistics services among different industries and regions. Global corporations have replaced the complex, decentralized networks that used to drive this industry.

Logistics parks were first viewed as a consolidation mean for goods traded globally. More recently however, these parks are now offering different value-added services to different areas of the supply chain, in addition to assisting global companies in achieving economies of scope, and enhancing the efficiency of their supply chains. These services can range from manufacturing processes to customization and serviceability, impacting all the flows of the global supply chain including the physical, financial, information and knowledge flows. The impact of the value-added services on the flows of the supply chain and their attractiveness is not well understood, as these are new trends in the industry that differ among facilities, regions, and businesses. These value-added services are being developed and implemented in different logistics parks, from collaborations with their partnering companies based on the current needs. With this rapid increase in the number of outsourced logistics services and the rise of companies' current needs, logistics parks are still unable to quantify the benefits and impact of each value-

added service on a global scale. Most of the available literature focuses on the benefits of certain services, but to our best knowledge, there is no formal and rigorous procedure for global companies to pursue when selecting and evaluating logistics parks. All corporations naturally seek out the best services that are best suited for their supply chains in the long term.

1.1 Motivation

The purpose of this research is to analyze all the different services offered at a selected list of logistics parks around the world. The focus is on the various value-added services that vary among different parks and industries. The intention of this study is to understand the impact of these value-added services on the global supply chain.

When selecting logistics parks and manufacturing sites, most companies tend to evaluate the physical flow of the supply chain, primarily focusing on factors such the availability of a cheap but skilled work force, and the level and complexity of the local transportation infrastructure (MacCormack et al, 1994). However, we believe that this trend is changing and the corporations are increasingly considering other value added services that could enhance physical, financial, and information flows to positively impact their entire supply chain in this global business environment. These additional factors are more likely to sustain the efficiency of their global supply chains, and enhance long term partnerships with their suppliers and customers (MacCormack et al, 1994). For example, Cisco Systems, a leader in designing and manufacturing networking equipment, created an integrated solution including cross-docking and other value-added services. These services include customs clearance, consolidated transportation carriers, and order fulfillment, in a centralized European distribution center. As a result, Cisco Systems achieved significant logistics cost savings, and higher customer service

levels (Jones, 2005). Consequently, in response to this new trend, logistics parks that are being developed today need to carefully decide which value-added services they need to offer their customers in order to be successful.

Since most of these logistics parks around the world were developed in the past decade to support the current industrial globalization trend, there is little research on these facilities and on the services these logistics parks are providing. Thus, we don't fully understand their effects on the global companies they are serving. It is hard for most corporations to select the right park that is best suited for their supply chain, and also for the logistics parks to choose the right combination of services to offer to their customers. An article by Cap Gemini states that manufacturing is the largest business activity for foreign investment, and that material outsourcing and global product distribution are still increasing (Duijvendijk et al, 2003). This implies that the need for product consolidation and other logistics services will be of even more importance in the future.

Part of the research is identifying and analyzing all the services that a selected list of logistics parks are providing, and the value-added services they are offering to their supply chain network partners. In addition to yielding a benchmark of industry practices and serving as a roadmap for logistic parks development, this study will also identify how the value-added services can benefit the logistics parks in terms of attracting and sustaining more business.

1.2 Definitions

This study is focused on the impact of logistics parks' value-added services on different flows of the supply chain; however, these logistics terms are not consistent among different industries and

regions. This section defines supply chain flows, logistics, logistics parks, and value-added services under the context of this research.

1.2.1 Supply Chain Flows

Supply chain management can be categorized into four different flows. The physical flow referring to the movement of goods, the financial flow which is the exchange of funds, the information flow which consists of sharing material and financial information, and the knowledge flow referring to the exchange of ideas and share of information. Examples of these flows are presented later in this chapter.

1.2.2 Logistics

Logistics is the range of activities and information associated with the movement and storage of raw materials and finished goods across the supply chain. The word logistics was originally used in the military, and was initially defined as “moving, lodging, and supplying of troops and equipment” (Nesathurai, 2003). The council of logistics management defines logistics as “the process of planning, implementing, and controlling the effective flow and storage of goods, services, and related information from point of origin to point of consumption for the purpose of conforming to customer requirements”. This classical definition refers to the acquisition of material and delivering products to the customer; however, more recently logistics is viewed as an area of increased product value and flow efficiency, and as a potential a source of competitive advantage. As part of the required increase in value and efficiency, and with the propulsion by the recent trend in globalization, logistics parks have emerged as a principal contributor to the consolidation and efficiency of these flows.

1.2.3 Logistics Parks

The logistics park concept is not consistent across different regions and industries. The general concept is to consolidate the use of shared infrastructures, and to streamline services. Other goals include better economy of logistics operations, reduced cost, and increased visibility and better collaboration across the entire supply chain. This logistics concept started in the 1960s when storage was the main service at these facilities; it was soon followed by the consolidation of products. With the increase in their popularity and importance in the global supply chain, logistics parks later started offering additional services like the management of material flow from sourcing and inventory management to fulfillment. In addition to these services, logistics parks are now focusing on different value-added services that depend on collaboration across the supply chain and the use of technology.

Juhel Marc of the World Bank describes the evolution of logistics parks in four phases:

- The “physical distribution” phase is where the consolidation of the fragmented distribution began (The World Bank, 1999).
- The “internally integrated logistics” phase that integrated material sourcing and material management.
- The “externally integrated logistics” phase in early 1990s, where other value-added services and collaboration tools gained popularity.
- The “global supply chain management” phase is the fourth stage, where the global supply chain from end-to-end is considered. During this phase value-added services became an important element of the supply chain, and the number of logistics parks around the world significantly increased, especially in China, reaching more than one thousand logistics parks.

The basic and common characteristics among logistics parks today include a warehousing infrastructure, an efficient transportation infrastructure, and other additional services that facilitate the flows within the parks. The storage or warehousing infrastructure is not consistent among logistics parks in a way that each park offers different options to its customers. These options include the sale and lease of land, office space, warehousing space, and other storage and inventory management facilities.

The transportation infrastructure usually includes two or more modes of transportation linked to the park. These modes are road, air, rail, and sea. The proximity of the park to major transportation hubs also contributes to the efficiency of its transportation system.

The usual extra services at logistics parks include on-site customs to facilitate the process of custom clearing, and the use of technology to streamline operations, increase supply chain visibility and promote coordination across the supply chain. Logistics parks are however differentiated by other value-added services they offer to the customers. These value-added services come in a broad variety and are meant to enhance the physical, financial, information and knowledge flows of the global supply chain.

1.2.4 Value-Added Services

Conceptually, value-added services add value to the standard product or service offering. They refer to the contribution of the resources used in the production of goods to raise the value of a product. In manufacturing, value added-added services pertain to something added to a product to increase its value or price, thereby contributing to the cost of good sold of the product. Generally these additional services generate more profit than the standard services. They are often customized to certain operations, and do not rely as much on shared infrastructures among

customers as general services do. It is also believed that value-added services stimulate incremental demand for core service.

In this research, value-added services are segmented among the physical, financial, and information, and knowledge flows of the supply chain. With the exception of the main warehousing and transportation infrastructures in a logistics park facility, value-added services include all the other services that facilitate the flow of the product through the park. Here are few examples of value-added services and their impact on different supply chain flows:

- Physical flow:

Examples include customization, assembly, repair, and customs clearing.

These services modify the product status and location, and can transform the entire product type.

- Financial flow:

Examples include tax incentives, and location within an economic zone.

The impact lies in cost reductions and cash-to-cash cycles.

- Information flow:

Value-added services include the use of communication technologies.

The information related services impact collaboration between supply chain partners, and increase material visibility as it flows across the chain.

- Knowledge flow:

Examples include information sharing and collaboration with research institutions.

The impact results in the implementation of best supply chain practices.

Large logistics parks like Plaza and the Port of Rotterdam Logistics centers offer a number of value-added services including the examples mentioned above.

2 Literature Review

This literature review section introduces the recent trends in logistics, and their global impact on supply chains. Then, few successful logistics consolidation examples are discussed to understand the benefits of this impact, followed by a discussion about the increasing importance of Value-added services in logistics Parks.

2.1 Logistics Trend

According to a study by the United Nations (UN) Transport and Tourism Division (2002), the liberalization of trade and information technology, and the decline of the global trade barriers, are resulting in global manufacturing firms search for new and more efficient production and logistics architectures. These attributes are becoming necessary for corporations to cope with this new operational environment, and to gain sustainable competitive advantages. Fine (1998) said that in a changing and competitive market, designing and managing the supply chain is necessary for a company to gain strategic advantages. The UN report on commercial development of regional ports as logistic centers also states that in a period of ten years the global business environment is expected to undergo greater changes than it did over the last one hundred years. This radical change will require a rapid adoption of new logistics elements by global companies. Logistics centers on the other hand must also be part of this transformation by providing the necessary services and infrastructures for their customers. They must also collaborate with one another to achieve efficient logistics flows and improve the centers' logistics attractiveness.

The report looked at the attributes that make a port successful, including infrastructures, services, policies, and the use of technology in these centers to support large corporations. This is important because they have been consolidating their operations and distribution facilities in the last three decades. Facilities with these advanced logistics features offer “agility, reliability, and flexibility” to the supply chain of their customers, who welcome these advancements for the competitive advantage they bring. The study considers these changes in infrastructures and policies as growth barriers when they are not available, and not only as elements that provide logistics value-added services. The report outlines development requirements for ports and logistics centers, focusing on complete infrastructures, value-added services, government investments and incentives to attract customers (United Nations, Commercial Development of Regional Ports as Logistic Centers, 2002). Strong supply chains are essential for business success, and agility is one of the most important elements of the supply chain that can enable companies to get ahead of its rivals (Hau, 2004). Global supply chain agility is a measure of the supply chain's ability to quickly adapt to changes in the global competitive environment (Swafford et al., 2000). Supply chain flexibility measures the supply chain’s responsiveness to changes, without any additional required investments. Supply chain reliability is defined as the probability of the supply chain meeting its requirements to provide information and distribute supplies within the system (Thomas, 2002).

This logistics trend is developing around the globe, but developed countries are ahead on the value-added services spectrum. Emerging economies like China for example, are still focusing on developing their basic infrastructures and providing the necessary services; while the western world is concentrating on value-added services and the overall efficiency of the supply chain (Day, Wang, and Wong, 2003).

2.2 Consolidation Examples

To demonstrate the importance and attractiveness of the consolidation of operations and distribution, mentioned earlier, we can look at examples from global corporations. A Delphi Survey on the trends in logistics, completed by the Logistics Research Centre at Heriot-Watt University in 2000, suggested that the consolidation of inventories and geographic concentration of production are continuously increasing. This trend results in a higher dependence on logistics parks to support these consolidation efforts.

British Telecom designs, manufactures, and distributes telecommunication equipment globally. British Telecom was very successful in consolidating its distribution centers in a logistics park. Ward explained that through this transformation, the company cut its lead-times and inventory levels by half, and significantly lowered its total logistics cost (Ward, 2004). This example illustrates the drive for operations and distribution consolidations across the globe.

According to Tony Brown, a vice president at Ford Motor Company, Ford is moving towards a supplier park concept, in which all the suppliers are consolidated around the plant. The company is adapting this model to save on transportation and inventory costs, and increase supplier service and coordination. Ford is going through this effort in order to stay competitive in the market (GlobalManufacture.net, 2004).

It is also important to note that other companies from different industries might benefit even more from the consolidation concept, depending upon the complexity of their distribution network.

2.3 Logistics Parks and Value-Added Services

In the 1999 World Bank Transport Division report, Juhel talks about the general value of logistics in trade, and more specifically about the increasing importance of value-added services in logistics centers. The study also reveals how inefficient supply chains can hinder the integration of newly industrialized countries into the world economy. An efficient supply chain is distinguished by steady production lead-times and material flows, allowing for low cost supply chains. These material, cost, and time efficiencies in supply chains can be achieved through facility consolidation and value-added services (The World Bank, 1999).

Greis et al (1995) add that a responsive delivery system, an efficient material flow, a well coordinated system, and a shared infrastructure are necessary components of agile logistics networks. These elements describe responsive logistics systems, and all of them can be added to the supply chain network through consolidation of manufacturing and distribution facilities, and other value-added services at logistics parks. A responsive supply chain is distinguished by short production and distribution lead-times that allow companies to adapt quickly to market demand and customer requests.

Another supply chain feature supported by logistics parks is postponement. Van Hoek (1998) explains how postponement brings benefits to the supply chain including lower lead-times, lower required inventory levels, customization, and higher customer service levels, which is a measure of customer satisfaction. This customer satisfaction is a result of the company offering low costs products, and achieving its promised delivery lead-times. All these elements contribute to cost reductions and competitive advantage for the firms. Van Hoek elaborates on the importance of this value-added service, and on how postponement is made possible by the consolidation of operations and distribution facilities in logistics parks. Benetton, a world leader in knitwear, was

able to achieve better demand visibility, and increase sales of its fashion items, by postponing segments of its garment manufacturing process. This postponement was enabled by operations consolidation.

2.4 Summary

It is clear that logistics is one of the main enabling factors of globalization and trade in general. Historical trends show that logistics have gained more importance in the last few years, especially with the increase in required efficiencies in the global supply chain. Logistics parks are considered as major elements that introduce these necessary efficiencies and collaborations to the supply chain.

Therefore it is essential to study and understand the importance of these value-added services and their impact on the global supply chain.

3 Research Methodology

To identify the value-added services that are currently being offered in the field of logistics and better understand their impact on the supply chain, logistics parks from around the world were selected for the study. These logistics parks were sent a survey about their infrastructure and all the services they are offering, the companies operating at their facilities, and industries they support. Interviews were also conducted with management from some of these logistics parks to better assess the perception of these services inside their logistics facilities. Generally, interviews lead to more detailed information regarding industry trends especially that these value-added services are not standard across the industry, and are continuously evolving.

Some of the selected logistics parks maintain a continuously updated website with information about their infrastructure, services, and financial results from their operations. These websites were used as a source of data collection as well.

In addition, a number of logistics parks were surveyed by the Center of Transportation and Logistics at MIT in the past. The data collected from those surveys is also analyzed as part of this study.

The survey used for this study, which is included in Appendix B, was originally modified from a prior MIT project. It covers questions about the overall infrastructure and facilities of the parks, and services related to the physical, financial, information, and knowledge flows of the supply chain. As the aim of this study is to discern the marginal impact of value-added services, the

survey seeks to identify the attractiveness and the effects of the value-added services offered at each of the logistics parks.

In addition to a cover letter that provides general information about this research and explains the purpose of the study to logistics parks managers, the survey includes four different sections. The first of these sections contains general contact information of the facilities. The second section gathers information about the transportation infrastructure by requesting data about all the available modes of transportation at the facilities. This part is valuable for analyzing the transportation efficiency at the logistics parks. The third section covers available options for land, warehousing and office space. This part also collects information about companies operating at the parks and some additional services they are using. Value-added services information is collected through the fourth section of the survey, which is also broken into four parts as follow:

- The physical flow covering labor, infrastructure and location, security, and environment related services. In addition, information about the services used by the parks' major customers is requested.
- The financial flow services include government financial and tax incentives, and the location of the park within a special economic zone.
- The information and knowledge flows part requests information on training, and the communications technologies these parks are using to facilitate communication and collaboration among the companies operating at their facilities.
- Other value-added services. This section captures all the additional services offered at the parks, and how important these services are to their customers.

The survey also allows for additional information about services and incentives available for companies operating at the logistics parks.

The impacts of these value-added services are identified by comparing the infrastructures and the available services at different logistics parks from different locations. The goal is to identify the value-added services that are important factors in attracting customers to the parks. The data is also used to evaluate and benchmark these logistics parks in each supply chain flow category, which will identify the functions of the supply chain that are best suited for each logistics park. This categorization will greatly help during the development phase of new logistics parks. It will also serve as a support for corporations for their logistics site selection process.

4 Analysis

The data collected from the survey, interviews, and other online sources is analyzed in this section. The analysis is broken into different segments corresponding to the flows of the supply chain.

The survey was sent to a list of selected logistics parks around the world, and the selection criteria include size and location. Of these parks, the data of largest thirty-six facilities was analyzed. I evaluated value-added services at the largest logistics parks located in strategic areas because they offer a bigger and more consistent selection of value-added services to their customers. Almost all these facilities have an area of 500,000 m² or more. The complete list of analyzed logistics parks is shown below. A world map with their locations is included in appendix A.

Table 1: List of Logistics Parks Included in the Study

Country	Name of Logistics Park
China	Dalian International Logistics Park
	Jiangsu International Logistics Park
	Pinghu Logistics Park
	Qingdao Qianwan International Logistics Park
	Suzhou Logistics Park
	Tongzhou Logistics Industrial Park
France	Garonor Logistics Park
	Magna Park Arras
	Magna Park Pagny
	Parisud Business Park
Germany	Magna Park Berlin
	Magna Park Rhein-Main
Hungary	Budapest Intermodal Logistics Center
Italy	Magna Park Monticelli
	Port of Padova
Malaysia	Port Klang Logistic Centre
Morocco	Medhub Free Trade & Logistics Zone
Netherlands	Atlaspark
	Botlek DistriPark
	Eemhaven DistriPark
	Maasvlakte DistriPark
	Schiphol Logistics Park
Poland	Poland Central
Romania	Bucharest Industrial Park
Singapore	Banyan Logistic Hub
	Tanjong Pagar Distripark
Spain	Madrid Este Logistics Park
	PLAZA
	ZAL
UAE	Jebel Ali Free Zone
UK	Magna Park
	Magna Park Lutterworth
USA	Brownstone Business Center
	CenterPoint Intermodal Center
	Gateway Commerce Center
	Westmoreland Logistics Park

One of the major difficulties with collecting data through the survey and literature is the fact that the value-added services are not defined consistently among the logistics parks. In addition, these services are often grouped and offered as a supply chain function or package solution to their customers. I also found that more and more logistics parks are providing additional services to selected customers based on different levels of partnership. A frequent comment made by logistics parks managers was that value-added services are usually introduced based on requests or collaboration with large customers. For example, in the case of the port of Rotterdam and its

logistics facilities, certain value-added services are only available to corporations that joined the parks early in their development. These customers with seniority are assured more customized services, and have access to better port locations.

Through the survey, I found a considerable amount of discrepancies among logistics parks in identifying their customers' priorities and main reasons for operating at their facilities. For example, customs clearing is a popular value-added service among the parks; however, logistics parks are not clear how many companies are operating at their parks because of this service. I believe the reason is because companies are considering logistics parks for a full range of solutions, and not specifically for a particular service.

Logistics parks managers also believe that most of their customers have been more concerned with costs than they have been with service when it comes to logistics services. They maintain that this cost relevance is the end user's main concern. However, these companies are now looking more closely at other elements like the quality and performance of services, and more importantly, knowledge about their industry. Logistics parks' long-term customers are also continuously expecting better and more consistent services. Through industry focus, JTC Corporation, owner of a number of logistics parks in Singapore, offers its customers both industry-related bundled solutions for cost efficiencies, and industry expertise.

To analyze these value-added services in the same approach logistics parks cluster them, I have organized the services under supply chain functions as well. As an example, software services that contribute to the collaboration, data exchange and real time visibility are all grouped under the same information technology section.

4.1 Supply Chain Trends

Logistics parks managers recognize that it is becoming more popular for companies to outsource more of their logistics and supply chain functions, because these services are not considered to be core functions of the business. This is especially true for outbound product distribution, since these companies are not as willing to give up the inbound product distribution in order to have control of their material sourcing and replenishment. Other services that are becoming more attractive to being outsourced include inventory and carrier management. Leading companies also choose to outsource services in order to gain a strategic advantage from their supply chains, by increasing their supply chain flexibility, responsiveness, and customer service levels. As an illustration of this trend, the Logistics Institute in Singapore published the following results on the rate of outsourced logistics value-added services in China in 2003. Value-added services are gaining popularity in terms of usage rate.

Table 2: Outsourced Logistics Services

Source: The Logistics Institute-Asia Pacific

Logistics Services	Usage Rate (%)
Outbound Transportation	86
Inbound Transportation	63
Warehousing	46
Freight Forwarding	38
Cross-docking	36
Customs Clearance	29
Inventory Management	27
Carrier Selection	21
Fleet Management	21
Labeling/Packaging	18
Customer Service	16
Order Fulfillment	14
Distribution Control	13
Shipment Consolidation/Distribution	13
Information Technology	11
Product Assembly/Installation	9
Order Entry/Processing	7
Supply Chain Manager	7
Freight Bill Auditing/Payment	7
Rate Negotiation	7
Consulting Services	7
Factoring (Trade Financing)	5
Products Returns and Repair	5

Traditional services including transportation and warehousing are still the most outsourced ones; however, many other value-added services are gaining popularity among these outsourced logistics services.

4.2 Physical Flow Value-Added Services

Physical layout, location, and infrastructure are all very important characteristics of logistics parks. When companies decide to outsource functions of their supply chain, these are the first elements they look at when considering a logistics facility. Labor and onsite customs clearing are also part of this section, as they contribute to the physical capabilities of the supply chain within these parks.

4.2.1 Labor Analysis

Generally, most companies consider labor as one of the leading factors when outsourcing their operations and logistics services. As noted in the earlier section, these companies are focused on cost reduction, and they look at labor as a major source for savings. More specifically, labor costs and qualifications are all in the list of companies' priorities in deciding where to outsource. Since logistics parks and distribution centers are relatively labor intensive, especially when including manufacturing and customer service sites, labor availability is also an important factor. The logistics centers at the port of Rotterdam, for example, are seeing that the demand for unskilled labor in the port and their industrial complex is declining. This trend will probably occur soon in the US followed by Asia, since Europe is the leading region in the percentage of outsourced services. In addition to labor skills, other important factors that companies started considering more recently include multilingualism and labor flexibility. All these elements have a direct impact on their service levels and competitive advantage. MacCormack et al. (1994) suggest that companies should establish their logistics facilities in regions with skilled labor and efficient logistics system, as opposed to places where a cheaper source of labor is the main advantage. Results from the survey support this suggestion, as most logistics parks consider labor skills to be important factor for their customers.

4.2.2 Industry Sector Analysis

None of the analyzed logistics parks that we surveyed was built for a single specific industry; however, park managers have recently begun to consider industry focus as a competitive advantage for their parks. Some of the larger logistics parks are now focusing on a few industry sectors such as the electronic, chemical, logistics services, and biomedical industries.

Based on the Official 2006 Statistics report from JTC Corporation in Singapore, the demand for biomedical manufacturing, logistics services, and other value added-services saw high and continuous growth from 1997 to 2005. Over this period, the demand for these three industries combined gained twelve percent points from the total park’s demand. The segment that showed the highest decrease is general manufacturing; while the electronic industry was stable. To cope with the growth of these industries within the logistics park, the management increased land and other resources allocated to the three growing segments (JTC Corporation, Official 2006 Statistics, 2007).

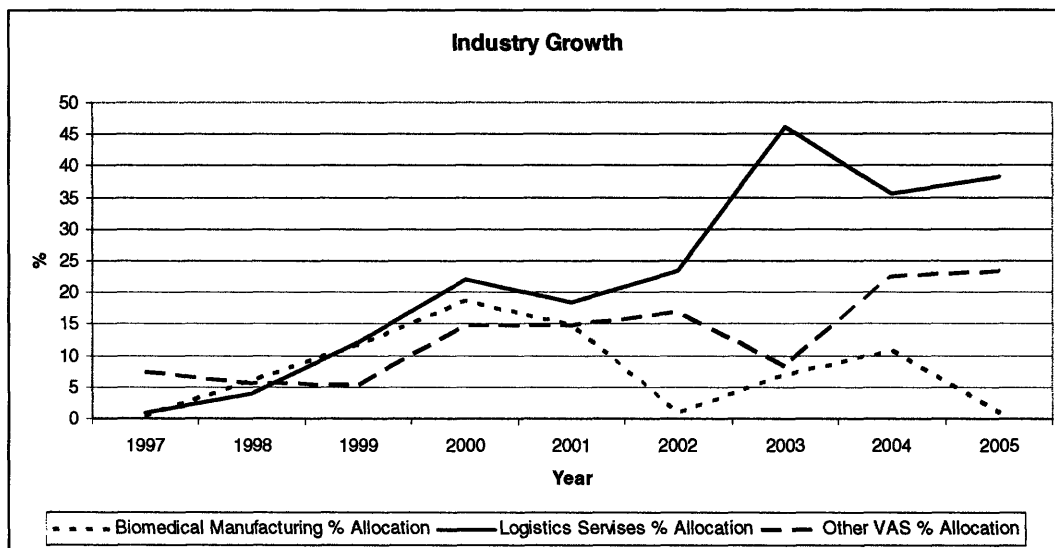


Figure 1: Industry Growth percentages inside Logistics Parks for JTC Corporation
Source: Official 2006 Statistics report, JTC Corporation

Kuehne + Nagel, a global logistics solution company, also reported that profits from the logistics services area saw the highest increase compared to their other sectors, with 170% increase from 2005 to 2006. During the same period, the company’s total profit rose by 50% only (Kuehne + Nagel project, 2006).

Efficient supply chain configurations vary among industries in the same way they do among companies. Industry focus results in greater supply chain efficiencies for companies operating at

these parks. By focusing on certain industries, logistics parks gain better understanding of the industry allowing better collaborations with their customers, and greater levels of services related to those industries. Logistics parks consider this focus as a competitive advantage for their business.

Manufacturers benefit from industry consolidation because suppliers can offer them better prices due to economies of scale; at the same time they take advantage of consolidating shipments to customers. This is especially true for industries that require different material handling, like the chemical industry. In this case, all the companies of the same industry within the park can benefit from combining their storage and transportation.

Form the survey it is clear that logistics service providers and distributors represent the highest number of customers in logistics parks. These segments also utilize the majority of space and resources within the parks, and generate the highest revenue allocation for logistics parks. Large logistics providers also attract a variety of customers to these facilities.

4.2.3 Location

To many companies, location is the first factor they consider when evaluating logistics parks. Similarly, these logistics facilities believe that location is one of their major assets. Labor, transportation infrastructure, and other value-added services significantly impact the location attractiveness, but these factors are discussed in another section. In this part, the focus is on the benefits associated with the geographic location of logistics parks.

Logistics parks managers confirm that few companies begun combining their operations and distribution facilities to save on transportation costs, promote lean operations, and reduce inventories. Global corporations see large logistics parks offering manufacturing capabilities and

other value-added services as an end-to-end solution to their outsourcing need (Murphy, 1997). Other decision criteria these companies are considering when looking for logistics parks include the distance between these facilities and major cities, ease of access to suppliers and materials, and more importantly, the proximity to large number of customers and regions with high purchasing power to have access to larger markets and achieve high customer service levels.

4.2.4 Transportation Infrastructure

At logistics parks, it is important to have an excellent transportation infrastructure that can handle a high volume of inbound and outbound freight, and which is flexible to support all customer needs. The table below shows the percentage of available modes at the logistics parks analyzed. Please note that these percentages are only representing the logistics parks selected for the study.

Table 3: Transportation Modes Availability in Surveyed Logistics Parks

Transportation Mode	Percentage of Logistics Parks with Mode
Highway	58%
Airport	47%
Port	33%
Rail	33%

Among the analyzed thirty-six logistics parks, 33% are located near a seaport or a rail hub. The reasons for this low rate are the high land price near seaports and large cities, and the high costs associated with setting rail hubs.

According to Prologis, a world leader in logistics services, the recent trends in outsourcing and globalization have had a major impact on the global distribution infrastructure, causing over 90% of the world trade to move by sea (ProLogis Annual Report, 2006). This statement reveals the important role of sea ports in the global logistics infrastructure. Even with this high freight

allocation, maritime transportation will still be realizing more potential in the future. World container and airfreight traffic projections from Kuehne + Nagel are shown below (Kuehne + Nagel project, 2006).

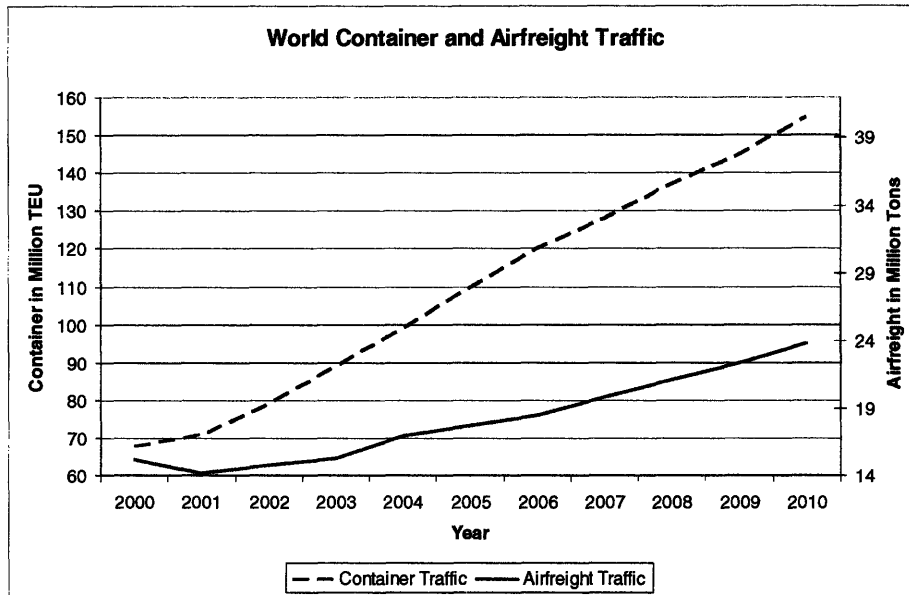


Figure 2: Expected World Container and Airfreight Traffic Growth
Source: Kuehne + Nagel 2006 Results

Container freight volumes are increasing at a higher rate than airfreight. The growth from 2005 to 2006 for sea freight is 41%, compared to 19% for airfreight, and 26% for railroad and highway logistics during the same period. It is clear that the proximity of logistics parks to sea ports will be of even more importance in the future. This movement is due to the fact that more commodities are being traded globally, and that supply chains overall are getting more efficient.

To cope with this growth in maritime transportation, ports are continuously developing their infrastructures and adding services at their ports. According to the Port of Rotterdam, one of the major ports in the world, the success of the port and its logistics facilities is the result of the constant focus on the development and management of infrastructure in and around the port. The

port has never stopped expending since the end of World War II, in response to the relentless demand from industry.

Even if sea freight represents the highest freight percentage, multimodal infrastructures are necessary at logistics parks. Rail infrastructures are very efficient for inland transportation, and they are also very popular among few industries like the chemical industry.

Based on the survey, 58% of the logistics parks are connected by highways. This rate is much higher in developed countries. Highway infrastructures at logistics parks are considered very important by these facilities' management. In addition to offering another transportation mode to the parks' customers, highways reduce congestion risk for personnel and suppliers transportation to the parks.

4.2.5 Onsite Custom Clearing

One-third of the logistics parks analyzed in the study offer onsite customs clearing for their customers, and the likelihood of having an onsite customs clearing increases with the size of the facilities. This is an attractive value-added service for companies operation in the parks, because customs clearing has impacts on both the physical and the financial flows of the supply chain. The impact on the physical flow is in shortening the time for the material to be available for use, since local customs are more efficient in the clearing process. It is also applicable when shipping material to customers, resulting in lower in-transit lead-times. For the financial flow, onsite customs clearing might lower material ownership periods and liability for manufacturers and companies operating at the park, lowering their cash-to-cash cycle. This financial measure is discussed in a later section.

4.2.6 Logistics Parks Facilities Occupancy Rate

Since most of early logistics parks were created for regional economic development, the attention was not on higher profitability from additional services. These parks were focusing on the infrastructure, location, and other incentives to attract businesses to their region. The parks' business model has been changing, and more recently some of these facilities and other new ones are selling most or all of their land to their customers and focusing on services.

Land and warehousing occupancy rate change significantly among parks. Occupancy rate refers to the percentage of occupied land or warehousing space of the total available land. From the survey, the occupancy rate for most of the parks ranges from around 50% to 85% of the available space. It is impossible to draw a conclusion or trend from the occupancy rates because parks are changing their offerings and supply to adapt to the demand. For example, if occupancy is low for land, the park may turn the land into warehousing space, or into a different service area, which will increase occupancy rates. If on the other hand there is high demand for land, the management might decide to acquire more land or make it available from other services to balance supply with demand. Two of the logistics parks that have manufacturing facilities indicated that manufacturing space occupancy has been stable since 2000 at about ninety four percent. As opposed to land, manufacturing space occupancy rate is high because the supply is fixed and does not change with demand.

There is no clear correlation between the value-added services offered at a park, and its occupancy rate. It is maybe due to the flexible supply of land and services. The occupancy rate, and land lease versus sell allocation rates within logistics parks also depends on real estate cost, and the future value of the asset. Large corporations prefer to buy land or warehouses, especially if there is a potential for major asset appreciation. Owning land also ensures long term

relationships with logistics parks, and higher probabilities of using more value-added services. Even with the case of leasing, large companies tend to contract a combination of solutions including warehousing and office space, and a number of other services.

4.2.7 Other Physical Flow Value Added Services

Customization and finishing are among the most popular services at the surveyed logistics parks. Depending on the facility, these processes could include labeling, testing, inventory tracking, and they are considered as facilitators in the postponement process discussed earlier.

A full manufacturing and product support capability is also an end-to-end solution that customers will soon be requesting, due to the increase number of outsourced segments of this complete solution. 25 % of the analyzed logistics parks have local or nearby manufacturing sites, and logistics parks are expecting this figure to grow with the popularity of operations consolidation, and increasing freight costs. Other popular services requested by logistics parks' customers include assembly, quality control and repair, and all these value-added services are part of the manufacturing capabilities.

4.3 Financial Flow Value-Added Services

In general, financial value-added services related to logistics are very important because they enable companies to reduce material and operation costs, and shorten their cash-to-cash cycles. Cost reductions have a direct impact on the companies' profit, and represent a direct measure of the production and distribution efficiencies. Cash-to-cash cycle impact the return on investment phases for resources invested on inventories, it is a supply chain efficiency measure. In the survey, related to the enhancement of the supply chain financial flow, I looked at the impact and

attractiveness of economic zones, or free trade zones, FTZ, at logistics parks. These trade zones offer companies different types of financial incentives; however, the survey used did not focus on the impact of each type. All the economic incentives were grouped together to understand their general impact on the supply chain, as they are not consistent among the logistics parks analyzed in this study.

Through the survey, logistics parks managers were asked to comment on the financial incentives that are especially important to their customers, and which have the most impact on their financial flow. The questions requested information on free trade zones, financial institutions within the parks, and other government related financial incentives. The feedback suggests that the location of these logistics parks within free trade zones is the factor that attracts customers the most, influencing their decision on where to locate their operations and logistics facilities. A free trade zone is a familiar concept in the industry, referring to agreements between logistics parks and local governments. These agreements generally have similar objectives; however, they vary from country to country, and they come in different forms that are attractive to investors, usually foreign corporations.

In order to achieve significant cost reductions and gain a competitive advantage, companies have traditionally looked at outsourcing and off-shoring to save on material and labor costs. These companies are now under even greater pressure to improve profitability and return on investments, so they seriously consider other incentives that benefit their cash flow. This is the main reason that makes the financial incentives offered in free trade zones very attractive to these companies. On the other hand, regional authorities use these incentives to attract these corporations to operate in their regions in order to boost their economic development and encourage an environment for investment. Logistics parks turned out to be an efficient way of

offering these incentives. Governments focus on the regional development, while logistics parks concentrate on luring companies using the incentives.

These government incentives come in different types, depending on the available resources they can offer, and the companies or industries they want to attract. The most common types include income tax exemptions or deductions, custom duties reductions, flexible import and export regulations, and employee tax incentives within the zone. All of these help companies attract qualified local and foreign workforce. In order to advance the economic growth in developing countries, certain governments offer financial incentives to lower the initial setup costs for companies, when large and long term investments are promised. Examples include land, infrastructure, and other capital equipment at lower prices or no cost at all. Companies prefer this option especially with capital intensive investments, and when there are significant risks associated with relocating to that specific region. In some cases government also offer regulatory incentives to selected companies when financial incentives are not available. These regulatory motivations can include environment, banking, and intellectual property accords.

China for example was very successful at offering different financial incentives through free trade zones to boost foreign investments. They opened business environments in several sectors, and lowered trade barrier to allow international competition. These changes positively impacted the Chinese manufacturing outsourcing wave.

4.4 Information Flow Value-Added Services

A number of industry experts link the biggest revolution in supply chain and logistics in the last several years to information technology, IT. Similar to the physical flow of the supply chain, the information network is being consolidated across different players of the entire supply chain. The

current decentralized systems are being replaced by centralized infrastructures, to allow all the members of the supply chain to work jointly under a central system. In addition to system consolidation, standardized systems and technologies are emerging to support these transformations, resulting in increased supply chain visibility and significant flow efficiencies.

4.4.1 Information Technology

Through the information flow section of the survey, we gathered information from logistics parks managers about different communication and information technologies available for their customers and used at their facilities. The most common solution was the existence of phone and internet infrastructures, which are now considered as standard necessities. Their customers however have recently adopted several IT services to improve supply chain flows. Few logistics parks offer other technologies including Radio Frequency Identification Technology, RFID, and other IT technologies, but these solutions are not consistent among the parks, and to these managers, they are not considered as important value-added services for the companies operating at their facilities. To the logistics parks, it is not clear how soon RFID technology will succeed in revolutionizing the supply chain. This technology is still in the development stage, and not many large companies operating at their facilities are using it to control the flow of their products.

On the other hand, supply chain leaders view IT and software applications as a major challenge. There are no standard and clear solutions that are suited for their entire supply chain, and using several applications across the chain is extremely inefficient. The aim of all software applications is to improve visibility and efficiency across the chain; however, these solutions are fragmented and each one is tailored to small and specific applications, within a specific industry. For a company to assure supply chain visibility and control internally and externally, these

applications must be integrated together, which is often very difficult to do. Better external visibility leads to efficiencies and responsiveness through increasing collaboration among supply chain partners. Companies understand well the necessities of these collaborations; logistics parks however are at a better position to contribute to this coordination.

Because logistics Parks are in the center of all the chain flows, they are better positioned to provide this external collaboration between supply chain partners, and to promote and implement consolidated and standardized solutions. Better functionality and visibility achieved through these network consolidations results in cost reductions. Companies will also benefit from improved system administration. The parks can enable manufacturers and suppliers to manage their flows more efficiently by offering them real-time visibility to their supply chains. In fact, leading third-party logistics providers that have long been investing in IT experienced great success in helping their customers achieve visibility and cost efficiencies across their supply chains.

The figure below shows an example of a consolidated system architecture that could be used at a logistics park. All the members of the supply chain are connected through the same system, and can exchange data in real-time.

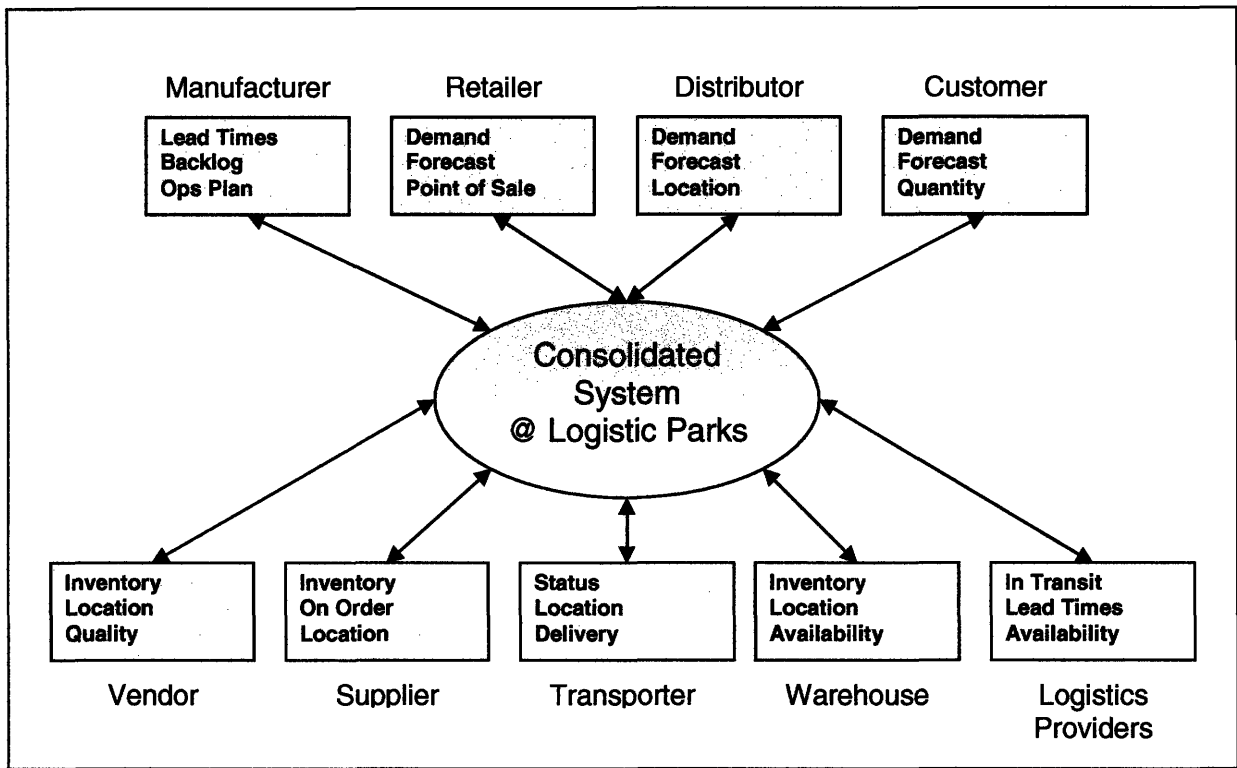


Figure 3: Example of Consolidated Information Technology System at Logistics Parks

A few examples have demonstrated that it is clear that IT related value-added services have a positive impact on the information flow of the supply chain. The Delphi Survey completed by the Logistics Research Centre at Heriot-Watt University in 2000 says that companies are now relying less on their internal resources for IT solutions. They have been outsourcing more to logistics providers, especially IT solutions. These companies are willing to continue outsourcing parts of their IT infrastructure as long as it does not conflict with their core business expertise.

According to Kuehne + Nagel, a number of logistics facilities across Europe have decided to implement standardized IT systems in 2006. They are expecting significant increase in productivity and quality across the global supply chain. Also, Kuehne + Nagel enabled its customers' visibility to their entire supply chain data in real time, by consolidating several supply chain management systems into a single solution.

Even at the national level, a UN report mentions that pioneering countries in logistics have implemented standardized solutions in several areas of their trading systems, enabling process automation and trade efficiencies (United Nations, 2002).

4.4.2 Other Technologies

In addition to IT, the implementation of emerging technology solution plays a major role in the advancement of the supply chain information flow. Few logistics parks mentioned the use of systems supporting RFID and Voice recognition systems. In logistics parks, these new technologies are usually adapted upon customers' requests, which is the reason for mixed feedback regarding the implementations of new technologies.

RFID technology provides companies with improved visibility and traceability across their supply chains. Companies using RFID have access to real-time data on quantities and locations of all their products at all points of the supply chain, internally and externally. RFID technology benefits could be amplified if used thoughtfully and applied upstream in the supply chain. It would give all the supply chain players visibility through the entire chain from sales and customers to suppliers' information management. Logistics parks can be more proactive in implementing RFID solution by installing the necessary equipments at their facilities, to prove the benefits of the solution trough partnering with their customers.

Voice recognition technology is also implemented in a few logistics facilities. This technology is defined as a two-way electronic communication system between the warehouse management systems and warehouse workers. Voice recognition systems are usually used directly by the companies operating in logistics parks, and are not integrated into the park's infrastructure yet. Voice recognition leads to significant reduction in picking errors and to increase in material flow

efficiency in the warehouse. According to Prologis, this technology is one of the most important breakthroughs in warehousing operations, and its implementation has already delivered great benefits. (ProLogis Annual Report, 2006).

4.5 Knowledge Flow Value-Added Services

With the increased complexities in today's business environment that are caused by tighter customer requirements and shorter product life cycles, most companies find it challenging to excel in all areas of their supply chain. These challenges are even greater with outsourcing and globalization. Knowledge transfer and exchange across the supply chain has become essential for companies to compete in this environment.

Logistics parks were asked to provide details on value-added services impacting the knowledge flow of the supply chain at their facilities. The only knowledge related services they identified are their link to universities and research centers, and knowledge and resources exchange between similar companies within their logistics parks; however well established logistics centers have recognized the importance of knowledge related value-added services and have introduced processes to implement them to better support their customers, and gain a competitive advantage. Examples of this process include partnering with other logistics providers, and implementing logistics training programs. These leading logistics parks are continuously increasing value for their customers by making knowledge accessible to them. For example, the port of Rotterdam and its logistics facilities management believe that competition is becoming a question of knowledge. They specifically focus on how to attract knowledge through cooperating with universities and establishing education program with local governments, and use it to the port's advantage in attracting businesses to their facilities.

Another practice that is gaining popularity in logistics parks administration is management and ownership by a larger distribution network. 25% of the parks analyzed in this study are managed centrally, even if they are owned by local governments. More parks are being managed by central organizations to share their global customers and logistics providers, and more importantly, to leverage and transfer industry knowledge and expertise across the logistics parks network.

5 Results and Conclusion

In this section, different value-added services that were analyzed in the previous chapter will be compared based on their importance to the logistics parks offering them, and attractiveness to the companies using the services. Logistics parks managers were asked to directly prioritize the importance of few of these services to their customers, and based on how much they think the facility benefits from the services. These rankings, along with other information about the impact of supply chain related value-added services and industry trends collected directly from logistics parks' websites, are used to group and rank the importance of these services.

Elements of logistics parks' physical infrastructures and value-added services are grouped and ranked based on the order of their present importance and current impact on the global supply chain, and are shown in table 4. Services and elements of the infrastructure are ranked based on averages of how important, logistics parks managers think, they are to the companies using them, and on how they contribute to attracting new companies to their logistics parks. This information is from the survey, and confirmed through additional interviews with few logistics parks managers. Services are grouped together in this section because some of them are closely important and attractive to companies operating at the parks.

One important factor we should keep in mind is the effect of the quickly changing logistics industry standards and trends. Infrastructures or services that are extremely important to today's supply chains might not be of great importance in the near future; the opposite could be true as well. The availability of cheap labor for example is an absolute necessity to outsourcing and to

supply chain operations today; however, in the future companies will depend more on skilled and educated labor in order to be able to compete globally. The reader should be aware of this fact while interpreting the results in table 4. In this table, level 1 represents the most important and attractive value-added services and infrastructure elements, and level 5 represents the least.

Table 4: Current Infrastructure elements and Value-Added Services Rankings
Level 1 represents the most important services and level 5 the least important ones

Infrastructure and Value-Added Services at Logistics Parks	Current Attractiveness Level 1 to 5
Proximity to Large Cities (Large Markets / Buying Power)	1
Logistics Infrastructure	
Logistics Park Located in Economic Zones (FTZ - Financial Incentives)	
Cheap Labor Availability	
Large Warehousing and Storage Space	2
Manufacturing Capabilities On Site	
Labor Cost	
Customs Clearing On Site	
Inventory Management	3
Product Customization, Assembly, Finish ...etc	
Highway Infrastructure	
Shipment Consolidation and Deconsolidation Related Services	
Sea Port On Site	4
Proximity to Rail Road Hub	
Proximity to Airport	
Information Technology (Systems and Communications End-to-End Solution)	
Highly Skilled and Educated Labor Availability	5
Government Support and Ownership	
Technology (RFID, Voice Recognition, ...etc)	
Connections to Research and Universities	

Currently, companies are still consolidating their distributions and operations into central locations globally. Operations and distribution networks consolidation efficiently serves large customer regions, and assures great cost reductions by merging many logistics and supply chain operations in the same location. Companies save on the increasing freight costs and shorter lead-times and in dealing with suppliers centrally. In Europe for example, this consolidation was accelerated by the larger European Union, causing the flow within these countries to increase. In

Asia, the dominant concentration of manufacturing and trade in one region in China caused the bi-directional flow to increase, favoring this consolidation model. To support this growth, port capacities in China are expected to continue expanding significantly past 2010. The efficiency of logistics infrastructure and services becomes even more important with these changes. In addition, products are getting more complex and customers are more demanding than ever, driving companies to postpone parts of their operations and to reduce their products lead-times. All these contribute to greater complexities in the global supply chain, and require an increase in the number of value-added services. These trends are still expected to continue over the next few years. As a result, logistics, infrastructures, and supply chain services are still getting more attention globally, and efficiencies of these services are of even more importance.

These changes are having a major influence on the importance of each of the logistics infrastructures and services analyzed earlier, causing their attractiveness to increase or decrease depending on the values each service adds to the future supply chain.

After the data from the survey was analyzed, I conducted interviews with few logistics parks managers to better understand the fast changing industry trends, and what these parks are doing to continue supporting their customers and stay competitive. These discussions were focused on the value-added services that are most important to their businesses. I also researched the annual reports for few of the largest logistics parks to see what area they are investing in, and to identify the impact of certain services on their revenues. This last part was also helpful in quantifying the importance and growth of different industries within the parks, as these logistics parks segment their financial reporting by industries. From these interviews and research, following are some of the services of which the attractiveness is being impacted by the current industry changes.

In general, freight costs represent a big part of logistics costs. In the US for example, freight costs are more than 50% of the logistics costs (Cowee, 2003), and they are continuously increasing due to several reasons including the rising oil prices. Because of this increase in freight cost, and the constant increase in manufacturing outsourcing, consolidation will continue to become gradually more important, and value-added services that support consolidation will be more attractive to global corporations.

With increased efficiencies in supply chains, and increase in operations consolidation, companies are now carrying fewer inventories and requiring smaller shipments from their suppliers. As a result, smaller warehouses are required for their logistics operations. Large Warehousing and storage space importance is relatively decreasing compared to other supply chain services.

Advanced information technology systems and other new technologies are becoming very important to assure supply chain excellence. They enable flexibility and visibility in the entire supply chain.

The demand for unskilled labor in a number of logistics centers is decreasing; however, skilled and educated labor is becoming more important, and is significantly and positively impacting the attractiveness of logistics parks.

Since sea freight is growing at a much higher rate than air, rail, and road freights, maritime transportation is becoming very important to logistics parks operations. The proximity of sea ports to logistics parks is also becoming a more attractive factor for companies when selecting logistics parks.

Services that impact the knowledge flow of the supply chain like local business training and connections with universities and research centers are increasingly helping companies that are operating at the logistics parks achieve local competitive advantage.

These facts illustrate how the importance and attractiveness of infrastructure elements and value-added services at logistics parks are changing with the current trends in the logistics industry. This means that soon the current importance and attractiveness level of each element and service will increase or decrease based on the radical changes the industry is undergoing. These facts are then evaluated against the results presented in table 4 above. Based on what logistics parks managers believe is the impact of the current industry changes on each value-added service, I reevaluated all the services presented in table 4. The final results are shown in table 5 below. These results include the new importance and attractiveness levels of the infrastructure elements and value-added services in logistics parks.

Table 5: Estimated Future Infrastructure elements and Value-Added Services Rankings
Level 1 represents the most important services and level 5 the least important ones

Infrastructure and Value-Added Services at Logistics Parks	Future Attractiveness Level 1 to 5
Logistics Infrastructure	1
Proximity to Large Cities (Large Markets / Buying Power)	
Information Technology (Systems and Communications End-to-End Solution)	
Manufacturing Capabilities On Site	
Customs Clearing On Site	2
Highly Skilled and Educated Labor Availability	
Logistics Park Located in Economic Zones (FTZ - Financial Incentives)	
Shipment Consolidation and Deconsolidation Related Services	
Cheap Labor Availability	3
Inventory Management	
Product Customization, Assembly, Finish ...etc	
Sea Port On Site	
Large Warehousing and Storage Space	4
Technology (RFID, Voice Recognition, ...etc)	
Highway Infrastructure	
Labor Cost	
Connections to Research and Universities	5
Proximity to Rail Road Hub	
Proximity to Airport	
Government Support and Ownership	

The services that saw the most increase include information technology and highly skilled and educated labor availability. This reflects the increasing importance of these elements in the logistics industry. Onsite manufacturing locations, consolidation, proximity to sea ports, and technology elements also increased one level on importance.

Companies used to outsource some of their operations and logistics services to gain strategic advantage through cost reduction, and to create access to new markets. More recently, strategic advantage drivers have shifted to services that enable flexibility and visibility in the global supply chain, and better customer service levels. To increase their attractiveness, logistics parks must cope with this change by providing the relevant value-added services that are becoming standard in the industry.

6 Recommendations

In order for logistics parks to stay competitive globally and attractive to leading corporations, they need to increasingly improve not only the infrastructure elements and value-added services that are important to their customers now, but also the services that are growing in demand. This will strengthen their competitiveness and assure their long-term success. The results presented in the earlier section should help logistics parks anticipate the next services they need to offer in order to stay competitive, and enhance their global reputation. All this serves the primary aim of assuring world-class services for their customers.

In one section of the survey, logistics parks were asked to identify what they perceive to be the priorities of their customers. The feedback from this section was the part with the most discrepancies among logistics parks. It appears that they do not have a clear understanding of their customers needs. These parks need to develop a profound knowledge of their customers business, and a stronger relationship with them. Customer requirements will continue to increase, and understanding their business will be of great value to the logistics parks development.

Governments and local authorities could be the most influential elements impacting the success of logistics parks. Because transportation infrastructure is a basic need for logistics parks, governments need to invest in developing and maintaining these infrastructures. Transportation infrastructures, in particular, require great commitment from the government. They involve large investments that represent too much risk for corporations to take. This is especially true for sea ports, which are increasing in importance for the global supply chain.

In order to attract foreign corporations to the logistics parks, governments need to introduce additional financial incentives through free-trade zones and other tariff reduction programs. This is one of the most effective ways to increase the competitiveness of the logistics parks. Governments must also take the lead in setting standards and regulations that favor a professional and easy business environment, fighting industrial corruptions, and removing trade and financial barriers, especially for developing countries. In addition, the government can assist in training and providing qualified labor, which is becoming an important factor for measuring competitive advantages among logistics parks.

It has been proven that logistics parks operations become more efficient when they focus on one or more industries. Attracting emerging industries and niche markets is a way for logistics parks to sustain their growth and global competitiveness. Examples of these industries include the energy, e-commerce, and biotechnology sectors. These parks need to strengthen their industry position by offering competitive and specialized services to support these industries, in order to increase their attractiveness.

Competition between logistics providers is increasingly dependent upon industry expertise and knowledge. Logistics parks must cope with this trend and develop knowledge foundations by cooperating with universities and research centers. They must cooperate to attract highly-skilled workers, and develop partnerships with other leading logistics providers. Logistics parks need to make industry, business, and region specific knowledge available for their customers to support them with their operations.

Recently, environmental and security concerns have arisen in the global community. Logistics parks need to keep all the existing and new international regulations in mind when developing infrastructures and services to assure their sustainability and security.

Logistics parks must also contribute to the evolution of information technology implementation. Without employing standard solutions, they will be at risk of falling behind other competitors and logistics providers, due to the growing supply chain reliance on advanced software. Leading logistics providers are replacing all the range of computer programs specific to each part of the supply chain with Enterprise Resource Planning, ERP, systems for end-to-end solutions. Standard and end-to-end solutions enable the control of each supply chain process between the park and all its partners. This mapping helps identify responsibilities among supply chain partners, to control tasks ownership and enable efficient flow management. It is also important for logistics parks to adapt to new technologies and help their customers implement them. The implementation rate of RFID technologies in logistics parks is very low; however, this presents a promising solution that enables traceability and visibility across the supply chain.

Logistics parks are now playing a vital role in the logistics industry, and are increasingly gaining importance across the global supply chain through value-added services. These facilities can increase their positive impact on their customers' supply chains by continually adjusting and increasing their services to meet the demanding and fast changing logistics industry.

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Appendix A

Map with locations of logistics parks included in the study

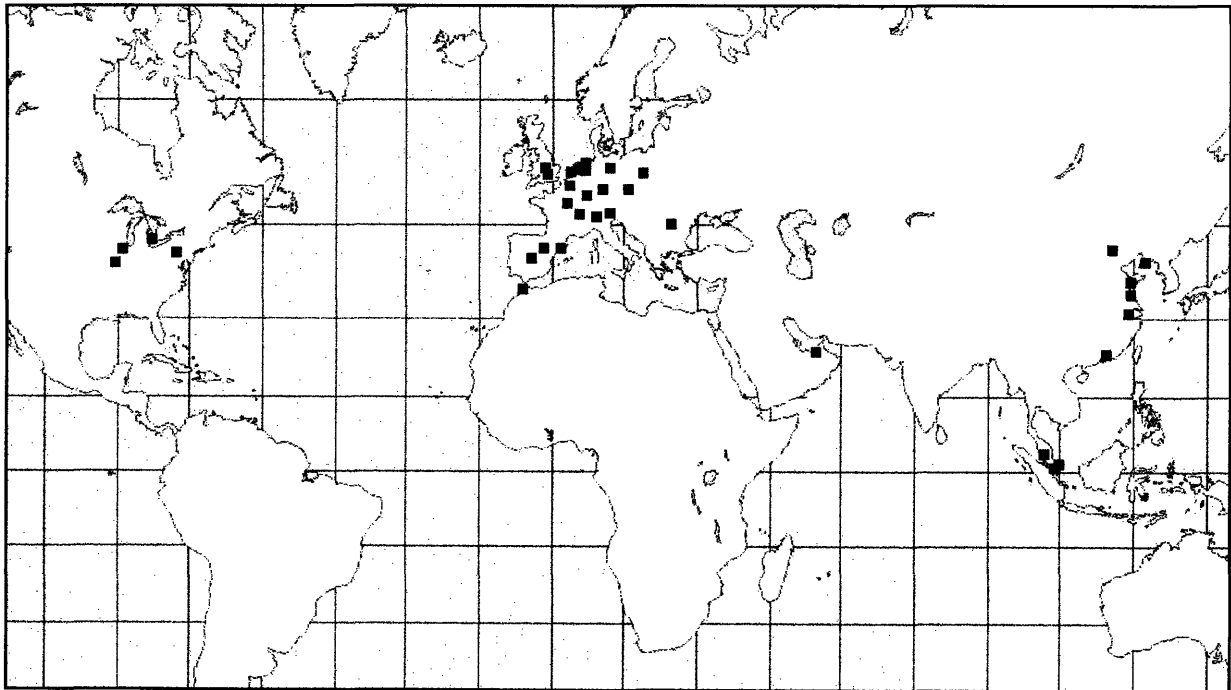


Figure 4: World map with locations of logistics parks included in the study

Appendix B

Survey

March 2007

Dear Park Operator

M.I.T.'s Center for Transportation and Logistics is conducting a research project on the role of logistics parks and their value-added services in the global supply chain. To assist in this project, we are asking you to participate in a survey about your logistics park facility and its value-added services. The research focuses on the value-added services offered at logistics parks and their impact on all the supply chain's physical, financial, information, and knowledge flows. Following the park information is a series of questions about operations and services within your logistics park and the derived value of logistics parks within the supply chain. Please answer as completely as possible, and use as much space as needed.

Your answers will be used for benchmarking industry best practices and evaluating the role and the development of logistics parks around the world. The results of this work will be shared with you. It is relevant to your field, and is important for your customers and for the development and growth of your logistics park. All surveys will be evaluated as part of a thesis research at MIT and all answers will be kept anonymous.

We appreciate any additional assistance or information you can provide about the role of logistics parks as an innovative trend in logistics services and distribution.

If you need assistance or prefer to go over the survey over the phone with a researcher, please do not hesitate to contact me.

Please return the survey to Ali Amrani at amrani@mit.edu

Thank you for your time. We appreciate your prompt assistance.

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1 - General Information about Logistics Park Facility

Name of Logistics Park: _____
 Address: _____

 Website: _____
 Contact Name: _____
 Title: _____
 Phone: _____
 Email: _____

2 - Transportation and Distribution Network

Is the facility linked by Rail? Yes / No
 Distance to Nearest Rail Hub: _____ km _____ mi
 Distance to nearest major airport: _____ km _____ mi

Is the facility linked by highway? Yes / No
 Distance to nearest highway from facility: _____ km _____ mi

Is the facility linked to any seaports: Yes / No
 Distance to nearest seaport: _____ km _____ mi

- If you are located inland at a “dry port,” what is your estimated total processing and travel time to the nearest port? _____

3 - Park Services

3.1- Within your facility, please check whether you sell, lease or both:

	Land	Storage/Warehousing	Office Space	Other:
<u>Sell</u> Approximate price: __m ² __ft ²	Yes / No _____ \$	Yes / No _____ \$	Yes / No _____ \$	
<u>Lease/Rent</u> Approximate price: __m ² __ft ²	Yes / No _____ \$	Yes / No _____ \$	Yes / No _____ \$	

3.2- Please list any additional options for land and warehousing offered to customers in your facility: _____

3.3- How many companies operate within your park? _____

- For the companies operating in your park, please approximate the following criteria by separating the companies into their industry classifications:

	Manufacturers	Distributors	Carriers	Logistics Service Providers	Other (please specify type of business)
Percentage of Total Companies in Park					
Percentage of Total Physical Flow through Park-TEU or Ton					
Average Length of Leasing Contract					
Average Size Of Space (m2)					
Approximate revenue from type of business of total rev. \$ or %					

3.4- In making their park-selection, please identify what you think are the priorities for your customers:

Influential factors: (1: most important factor, 5: least important factor)

- Proximity to Consumer Base _____
- Proximity to Manufacturing Base _____
- Strong Logistics Infrastructure _____
- Presence of Special Economic Zone _____
- Reduced Trading/Tariff/Customs Barriers _____
- Reduced Labor costs _____

Other Value Added services:

- Assembly _____
- Test / Quality _____
- Packaging _____
- Security _____
- Other _____

3.5- How do you rank the benefits of your facility when marketing to prospective tenants? (1: most emphasized, 5: least emphasized)

- _____ Geographic location
- _____ Transportation modes and infrastructure
- _____ Infrastructure conducive to value added services
- _____ Value-Added and shared services such as storage, onsite customs, refueling ...etc.
- _____ Additional onsite services (office space, recreational space, retail services)
- _____ Communication infrastructure
- _____ Access to knowledge such as collaborations with universities, training centers ...etc.

4 - Additional Services:

The questions bellow focus on value-added services in different flows of the supply chain.

A- Physical Flow

Approximate population within 500-km (300-mile) radius _____

Logistics Park occupancy Rate: _____ %

A.1- Please complete for the most important companies operating in your park:

	Company	Industry	Revenue percentage of your total revenue	Rent or Buy	Land, Office, or Warehouse	Labor Intensive, Yes or No	Value-Added services used
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

A.2- Labor:

- How would you rate availability of qualified labor in your region? (1 to 5; 1 = Most available, 5 = Least available) _____

How important is availability of qualified labor to your customers? (1 to 5; 1 = Most important, 5 = Least important) _____

- Is labor cost an important factor for your customers? (1 to 5; 1 = Most important, 5 = Least important) _____

A.3- Please describe any environmental initiatives at your logistics park, and rank their importance to your customers (1-5) _____

A.4- Please describe any security initiatives at your logistics park, and rank their importance to your customers (1-5) _____

B- Financial Flow

Annual Revenue of Park: \$ _____

B.1- Are you located within a special economic zone? Yes / No
If so, how important is it for your customers? (1 to 5; 1 = Most, 5 = Least) _____
What is the impact of that zone on your customers? _____

B.2- What economic agreements do you have with local governments that assist in park operations (Please rank the agreements importance)? _____

B.3- What government tax incentives are available to your customers? _____

B.4- Any other government financial incentives that are available for your customers? _____

C- Information and Knowledge Flows

C.1- Do non-trading partners within your facility communicate? Yes / No
If yes, for what reasons? _____

C.2- To your knowledge, do companies in the park share knowledge about best practices? Yes / No
Please describe any collaboration between companies within the park to share resources such as reserved storage space, shared transportation infrastructure, and training facilities: _____

C.3- How does the park facilitate this communication? _____

C.4- What communication technologies are installed in the park and available for company use? _____

C.5- Do you train or advise companies of local customs procedures? Yes / No
Please list any partnerships with logistics research centers, universities, and associations? _____

D- Other Value-Added services

D.1- Was your logistics park built for a particular industry? Yes / No
- If yes, please specify industry: _____
- What is the reason for choosing this industry? _____

D.2- Please rank ease of doing business in your region (1: easy- 5: complex) _____

How important is this ease of doing business to your clients? (1: very- 5: not important) _____

D.3- Please complete the following matrix based on the Value-added services you offer:

Value-Added service	Number of Companies using service	Approximate revenue generated from this service in (\$) or %	How important is the service to the company 1:most, 5:least	Are companies likely to operate at your park because of this service 1:most, 5:least	How do you support the service
Postponement / Finish					
Customization					
Reverse Logistics / Return Mgmt					
Assembly / Test and Repair					
Quality Control / Inspection					
Material Management					
Consolidation / Deconsolidation					
Cross Docking					
Customs clearing					
Financial Institutions within park					
Regional Business Training					
Container & Packages Traceability					
Business Expertise					
Business Document Preparation					
Other					

D.4- Please list any additional value-added services that you offer companies located within your facility: _____

D.5- Are there any additional benefits or unique characteristics to logistics parks that you would like to share? _____