Strategies of the Long-term Industry Development in Central Taiwan Science Park

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***Abstract*--This paper aims to explore the long-term industry development strategies of Central Taiwan Science Park (CTSP). To upgrade the technology industry in Taiwan, CTSP provides strong foundation for high tech company to enter and formulate the clusters, formulating the nature advantages and bringing the regional competitiveness.**

Cluster effect strengthens the overall development of Science Park, especially connects the related industry and support the combination of internet. As for Central Taiwan Science Park, it has optoelectronics, precision machinery and integrated circuits.

By evaluating the movement of industry trends, the research benefits the study to the cooperation and competiveness relations of Hsinchu Science Park, Southern Taiwan Science Park and Central Taiwan Science Park.

I. INTRODUCTION

The Science park to facilitate balanced regional developments throughout Taiwan and to respond to the industrial advancement and economic boom in central Taiwan, the Executive Yuan approved the preparation proposal for the Taichung and Yunlin sites of Central Taiwan Science Park on September 23, 2002. As of the end of December, 2013, overall planning and development is nearly in nits tenth year. A total of 157 manufacturers have been approved to establish a presence at CTSP, generating a planned investment value in excess of NT$ 2 trillion. Thereafter, 117 manufacturers completed their company and facility registration and became operational.

Thanks to fast-paced and prosperous development, the CTSP industrial cluster will team up with Hsinchu Science Park and Southern Taiwan Science Park and, through synergistic effort, successfully transform Taiwan into an island of high technology and help Taiwan become well known and respected throughout the world.

Science Park is greatly regarded as an important policy instrument to stimulate economic development. How to plan a good regional industry strategy for a science park to implement is still the issue needed to be discussed. So, the paper by making a case study of Central Science Park seeks to investigate the role of science park in the boarder economic development context such as attracting inward investment or providing support for the formation and growth of local firms. Also, this science park is at its infancy phase and begins to attract tenants or inward investment aggressively from this year. The paper will explore the process how Central Science Park identify its industrial strategy to foster regional economy growth in the future, and what it intends to do for achieving its commitment to regional development.

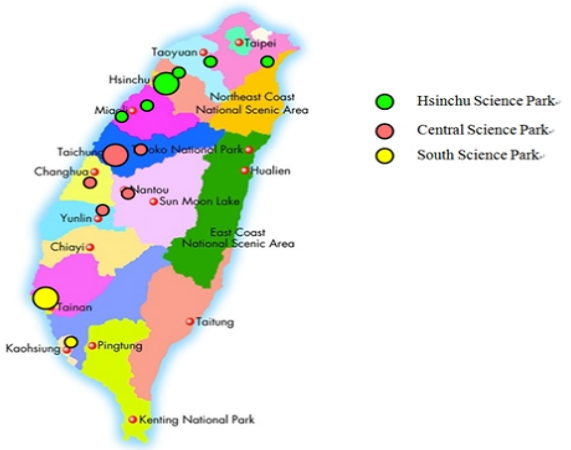

Figure 1:Three Science parks in Taiwan

II. LITERATURE REVIEW

The literatures related to this paper can be divided into three parts: (1) the economies of scale (2) an industry cluster, and (3). innovation and entrepreneurship. These are discussed below.

A. An Overview of the Economies of scale

Krugman [4] believe that vendors in order to achieve economies of scale, minimize transportation costs, manufacturing firms tend to have a greater market demand settled in the area , or to be close to the Commodity Production and Marketing Activity.

Krugman [4] claims that the study of economic outcomes across space and helists "familiar examples of localization" in the United States, including Silicon Valley, Route 128, and North Carolina's Research Triangle as high tech centers, Hartford as an insurance city, Chicago as the center of futures trading, and Los Angeles as the entertainment capital.

Marshall's exposition of external economies applied to industry localization (other reasons for concentration). He summed up the industry gathered for three reasons:

The first, pooled market for workers with specific skills, the second, none-tradable specialized inputs, the third, Informational spillovers across.

Even casual observers, however, know that a large number of industrial clusters both inside and outside the United States look quite different from these "familiar examples." In developing countries, there are rapidly growing clusters, declining clusters, and traditional and still active clusters, but the majority are what Altenburg and Mayer Stamer [6, p.1695] call "survival clusters of micro and small-scale enterprises which produce low-quality consumer

goods for local markets".

While almost all clusters were formed spontaneously due to localization economies, their performances vary considerably in growth, productivity, product quality, profitability, employment sizes, and wage levels.

The term business cluster, also known as an industry cluster, was introduced and popularized by Michael Porter in The Competitive Advantage of nations [3]. The importance of economic geography, or more correctly geographical economics, was also brought to attention by Paul Krugman in Geography and Trade [4]. Cluster development has since become a focus for many government programs. The underlying concept, which economists have referred to as agglomeration economies, dates back to 1890, and the work of Alfred Marshall.

Michael Porter claims that clusters have the potential to affect competition in three ways: by increasing the productivity of the companies in the cluster, by driving innovation in the field, and by stimulating new businesses in the field. According to Porter, in the modern global economy, comparative advantage—how certain locations have special endowments (i.e., harbor, cheap labor) to overcome heavy input costs—is less relevant. Now, competitive advantage—how companies make productive use of inputs, requiring continual innovation—is more important[2] .

President and Chief Executive Officer, Dr. Curtis R. Carlson is known for a term known as "Carlson's Law", coined by New York Times columnist Thomas Friedman to describe Carlson's balance between autocracy and democracy in an organization: "In a world where so many people now have access to education and cheap tools of innovation, innovation that happens from the bottom up tends to be chaotic but smart. Innovation that happens from the top down tends to be orderly but dumb. Carlson (2013) made a keynote speech titled "Challenges and Opportunities for Taiwan in the Innovation Economy" in Taiwan (show in the Table 1,2 & Figure 1).

TABLE-1: INNOVATION ECONOMY

Innovation Economy	
Type of Innovation Economy	**Example**
● Driving Force for Innovation Economy	✓ Rapid Development of Technology （ex: Moore's Law ） ✓ Surge of Emerging Market ✓ Intensive Global Competiveness
● Opportunity for Innovation Economy	✓ Rapid Industry Change：Shorten Life-cycle, Withdraw from Market (RCA, Bell Lab), Operation Crisis (Kodak)、New Ventures (Google, Facebook…)，Driving Transformation(IBM, HP)…
	✓ Endless Business Opportunity: Web 2.0, Web 3.0 software, cloud ware, consumer internet, wireless communication, clean energy etc.

Source: Challenges and Opportunities for Taiwan in the Innovation Economy, Curtis R. Carlson, August 6, 2013

TABLE-2: **ECOSYSTEM OF INNOVATION**

Requirements for Innovation	
Type of Innovation Economy	**Example**
● **A Complete Ecosystem for Innovation Contains <u>Four Elements</u>**	✓ Government, ✓ Education, ✓ Talent and ✓ Ventures
● **Plus a Comprehensive Plan**	✓ ***Success****= a comprehensive <u>plan</u> that is implemented*

Source: Challenges and Opportunities for Taiwan in the Innovation Economy, Curtis R. Carlson, August 6, 2013

Figure 1: **Ecosystem of Innovation**
Source: Challenges and Opportunities for Taiwan in the Innovation Economy, Curtis R. Carlson, August 6, 2013

Put in another way, a business cluster is a geographical location where enough resources and competences amass reach a critical threshold, giving it a key position in a given economic branch of activity, and with a decisive sustainable competitive advantage over other places, or even a world supremacy in that field (e.g. Silicon Valley and Hollywood).

As of the end of 2012 in CTSP, a total of 39 manufacturers in the optoelectronics industry had been introduced, with the planned investment value to be NT$908.4 billion, including benchmark enterprises such as AUO, TSMC Solar, Taiwan Corning, Taiwan Nitto Optical, JSR Micro Taiwan, Huga Optotech, High Power OPTO, NexPower Technology, Big Sun Energy, Genius Electronic Optical, and Taiwan Ohara Optical. As these domestic and international heavyweight optoelectronics manufacturers and upstream material suppliers establish their presence at CTSP, the complete upstream, midstream, and downstream optoelectronics industrial chain has steadily taken shape.

In addition, precision machinery has always been a key industry for CTSP and also the industry with the most manufacturers introduced to the Park at present, 48 manufacturers in total. The investment value is expected to be NT$45.13 billion. The manufacturers are heavyweights in the production of optoelectronics and integrated circuit machinery and equipment, parts, and machine tools. They can help improve product processing precision and accordingly the additional value of the final product. n addition, the advantageous location favors supply of production equipment to the optoelectronics and IC industries to greatly reduce production cost and significantly increase competitive advantages, contributing to the formation of the world's topnotch precision machinery cluster.

As for the IC industry, there are currently 7 companies already based in the Park, including TSMC, Winbond,

Rexchip, SPIL, Dainippon Screen, and Applied Materials, accounting for as much as NT$1.095 trillion in planned investment. Among these manufacturers, a total of 6 Fab 12 plants from TSMC, Winbond, and Rexchip have already been commissioned for mass production while another 2 Fab 12 plants are currently under construction. TSMC will continue to further expand its Fab 12 and Fab 18 plants in the future and enhance its production technology and capabilities. CTSP is well-positioned to become the world's next leading IC hub.

In terms of the biotech industry, there are a total of 21 companies, including Adimmune Corporation, Microware Precision, GeneReach, Singen Animal Health, Orient Pharma, and Yushen Biotechnology, that plan to invest up to NT$5.42 billion in products including vaccines, pharmaceuticals, medical devices, and diagnostics reagents. They will help consolidate biotech manufacturers in central Taiwan and drive the formation of a biotech industrial cluster.

In addition, to substantially support the operation, management and technological requirements of the scientific industry, there are currently 10 utilities companies based at CTSP. For gas supplies, there are the Air Liquide Far Eastern, UIGC, Air Products San Fu, and Lien Hwa Commonwealth, 4 companies in total. As far as warehousing and logistics are concerned, there is the Central Taiwan Science Park Logistics Co., Ltd. Canon Semiconductor also established its presence in CTSP to provide IC and flat panel display manufacturers with manufacturing equipment maintenance and service. Sungen Power Corp. also has a presence in CTSP, and engages in solar power generation.

In terms of the computers and peripherals industry, there are currently 13 manufacturers, including Fomex Technology, Fulltech Fiber Glass, Bolymin, Jinco, Daiwoo, and Bigbest Solutions. For the telecommunications and digital content industries, there are the INPAQ and Info-Link Services.

C. An Overview of innovation and entrepreneurship

Innovation and Entrepreneurship by the 1980s, one of America's trademark fields, heavy industry, had been losing ground for at least two decades. Further, deregulation had gained momentum in the late 1970s, and by 1980, President Carter began deregulating industries from trucking to airlines to railroads. All combined, the external environment demanded that American management shift its thinking toward a more innovative, entrepreneurial approach to business.

Halfway through the 1980s, three fourths of America's 113 million workers earned their living providing services and establishing what would soon become known as the service industry. By the end of the 80s, entrepreneurship had taken off, and American managers were finally getting comfortable having shifted their focus from products to processes and from quantity to quality. It wasn't just happening in America. All across the world industries were undergoing transformation, which forced companies to begin laying the foundation for a new breed of innovation.

Peter Drucker's 1985 book to present innovation and entrepreneurship as a purposeful and systematic discipline that explains and analyzes the challenges and opportunities of America's new entrepreneurial economy. Superbly practical, Innovation and Entrepreneurship explains what established businesses, public service institutions, and new ventures need to know and do to succeed in today's economy.

Right in the thick of the decade's advances, Drucker's 1985 book on innovation and entrepreneurship championed "specifically entrepreneurial" strategies that Drucker described as important, distinct and different. They were aimed at breaking down the barriers to change that often discouraged CEOs. Resistance to change was a company's worst enemy in the 1980s, yet change was becoming increasingly unavoidable.

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Looking into the tenth year, we are expecting a "new" CTSP. "New" here is a synonym of "innovative". The current focus in the business circle is to constantly innovate in order to create high return for companies. As such, the operational strategies of CTSP will also shift from being efficiency-oriented to being innovation-oriented. We will take advantage of the superior industrial foundation laid in the past to transform industries to focus on technological innovation, help them break through by creating new niche for the technology industry, and enable steady developments of both science and technology to accordingly keep Taiwan competitive in terms of technological prowess, gradually realize the vision of "Highly Productive Taiwan, work together with the National Science Council to gradually realize the vision of "A Highly Productive Taiwan, Highest Leverage in the World", and create new opportunities for industries and the economy.

In the past, the Science Park is focus on efficiency. Facing with the competiveness from China and Korea, we will continue to keep progress in innovation and entrepreneurship.

III. METHODOLOGY

This study is based on the results from three phases of research studies for the of industry development strategies carried out by using the secondary data analysis method.

According to the research goals stated above, we want to find all relevant materials across the whole project scope as long as they are collected from unbiased sources. This study includes the following three research phases.

Phase I: A Critical Review of Investment Environment

This section offers a critical review of extant research on Investment Environment Creation. The purposes of this article are to use the secondary data analysis to summarize

information about the relationship between investment environment and subjective well-being and to assess the strengths and weaknesses of the secondary data analysis as a mode of research synthesis.

CTSP try to build a better quality investment environment in five science park basesin order to successfully attract international companies' investment(show in figure 2).

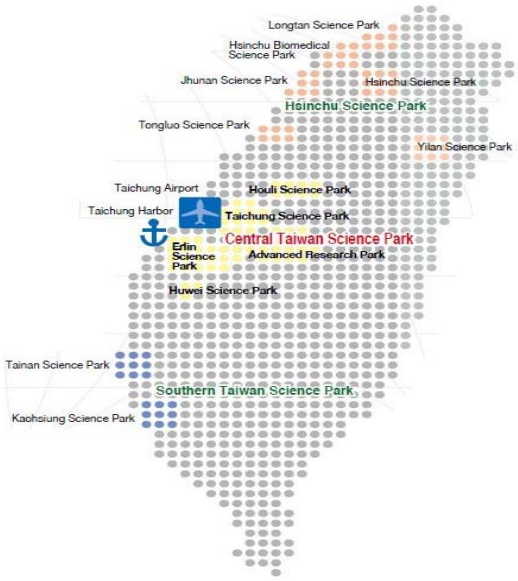

Figure 2: The Central Science park in Taiwan

After the successful introduction of international magnates such as TSMC, upstream, mid-stream, and downstream manufacturers and foreign companies have actively followed suit to establish their presence, resulting in the current shortage of land at CTSP. Besides the existing Taichung Park of 466 hectares, Huwei Park of 97 hectares, and Houli Park of 255 hectares, the Erlin Park of 631 hectares whose construction is ongoing and the Zhongxing New Village Advanced Research Park of 259 hectares whose construction began in 2011 will all be included as the hinterland of CTSP. The overall area of development will reach around 1,708 hectares.

The Public Facilities in CTSP emphasis on quality and quantity of power and water supplies are excellent at the CTSP's Taichung Park of the CTSP. Such as an administrative management and a business center, a residential area, electric power telecom line facilities, detention ponds, wastewater processing facilities, parking lots, a scenic park greenbelt, roads and traffic facilities, etc. It is expected to provide not only a pleasant working environment for all personnel, but also a good place for the public to spend their leisure time.

1. Taichung Park: A New Center to Prosper in Central Taiwan

Taichung Park is located on the border between Daya District and Xitun District of Taichung City, with an area of 466 hectares and a highway system connecting Freeway 1, Freeway 3, and Taichung-Changhua Expressway. It is 9.2 km from the Wurih Station of Taiwan High Speed Rail and adjacent to the Port of Taichung and Qingquangang Airport, with convenient air, sea, and land transportation access. The overall core planning for the park featured the dual track of "sustainable development" and "preservation of local look" for its adequate location, favorable climate, and adjacent urban functions, among other environmental advantages to create a green park that attracts the technology industry and talent for permanent settlement.

1). Standardized Facilities:
There are employee cafeterias and Mega International Commercial Bank to offer dining and financial services.

2). Business Services Building:
In order to provide manufacturers and employees at CTSP with various business services, the Administration has introduced related service providers as follows:

There are currently banks, CTSP employee clinic, employment service center, post office, transfer station, Convenience Store, among others, available on the first floor of the building. The CTSP employee clinic is organized by the China Medical University Hospital medical team and offers employees at CTSP and residents in adjacent villages and neighborhoods with quality healthcare services featuring both western medicine and traditional Chinese medicine. The employment service center is in charge of finding outstanding employees for CTSP and plays a crucial role in driving corporate growth and industrial developments. The transfer station offers transfer and shuttle services among the Taiwan High Speed Rail Station, Xitun residential district, the Houli Science Park, and National Experimental High School at Central Taiwan Science Park. The post office is like any other post office. It has mail boxes for rent and other functions such savings, withdrawal, and passbook entry, ATM, mail pickup, sales of freeway toll tickets, and various commodities, etc. The 0.02 Convenience Store on the other hand, sell daily necessities and provide shopping and dining services.

2. Huwei Park: Up-and-Coming Technological Center

The Huwei Park is located in the northwest of Huwei Township of Yunlin County and spans 97 hectares in area. The adjacent area on its eastern side is designated for a Taiwan High Speed Rail station that is expected to be completed in July 2015. With the Taiwan High Speed Rail community, it will be able to quickly develop into a green park and community that is both healthy and functional in the future. Its industrial strength is expected to be splendid and promising.

3. Houli Park:Technology Town of Tomorrow

The Houli Park is located in Houli District of Taichung City. It is about 11 km from the Taichung Park and close to the Fengyuan commercial district. Among the total area of 255 hectares, 148 hectares are meant to be used for industries only. Generally speaking, Houli and Qixin are the two

primary sites. They are located on the south and north sides of the urban planning area in Houli District. They target primarily manufacturers in the photovoltaic industry in order to integrate local industrial resources in Houli District and create economic prosperity.

4.Erlin Park:Transforming Hub for Precision Machinery Industry

The Erlin Park is located in Erlin Township of Changhua County, around 6.3 km to the west of the Yuanlin Interchange of Freeway 1. The site encompasses the Wanxing Farm and Dapaisha Farm of Taiwan Sugar and spans 631 hectares in area. The area assigned exclusively to park utilities consists 350 hectares. The park primarily targets the precision machinery industry.

5. Advanced Research Park:Research and Development Engine for Taiwan

The Advanced Research Park is located in the northwest of Nantou County, four km from Caotun and six km from Nantou City. It is part of the urban planning area for Zhongxing New Village (including Nanneilu) in Nantou County. The total area of the park is 259 hectares. In addition to existing administration-oriented operations, the park primarily focuses on the cultural creative industry and high-tech research and development.

Phase II: A Critical Review of Public Services

This section offers a critical review of extant research on public services quality. The purposes of this article are to use the secondary data analysis to summarize information about the relationship between public services quality and subjective well-being and to assess the strengths and weaknesses of the secondary data analysis as a mode of research synthesis.

The CTSP Administration is the authority responsible for Park construction and administration. In order to consolidate one stop window services and enhance administrative efficiency for applications submitted by manufacturers, the Administration proactively engaged itself in obtaining authorization in handling multiple services that help expedite business registrations. Business services that are currently available include company and manufacturing facility registration, tax deduction, personal property endorsement, employment permit for foreign professionals, online completion and submission of annual statements, and regulatory counseling.

1. One-Stop Service:

The One-Stop Service aims to simplify and integrate the service flow in administration for the CTSP enterprises. It includes investment recruitment, labor administration, business service, environmental protection, security protection, etc. CTSP also continues to invite various services to set up their offices in the Park to satisfy industrial and commercial service, such as customs, power, telecommunication companies, post office, banks, park associations, employment service center,customs brokers, and Central Taiwan Science Park Logistics Co., Ltd.etc. The Central Taiwan Science Park Logistics Co. offers warehousing, import/export pallets, customs, and transport services along with integrative logistics planning, etc.

Most enterprises currently based at CTSP are high-tech manufacturers whose throughput is constantly changing and innovating. In order to increase environmental protection permit documentation efficiency, the Administration offers one-stop window services in the review of fixed pollutants, water pollution sources, and waste clearing protocols. This helps manufacturers complete submission of documents, review, and regulatory counseling at one stop too.

2. E-Park Information Infrastructure and Service:

In order to boost the efficacy in promoting CTSP to the outside world to facilitate expanded operations and provide more convenient public services, the Administration took extra care to introduce various public facilities at CTSP such as a transportation map on the official CTSP website, interactive 3D office building guided tour, bike trails, and free park-wide shuttle bus. Meanwhile, email is available to facilitate real-time petitions and suggestions / communication from the general public.

For the purpose to satisfy innovation requirements of people and enterprises here, the Administration not only expanded various equipment -- such as related hardware servers and enhanced system backup mechanisms -- but also utilized modern information technology to realize real-time online interactive operations. Meanwhile, we continue to promote e-administration and operations for the ultimate goal of making CTSP a quality science park with rich information flows and sustainable management in the high-tech industry.

Important and substantial accomplishments in terms of information for the past few years include the complete deployment of the ADSL broadband network among the three park areas in Taichung, Huwei, and Houli, i-Taiwan in public areas for ordinary users, and WIMAX jointly configured by the Taichung Science Park and the Institute for Information Industry. Meanwhile, a fee-saving mechanism for landline telephones and mobile phones has been adopted to cut down on telecommunications costs In addition to the original FTTB and the exclusive line for external networks, the Administration added the national high-speed network exclusive line. It is meant to enhance the bandwidth of the Administration's external network and the backup safety mechanism.

Moreover, to help manufacturers complete related applications, streamline administrative procedures, and enhance the administrative efficiency, the Citizen Digital Certificate and Industry and Commerce Certificate are introduced to further perfect the online declaration process and make it even safer.

In response to the National Science Council's effort to expedite restoration of information at its affiliate agencies, we

planned integration of information among individual park areas by promoting the online integrated official document management system, paperless online sign-off operation, and client-end common information system among the National Science Council and the three park areas. The shared information resources are meant to enhance service quality and also contribute to environmental protection.

3. Emphasizing Service Quality for Enhanced Satisfaction with CTSP-based Manufacturers:

In order to have fair, objective, and consistent rating indicators with regard to the service quality of individual park administrations (at Hsinchu Science Park, Central Taiwan Science Park, and Southern Taiwan Science Park) and urge the administrations to pay attention to satisfaction among people they serve for the ultimate goal of improving service quality, the National Science Council authorizes a professional survey company each year to perform the satisfaction survey. In 2012, the survey company completed a survey of 86 manufacturers at CTSP which included on-site visits and interviews. In addition, the Administration also inspected manufacturers when their facilities became operational, including proactive visits to manufacturers already based at CTSP. We visited a total of 93 manufacturers in 2012. In addition to understanding the individual needs of the manufacturers in depth and providing them with related assistance and services, we also held instructive sessions which detailed CTSP's operations. We provided immediate responses to questions posed by participating manufacturers and followed up on subsequent developments in order to enhance the overall satisfaction level of manufacturers based at CTSP.

Phase III: Shaping industry clusters

The purposes of this article are to use the secondary data analysis to figure out that Industry clusters involving tight connections that bind supply chain firms and industries together in various aspects of demand inquiry, geographic location, sources of innovation, shared suppliers and factors of production, and so forth.

The CTSP has been shaped by the six major industry clusters, including IC, Optoelectronics, Computers & peripherals, Precision machinery, Biotechnology and Other industries. (Table 4 exhibits the 2013 Top Six Industrial Export Trade Statistic).

1. The IC industry:

As for the IC industry, there are currently seven companies already based in the Park, including TSMC, Winbond, Rexchip, SPIL, Dainippon Screen, and Applied Materials, accounting for as much as NT$1.095 trillion in planned investment. Among these manufacturers, a total of six Fab 12 plants from TSMC, Winbond, and Rexchip have already been commissioned for mass production while another two Fab 12 plants are currently under construction. TSMC will continue to further expand its Fab 12 and Fab 18 plants in the future and enhance its production technology and capabilities. CTSP is well-positioned to become the world's next leading IC hub.

2. The Optoelectronics industry:

As of the end of 2013, a total of 39 manufacturers in the photovoltaic industry had been introduced, with the planned investment value to be NT$908.4 billion, including benchmark enterprises such as AUO, TSMC Solar, Corning Taiwan, Taiwan Nitto Optical, JMW, HugaOptotech, HPO, NexPower, Big Sun Energy, Genius Electronic Optical, and Ohara Taiwan. As these domestic and international heavyweight photovoltaic manufacturers and upstream material suppliers establish their presence at CTSP, the complete upstream, midstream, and downstream photovoltaic industrial chain has steadily taken shape.

3. Computers & peripherals

In terms of the computers and peripherals industry, there are currently 13 manufacturers, including Fomex Technology, Fulltech Fiber Glass, Bolymin, Jinco, Daiwoo, and Bigbest Solutions. For the telecommunications and digital content industries, there are the INPAQ and Info-Link Services.

4. The precision machinery industry:

In addition, precision machinery has always been a key industry for CTSP and also the industry with the most manufacturers introduced to the Park at present, 48 manufacturers in total. The investment value is expected to be NT$45.13 billion. The manufacturers are heavyweights in the production of photovoltaic and integrated circuit machinery and equipment, parts, and machine tools. They can help improve product processing precision and accordingly the

TABLE-4:2013 TOP SIX INDUSTRIAL EXPORT TRADE STATISTICS

Industry	Export volume		Import volume		Gross trade volume	
	2013	Growth rate (%)	2012	Growth rate (%)	2013	Growth rate (%)
IC	332.2	10.53	1,453.16	131.39	1,785.36	92.27
Optoelectronics	1,672.04	10.12	491.47	-11.68	2,163.51	4.27
Computers & peripherals	11.62	2.38	6.32	-50.48	17.94	-25.59
Precision machinery	60.46	0.92	17.35	-25.57	77.81	-6.50
Biotechnology	1.03	6.54	1.63	272.63	2.66	89.61
Other	2.39	283.40	4.90	-50.89	7.29	-31.33
Total	2,079.74	9.93	1,974.83	60.43	4,054.57	29.84

additional value of the final product. In addition, the advantageous location favors supply of production equipment to the photovoltaic and IC industries to greatly reduce production cost and significantly increase competitive advantages, contributing to the formation of the world's topnotch precision machinery cluster.

5. The biotech industry:

In terms of the biotech industry, there are a total of 21 companies, including ADImmune Corporation, Microware Precision, GeneReach, Shin-Yuan Chemical & Pharmaceutical, Orient Pharma, and Yusheng Pharmaceutical, that plan to invest up to NT$5.42 billion in products including vaccines, pharmaceuticals, medical devices, and diagnostics reagents. They will help consolidate biotech manufacturers in central Taiwan and drive the formation of a biotech industrial cluster.

6. Other

In addition, to substantially support the operation, management and technological requirements of the scientific industry, there are currently ten utilities companies based at CTSP. For gas supplies, there are the Air Liquide Far Eastern, UIGC, Air Products San Fu, and Lienguo Medical Gas, four companies in total. As far as warehousing and logistics are concerned, there is the Central Taiwan Science Park Logistics Co., Ltd. Canon Semiconductor also established its presence in CTSP to provide IC and flat panel display manufacturers with manufacturing equipment maintenance and service. Sungen Power Corp. also has a presence in CTSP, and engages in solar power generation.

IV. FUTURE TRENDS

A vision for the Future of Transforming and Innovative Spearheading and Pace-setting.

In the past, the Science Park is focus on efficiency. Facing with the competiveness from China and Korea, we will continue to keep progress in innovation and entrepreneurship, transforming and innovative spearheading and pace-setting in the near future.

In addition, Internationalization and enhanced international influence have been two of the goals that the Administration has proactively devoted itself to over the course of developing the CTSP. To accomplish these goals, the Administration has been proactively promoting collaboration between domestic and international manufacturers, conducting visits and exchanges, recruiting international businesses, and seeking accession to world-class science park organizations and associations. The hope is to expedite the upgrade of industries in CTSP and help it become one of the international science parks through technical collaboration and transfer, both domestically and internationally.

Now the Administration of CTSP assisting young and start-up high technology companies with their business plans access to finance and helping them to overcome general business and growth problems as they arisen.

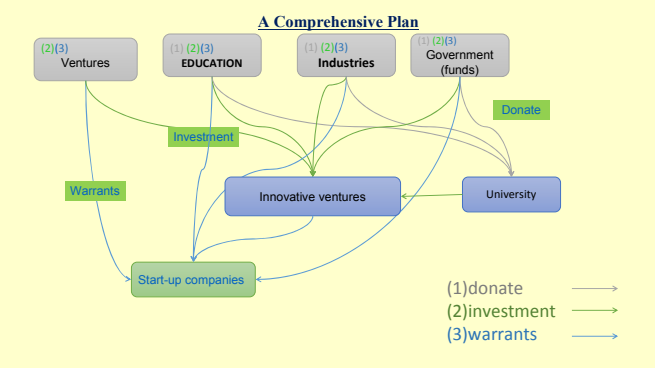

Figure 3: A Comprehensive Plan

B. A Vision for the Future of Park Transformation for New Heights

In early 2012, the photovoltaic industry experienced changes, and the Kuokuang Petrochemical Project was canceled. Both of these events impacted the Dadu Weir development plan. Long-term water supplies for the Erlin park also suffered significant changes. As such, the Executive Yuan instructed on the organization of and preparations for modifications to the development plan for the Erlin park on April 18. The revised protocol was approved on July 13. Having taken into consideration the overall environmental changes, local prosperity, industrial needs, and friendliness to the environment, the transformational plan re-tailored the Erlin park into a green science park that features minimum water consumption and reduced emissions, and serves as an important hub for the precision machinery industry. This will help realize the vision of having an industrial innovation corridor that connects Taichung, Changhua, and Nantou.

C. A Vision for the Future of CTSP Halo Endless Prosperity

2013 marks the tenth anniversary of CTSP. Over the past nine years, five sites, Taichung, Huwei, Houli, Erlin, and the Advanced Research Park were developed one after another, with the total area coming to 1,708 hectares. There are currently 140 high-tech manufacturers based in CTSP. The planned investment value is NT$2056.4 billion. They offer nearly 29,000 job openings. Besides the said quantitative results, CTSP has also become a quality leader in high-tech developments in central Taiwan. It is playing an important role in industrial transformation and upgrade.

2013 is positioned to be the business recruitment year for the Erlin Science Park of CTSP. The science park's transformation plan was approved by the Executive Yuan last year and will be developed to feature low water consumption and low emission industries. Its environmental impact assessment results were deliberated and approved by the Environmental Protection Administration on February 04. The water issue has also been resolved. It will be an optimal

site for domestic and international high-tech manufacturers. 2013 will be a fruitful year in terms of business recruitment. On the other hand, besides introducing high-tech research and development, the Advanced Research Park will also feature the cultural creative industry. The CTSP Administration will promote the science park as a new cluster for cultural and creative industries in central Taiwan.

Ten years mark an important milestone. Looking into the tenth year, we are expecting a "new" CTSP. "New" here is a synonym of "innovative". The current focus in the business circle is to constantly innovate in order to create high return for companies. As such, the operational strategies of CTSP will also shift from being efficiency-oriented to being innovation-oriented. We will take advantage of the superior industrial foundation laid in the past to transform industries to focus on technological innovation, help them break through by creating new niche for the technology industry, and enable steady developments of both science and technology to accordingly keep Taiwan competitive in terms of technological prowess, gradually realize the vision of "Highly Productive Taiwan, work together with the National Science Council to gradually realize the vision of "A Highly Productive Taiwan, Highest Leverage in the World", and create new opportunities for industries and the economy.

V. CONCLUSION

The goal of this research was to carry out the prior strategy of government agencies devoted to domestic and international business recruitment efforts. It is active in searching for potential high-tech manufacturers and helps them understand the overall investment environment at CTSP so that they feel confident in making investments and establishing a presence.

In addition, the One-Stop Service aims to simplify and integrate the service flow in administration for the CTSP enterprises. the One-Stop Service development through the wider use of information technology and to offer guidelines for handling government affairs online in order to improve administrative efficiency and raise the quality of public service. Moreover, the findings of this research can help government agencies reform civil servants' operating procedures and re-engineer the handling of public business so as to take advantage of modern computer and network communications technology in the Science Park, in the view point on bring in the regional competitiveness, thereby making other local government agencies dramatically more flexible and responsive, accelerating service speed, extending service time, broadening geographical service scope, enriching service options, and lowering costs.

This paper figured out that although capital for property is the most visible cost, there is another important component of cost - the management of the Science Park. The management function involves:

- Securing resources for the development of the Science Park;
- Promoting the Science Park and identifying and securing the tenant companies;
- Providing the all important links between Tenant companies and University;
- Assisting young and start-up high technology companies with their business plans access to finance and helping them to overcome general business and growth problems as they arise;
- Management of the land and buildings on the Science Park;
- Planning the Science Park and its strategy and making investment decisions;

When the government first contemplates a Science Park, initial thoughts may centre on objectives and potential benefits, but it will not be long before thoughts are concentrated on how to resource the Science Park in terms of land, capital for infrastructure and buildings and ongoing revenue considerations. These financial considerations often determine the nature of the formal relationships in the creation of the Park.

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