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Exploring the Development Strategies of Science Parks Using the Hybrid MCDM Approach

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Abstract: Science parks contribute to a country's economic growth, promote industrial transformation, and meet the development needs of high-tech industries. They also play an essential role in enhancing technological development and competitiveness. Due to the impact of the fierce U.S.-China trade war on the global economy, many Taiwanese companies are considering moving their high-end product production lines back to their home country. This trend may promote the growth of the population in the surrounding areas of science parks and affect the limited infra-structure at the same time. This study explores how science parks could achieve sustainable development goals by formulating their development strategy. We summarized four evaluation aspects for constructing the driving factors for developing the science park through literature review and interviews with experts. Combined with the hybrid multiple-criteria decision-making (MCDM) approach, we analyzed stakeholders' satisfaction among the four aspects of the driving factors for the development of the science parks and put forward appropriate strategy recommendations. We found that the improvement of public infrastructure (PI) can improve not only the environmental quality (EQ) but also promote the business environment (BE) and the working environment (WE). This improvement could attract domestic and foreign manufacturers, create employment opportunities, expand the park's scale, and eventually promote industrial development. This research improves the method of collecting empirical data to establish the driving forces for developing science parks through suitable development strategies.

Keywords: science park; Taiwan; Hybrid MCDM; DEMATEL; VIKOR

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1. Introduction

Industrial clusters were found to improve industrial growth and competitiveness. Expanding the scale of economies in the industrial cluster and encouraging the acquired knowledge formation process can further enhance the strength of local industries, enrich the corresponding knowledge base, and promote national economic development [1]. The success of Silicon Valley in the United States has motivated many developing countries to consider establishing their science parks. For example, Hsinchu Science Park (HSP) in Taiwan, with over 40 years of development, has become one of the country's most important large-scale science parks. Being dominated by high-tech industries and adjacent to important academic and research institutions such as National Yang Ming Chiao Tung University, National Tsing Hua University, the Industrial Technology Research Institute, National Applied Research Laboratories, and other industries surrounding Hsinchu Science Park have attracted residents from all over the world and manufacturers of high-tech industries to move in, settle, receive the benefits of industrial clusters, and promote industrial and economic development. The establishment of science parks enables Taiwan to sustain high-tech industrial clusters and an industrial development environment [2].

However, the factors affecting the development of science parks are extremely complex, and whether science parks are sustainable has recently received widespread attention.

Researchers have found that the critical factors influencing the efficiency of the regional innovation system are the industrial cluster effect, knowledge infrastructure, company partnerships, technology, and the implementation of regional innovation policies, evaluated by using the AHP method. The industrial cluster effect is the most critical operating factor of the regional innovation system of Taiwan's science parks [3]. Under the trend of fierce global competition, industrial clusters have been identified as an essential strategy for maintaining the sustainable development of regional industries. Enterprises in the cluster area can promote mutual support and learn through enterprise clusters. The development of industrial clusters attracts and drives many intermediary service organizations and institutions that provide R&D, technical support, and an innovation incubation platform. Meanwhile, the enormous contribution of industrial clusters is to transform labor-intensive industries into talent-intensive industries [4].

In recent years, the impact of the U.S.–China trade war and the upsurge of returning home have also led to rapid population growth in the surrounding areas of science parks, and the infrastructure will be insufficient due to the large population growth. If the overall environmental planning is ignored, it will affect the sustainable development of settlements [5,6]. Lin and Tzeng [7] used DEMATEL to evaluate the four dimensions of different industrial clusters in Taiwan's Neihu Science Park and Hsinchu Science Park: human resources, technical resources, investment environment, and market development, and proposed a development strategy. However, previous studies have not discussed stakeholders. Therefore, this research attempts to add in stakeholders from the perspective of economics. Taking Hsinchu Science Park as an example, after reviewing the literature and interviewing experts, we summarize the four evaluation aspects, namely public infrastructure, environmental quality, business environment, and working environment, to find out the driving factors for the development of science parks.

We use Decision-Making Trial and Evaluation Laboratory (DEMATEL) to solve the interinfluence relationship between aspects and, through principal component analysis, (PCA) classify the aspects according to their attributes. The relationship between the aspect and the component weights is evaluated by the Analytic Network Process (ANP). Finally, the VIKOR (Vlsekriterijumska Optimizacija I Kompromisno Resenje) method is used to analyze the competitive state of the factors in the science park and propose ways to improve their development.

This research will not only help the science park to review the plans for stakeholders (regulators, investors, occupants, and workers) and formulate appropriate sustainable development strategies but may also help the government in formulating and planning related policies to implement sustainable development strategies of science parks following local conditions.

2. The Driving Factors of Science Park

To improve the development of science parks, good governance, policies, and overall planning are needed, and local companies and residents are also required to participate [8]. The establishment of a science park can strengthen the connection between nearby companies and universities [9], which serves an important role in promoting economic development. In the past, most research on regional economic development centered on economic activities, society, politics, management models, and planning. The intensive relationship between residential quality and the environment for regional economic development was explored, with particular emphasis on public construction [10]. A more strategic approach is necessary to plan infrastructure in the United Kingdom and other advanced countries. The UK Infrastructure Transitions Research Consortium unifies key infrastructure aspects, such as energy, transportation, and communications, and evaluates their interdependence for planning [11].

According to the literature, this study summarizes the four major aspects of the development driving forces of the science park: Public Infrastructure (PI), Environment Quality (EQ), Business Environment (BE), and Working Environment (WE).

2.1. Public Infrastructure (PI)

Transportation infrastructure is important for stimulating demand and economic prosperity and is indispensable for the lives of urban residents, the efficiency of service providers, and the country's development. However, access to basic infrastructure services varies by region in many developing countries. A study of the distribution of economic and political conditions in the provinces of Turkey (population density, population size, income, and political participation), along with the quality of the sewerage and waste treatment systems, has shown that where there are good economic and political conditions, the accessibility to infrastructure services is also better [12]. With the goal of economic growth and environmental protection, there is a mechanism to explore the impact of transportation infrastructure and industrial agglomeration on China's industrial energy efficiency. The study's data source was based on 30 provinces in China from 2000 to 2017. The research results showed that the development of transportation infrastructure is closely related to the excessive energy consumption of industrial clusters. In addition to directly affecting energy efficiency, transportation infrastructure will also have indirect effects through industrial agglomeration. These findings demonstrate that developing transport networks and finding synergies between the transport infrastructure and industrial scale are important [13].

In addition to increasing the attractiveness of the environment, a good technology industry settlement plan requires the development of a diversified leisure infrastructure to weigh the connections between stakeholders. Moreover, the construction of the information network impacts the innovation effect of the technology industry clusters; especially when the COVID-19 epidemic affects the global situation, network information is more important. The higher network density of regional entrepreneurs allows companies to share risks better and helps suppliers and customers play a role in stabilizing the supply chain, reducing susceptibility to transportation bottlenecks and fluctuations in the market demand [14]. Building networks is governed by informal social norms and preferences in any organization. At the same time, experimental evidence and theory demonstrate that the individual cognitive status affects the choice of advisors in relational advisory networks in organizational settings. In the context of industrial clusters, the relationship network and the enterprise's inter-organizational network cooperate. Therefore, some scholars have used the Multilevel Exponential Random Graph Model (MERGM) to create a network of collaboration between companies and proposals between directors of knowledge-intensive technology clusters in Brazil. The research results show that the diversity of the network processed at each level is interdependent between the two levels but does not prevent the individual level from gaining some autonomy from the organizational level [15].

Regarding the Public Infrastructure (PI) aspect, it explains how the regulators of the science park increase the willingness of local living through infrastructure provision. This study summarizes four criteria, namely Transportation Infrastructure (PI1), Information Infrastructure (PI2), Sports and Leisure Infrastructure (PI3), and Basic Infrastructure (PI4). Transportation infrastructure provides users with more convenient transportation and commuting services. Information infrastructure provides users with more convenient information services. Sports and leisure infrastructure is to meet residents' needs for rest and exercise. Basic infrastructure refers to facilities such as water, electricity, oil, and gas in the science park to fulfill the basic needs of business operations (Table 1).

2.2. Environmental Quality

When industrial parks promote regional economic development, due to a large amount of resource consumption and intensive pollutant discharge, they also pose a massive threat to the natural environment. The development of the eco-industry, including clean production, exchange of biological products or waste, and infrastructure sharing, is crucial to improving the environmental quality and sustainability of the park. Therefore, their lousy influence on air quality has also become a controversial topic that attracts attention and needs to be examined. A study analyzing the effect of R&D funding and the operating performance on the air pollution index (PSI) of Hsinchu Science Park, which is a center for economic and social development in Taiwan, by using the Vector Auto Regression model (VAR), has indicated that R&D expenditures are significantly associated with operational efficiency and PSI. To improve air quality, the government should focus on environmental issues while managing science parks to achieve sustainable economic development [16].

Table 1. The description of the aspects/criteria of the strategy evaluation.

Aspect/Criteria	Description of the Criterion
Public Infrastructure (PI)	
Transportation Infrastructure	The comprehensive transportation construction in the science park can provide users with more convenient transportation and commuting services.
Information Infrastructure	The comprehensive information facilities in the science park can provide facility users with more convenient information services.
Sports and Leisure Infrastructure	The comprehensive sports and leisure facilities in the science park can meet the residents' need for rest.
Basic Infrastructure	The complete water, electricity, oil and gas facilities in the science park can meet the basic needs of business operations.
Environmental Quality (EQ)	
Living Quality	Science parks will attract many immigrants, often leading to improper additions and doubts about residential safety.
Rental Cost	Excessive rental costs in science parks often cause immigrants to deter the development of settlements.
Environmental Maintenance	The science park will attract many immigrants, which often causes local environmental pollution and affects the quality of housing.
Public Service	The provision of medical and educational facilities in the science park will help meet the needs of local public services.
Business Environment (BE)	
Tax Concessions	The implementation of preferential tax policies in the science park will help reduce the cost of investment firms to set up factories.
New Ventures	The abundant new venture investment in the science park helps to increase the willingness of manufacturers to invest and the demand for plant expansion.
Business Activities	Business activities in the science park will help drive regional economic development and attract immigrants.
Industrial Policies	The supporting industrial policies provided by the science park will help attract competitive manufacturers to invest.
Working Environment (WE)	
Employment Opportunities	The provision of high-quality and sufficient employment opportunities in the science park will help attract outstanding talents to invest in development.
Working Conditions	The high-quality working conditions in the science park will help attract outstanding talents to invest and stay long-term.
Living Function	The science park provides comprehensive life function services to meet the daily needs of workers.
Price Levels	The local price level in the science park will affect the workers' motivation for job hunting and their willingness to move.

Although science parks have a strong potential impact on businesses and regions, there is limited attention to the demand for services provided by science parks from enterprises in science parks. The rapid growth of the regional population has led to an increase in demand for land in the surrounding areas. Therefore, land ownership changes in specific rights, relationships, and systems creating trends around the city. The possibility of land-use conflicts can lead to violent disputes. Obviously, the asset value, rental costs, and land tenure have become one of the regional development factors [17]. A study of seven science park tenants in the Netherlands found that the science park attributes were associated with proximity benefits or real estate-related benefits derived from the literature on proximity and innovation in science park settings. Business-oriented companies will associate attribute science parks with additional benefits, such as access to customers and broader benefits, including image benefits, customer proximity, and other companies. Links between facilities and benefits sought by tenants may help practitioners strengthen the design and management and contribute to the growing science park literature in innovation management [18].

In addition, environmental quality (such as air, soil, water, noise, etc.) is a multivariate problem. When regulators want to upgrade the technology in the industry, they tend to overlook the quality of residents' living. Communities are responsible for a wide range of public services and represent a critical experiential context for social interactions among residents. However, local governance and public service delivery in creating social trust remain limited. A study discussed how the quality, efficiency, and equity of the local public service delivery are related to social trust by examining the relationship between membership-level indicators. Changes over time in the local government's quality and social trust were based on multilevel models in European cities. The findings indicated that growth in the quality of local public services (such as public spaces, sports and recreation facilities, streets, buildings, etc.) is very important and is substantially related to increased social trust [19].

Regarding the Environmental Quality (EQ) aspect, it emphasizes the maintenance of the quality of life in the science park, which impacts the residents. This study summarizes four criteria, which are Living Quality (EQ1), Rental Cost (EQ2), Environmental Maintenance (EQ3), and Public Services (EQ4). Among the four evaluation criteria, living quality refers to the fact that the science park will attract many immigrants and often lead to improper additions, which will cause doubts about residential safety. Rental cost covers the phenomenon that the high rental cost of the science park often causes immigrants to deter the development of the settlement. Environmental maintenance means that the science park will attract many immigrants and often cause local environmental pollution and affect the quality of the residence. Public services refer to providing medical and educational facilities in the science park that will help meet local public service needs (Table 1).

2.3. Business Environment (BE)

It is generally acknowledged that the National Policy on Science Parks and Innovation is one of the main drivers of an innovation-driven economy, especially for government-funded science parks [20]. The government is responsible for selecting outstanding companies for the regional innovation system, formulating policies, determining the systems to provide a better business environment for park companies, universities, or research institutions, and providing a large amount of research and development funds to encourage industry–university cooperation [21]. With financial support and assistance from the research team of the university to propose new ideas, after university–industry (UI) collaboration is implemented and completed successfully, and the results will be transferred to the enterprise according to the initial agreement between the two parties [22].

A study about Triple Helix—a collaboration among universities, government, and the industry from China—indicated the government's essential role in funding universities, creating a research environment that meets the industry policy requirements, and fostering the process of knowledge creation and commercialization [23]. Moreover, China's high-tech companies also design comprehensive strategies to acquire knowledge generated from external sources. These strategies are built based on the industry policies of local, provincial, and state governments to support collaborations with universities and the implementation of external knowledge within existing systems [24].

The authority's innovative investment and business activities attract foreign residents to emigrate and investors to stimulate regional development. The rapid development of industrial clusters is mainly the result of the growth effect produced by the accumulation and mutual reinforcement of talent, technology, and capital [21]. Government financial incentives have an impact on business innovation. In the short term, direct government subsidies benefit firms but limit the company's long-term innovation performance. In addition, indirect tax credits benefit companies in both short- and long-term innovation activities. A study used data from high-tech companies in Beijing's Zhongguancun Science and Technology Park to analyze changes in furniture companies over time. The study showed that government innovation and fiscal deprivation have a positive effect on the relationship between government incentives and firm innovation performance over time [25]. Hence, science and technology parks are widely acknowledged as an effective mechanism for promoting the innovative development of new enterprises and industrial clusters in a region or a country. By injecting various innovative elements such as venture capital or entrepreneurial talents into science parks, it positively impacts the knowledge flow and transformation of technology entrepreneurship in emerging economies [26].

Furthermore, innovation and technological arbitrage opportunities are the two main business opportunities contributing to technical progress and economic growth. Venture capital (VC) investments adjust for the impact of new venturing rates in industry-level technology arbitrage and innovation opportunities. A study following a survey of 45 U.S. industries between 1997 and 2015 found that the impact of new risk entry rates on innovation opportunities and technology arbitrage opportunities is very likely to depend on the availability of a resource, which could be venture capital investing in the industry. In addition, the interactions between the entry rates of new start-ups and venture capital have different effects on the industry. Additionally, the concentration and vitality of a certain industry will affect the moderating effect of venture capital on the relationship between the entry of new ventures and entrepreneurial opportunities [27].

Regarding the Business Environment (BE) aspect, it shows that a good investment environment in the science park affects investors' willingness to invest. This study summarizes four criteria, namely Tax Concessions (BE1), New Ventures (BE2), Business Activities (BE3), and Industrial Policies (BE4). Tax concessions mean that implementing preferential tax policies in the science park will help reduce investment companies' costs of setting up factories. New ventures mean that the rich new venture investments in the science park will help improve manufacturers' investment willingness and demand for factory expansion. Business activities help promote regional economic development and attract immigrants. The industrial policy creates supportive industrial policies to help attract competitive manufacturers to invest (Table 1).

2.4. Working Environment (WE)

Many cities worldwide set up special regions to increase the knowledge density and innovative activities. These areas help attract and retain talents to live nearby and prompt many investors to commit to investing in and accelerating the regional economic performance. The living quality and decision of where to work have a profound influence on the structure of the area. Although families and individuals have different preferences regarding consumption levels, housing types, and rental arrangements in urban areas, in most cases, when it comes to deciding where to live, the living quality of the place is the first consideration [28].

During rapid industrialization, Taiwan has become a country with a dominant high-tech industry in Asia that is attractive to the labor market. After the financial crisis, organizations adopted the form of layoffs, unpaid leave leading to increased workload, or transferred positions that caused anxiety among employees. Therefore, work pressure becomes the central issue emphasized by human resource managers. Regarding stress management-related issues, a study uses data collected from 500 high-tech employees of Hsinchu Science Park in Taiwan that discover the relationship between work pressure, work exhaustion, and job satisfaction. Work stress is significantly related to work fatigue, which occurs under long-term work stress. Therefore, improving work stress is a key issue in the high-tech industry. Improving work stress not only reduces burnout and avoids low job satisfaction it also benefits employee health and industrial productivity [29].

That is why enterprises have begun to understand that the workforce is not a fixed number but a variable and that talents need to be cultivated to rapidly increase organizational development. Employers and managers are gradually valuing the quality of life and working conditions of workers. For example, green workplaces and open spaces are employee benefits that allow workers to work in a comfortable environment and alleviate work pressure [30]. Therefore, attracting talent has become a key strategy in developing a science park, which can combine withdrawing on specific expertise and makes it easier for businesses to set up and access skilled workers. A research survey of 120 science parks included 22 variables, including 11 independent variables of the characteristics or personalities of science park stakeholders or leasing companies when selecting talent, 5 control variables, and 6 variables related to science park success dimensional variables. The findings suggest that talent traits are strongly associated with the park's success. Moreover, the important source of talent is universities, and the important function of the government is to promote cooperation between enterprises and universities. Therefore, park managers should make strong connections between local universities with student communities and provide access to government representatives to obtain the support needed for park development [31].

Regarding the Working Environment (WE) aspect, it indicates that a good employment environment in the science park attracts many willing to emigrate. This study summarizes four criteria for evaluating the working environment, which are Employment Opportunities (WE1), Working Conditions (WE2), Living Functions (WE3), and Price Levels (WE4). Employment opportunity provides high-quality and sufficient employment opportunities to help attract outstanding talents to invest in development. Working conditions help attract outstanding talents to invest and live for a long time. Life function refers to meeting the daily needs of workers. The price level will affect workers' motivation to seek employment and their willingness to move (Table 1).

3. The Evaluation Model of Development Strategies for Science Park

This study adopts the hybrid Multiple Criteria Decision-Making (MCDM) analysis method to understand the satisfaction of HSP stakeholders in the development of the park and introduces suitable development strategies. The hybrid MCDM analytical process consists of seven steps: (1) define the critical decision problem, (2) establish the evaluation system based on aspects/criteria, (3) use the Decision-Making Trial and Evaluation Laboratory (DEMATEL) to construct a network correlation diagram of the aspects and the criteria, (4) use the principal component analysis (PCA) to classify the criteria according to its attributes, (5) use Analytic Network Process (ANP) to find the weight relationship between the criteria, (6) use the VIKOR (Vlsekriterijumska Optimizacija I Kompromisno Resenje) method to find out the stakeholder's preference for the development of the park, and (7) establish the suited development paths (Figure 1).

3.1. Decision-Making Trial and Evaluation Laboratory, DEMATEL

Decision-Making Trial and Evaluation Laboratory (DEMATEL) is a comprehensive tool used to construct and analyze the structural model of the causal relationship between complex factors [32]. The DEMATEL method was applied to solve complex problems related to engineering systems in the early days, including fault sequencing in system failure analysis [33]. In recent years, it has gradually received attention in the field of decision-making and management. It can be found in many different areas. In this study, the Decision-Making Trial and Evaluation Laboratory method (DEMATEL) has five major analysis steps to introduce: (1) calculating the initial average matrix, (2) calculating the direct influence matrix, (3) calculating the indirect influence matrix, (4) calculating the total influence matrix, and (5) proposing the structural correlation analysis.

3.1.1. Calculating the Initial Average Matrix

When calculating the initial average matrix (A) is used to evaluate each respondent's assessment of the impact of the assigned aspects/criteria by pairwise comparison between the aspects/criteria, the scale used for the evaluation is 0, 1, 2, 3, and 4, where 0 represents no influence relationship between aspects/criteria and 4 represents extremely high influence relationship between aspects/criteria, and 1, 2, and 3 represent low influence, moderate influence, and high influence relationship, respectively, as expressed in the matrix from Table 1. For the degree of influence of "Public Infrastructure (PI)" on "Environmental Quality (EQ)", the average of the data is 2.897, which indicates the impact of "Public Infrastructure (PI)" on "Environmental Quality (EQ)" is moderate. Comparatively, the average influence of "Environmental Quality (EQ)" to "Public Infrastructure (PI)" is 2.855, indicating a moderate influence (Table 2).

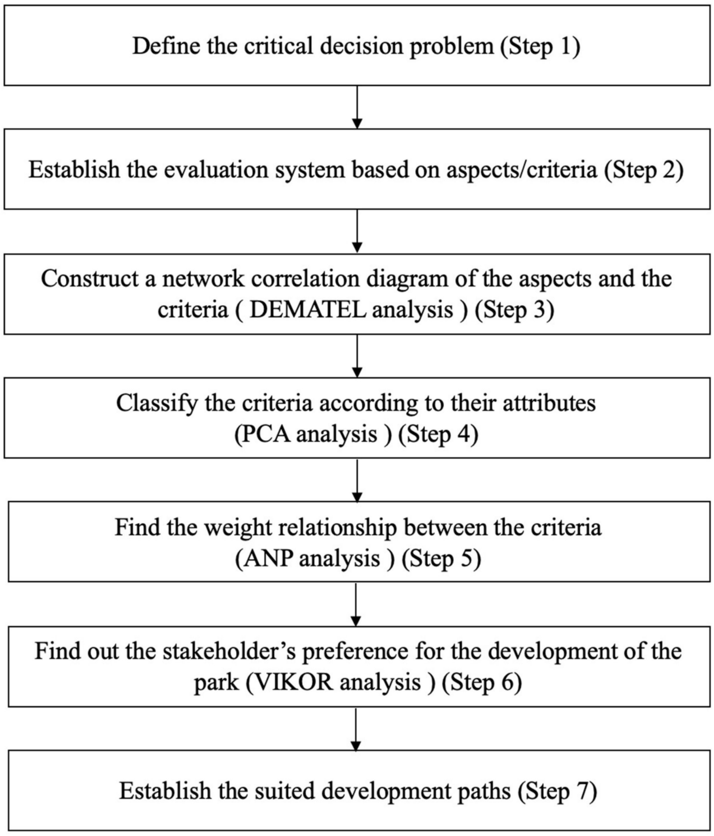

Figure 1. The hybrid MCDM approach.

Table 2. Initial average matrix.

Aspect	PI	EQ	BE	WE	Total
Public infrastructure (PI)	0.000	2.897	2.793	2.938	8.628
Environmental Quality (EQ)	2.855	0.000	2.621	2.814	8.290
Business Environment (BE)	2.745	2.545	0.000	2.945	8.234
Working Environment (WE)	2.834	2.779	2.897	0.000	8.510
Total	8.434	8.221	8.310	8.697	-

3.1.2. Calculating the Direct Influence Matrix

From Table 2 we already knew the initial matrix. The initial matrix (A) is a 4×4 matrix, and the direct influence matrix (D) can be obtained through Equations (1) and (2). As shown in Table 3, the diagonal of the direct influence matrix is 0, and the sum of rows and columns is at most 1. Then, add the sum of rows and columns of the direct influence matrix (D) to get the comparison table of important influence degree in Table 3. The sum of rows and columns of "Public Infrastructure (PI)" is 1.973, the most important aspect in the direct influence matrix, and the sum of rows and columns of "Business Environment (BE)" is 1.906, the least important aspect in the direct impact matrix (Table 4).

$$\boldsymbol{D} = s\boldsymbol{A},\ s > 0 \tag{1}$$

$$s = \min_{i,j}[1/\max_{1\le i\le n}\sum_{j=1}^{n} a_{ij}, 1/\max_{1\le j\le n}\sum_{i=1}^{n} a_{ij}], i,j = 1,2,\ldots,n \quad (2)$$

and $\lim_{m\to\infty} \boldsymbol{D}^m = [0]_{n\times n}$, where $\boldsymbol{D} = [x_{ij}]_{n\times n}$ when $0 < \sum_{j=1}^{n} x_{ij} \le 1$ or $0 < \sum_{i=1}^{n} x_{ij} \le 1$ and then at least one $\sum_{j=1}^{n} x_{ij}$ or $\sum_{i=1}^{n} x_{ij}$ equals 1, but not all do while we are sure that $\lim_{m\to\infty} \boldsymbol{D}^m = [0]_{n\times n}$

Table 3. Direct influence matrix.

Aspect	PI	EQ	BE	WE	Total
Public Infrastructure (PI)	0.000	0.333	0.321	0.338	0.992
Environmental Quality (EQ)	0.328	0.000	0.301	0.324	0.953
Business Environment (BE)	0.316	0.293	0.000	0.339	0.947
Working Environment (WE)	0.326	0.320	0.333	0.000	0.979
Total	0.970	0.945	0.956	1.000	-

Table 4. The comparisons of direct influences.

Aspect	Sum of Columns	Sum of Rows	Sum of Rows and Columns	Rank of Influence
Public Infrastructure (PI)	0.992	0.970	1.962	2
Environmental Quality (EQ)	0.953	0.945	1.898	4
Business Environment (BE)	0.947	0.956	1.902	3
Working Environment (WE)	0.979	1.000	1.979	1

3.1.3. Calculating the Indirect Influence Matrix

The indirect influence matrix (*ID*) can be obtained through the calculation of Equation (3). From Table 5, the calculated indirect influence matrix (*ID*) can be seen.

$$\boldsymbol{ID} = \sum_{i=2}^{\infty} \boldsymbol{D}^i = \boldsymbol{D}^2(\boldsymbol{I} - \boldsymbol{D})^{-1} \quad (3)$$

Table 5. Indirect influence matrix.

Aspect	PI	EQ	BE	WE	Sum
Public Infrastructure (PI)	7.575	7.351	7.411	7.671	30.008
Environmental Quality (EQ)	7.270	7.214	7.198	7.448	29.129
Business Environment (BE)	7.245	7.119	7.239	7.411	29.013
Working Environment (WE)	7.418	7.282	7.331	7.679	29.709
Sum	29.507	28.965	29.179	30.208	-

3.1.4. Calculating the Indirect Influence Matrix

The total influence matrix (*T*) can be calculated by using Equation (4) or (5). Table 6 shows the calculated total influence matrix (*T*), and the Equation (6) indicates that the total influence matrix (*T*) is composed of many elements. Then, add the columns (elements) of the total influence matrix in Table 6 to get the column sum vector (*d*) and add the rows (elements) of the total influence matrix to get the transpose (*r*) of the row sum vector. After that, add the column sum vector (*d*) and the row sum vector transpose (*r*) to get the row and column sum vector ($d_i + r_i$), and the sum of rows and columns represents the total influence relationship in the total influence matrix (*T*). If the sum vector of rows and columns ($d_i + r_i$) is higher, it represents a greater influence relationship between the aspect or criterion and other aspects and criteria. The sum vector (*d*) and the transpose (*r*) of the row sum vector can be subtracted to obtain the row-column difference vector ($d_i - r_i$), and it represents the net influence relationship of the total influence matrix. If $(d_i - r_i)$ is greater than 0, it means that the degree to which the aspect (criterion) affects other aspects (criteria) is greater than the degree of being influenced by other aspects or (criteria). On the contrary, if the difference between the ranks and columns is less than 0 ($(d_i - r_i) < 0$), it means that the degree to which the aspect (criterion) affects other aspects (criteria) is lower than the degree to which it is affected by other aspects (criteria).

$$\boldsymbol{T} = \boldsymbol{D} + \boldsymbol{I}\boldsymbol{D} = \sum_{i=1}^{\infty} \boldsymbol{D}^i \quad (4)$$

$$\boldsymbol{T} = \sum_{i=1}^{\infty} \boldsymbol{D}^i = \boldsymbol{D}(\boldsymbol{I} - \boldsymbol{D})^{-1} \quad (5)$$

$$\boldsymbol{T} = [\boldsymbol{t}_{ij}],\ i,j = 1,2,\ldots n \quad (6)$$

$$d = d_{n\times 1} = \left[\sum_{j=1}^{n} \boldsymbol{t}_{ij}\right]_{n\times 1} \quad (7)$$

$$r = r_{n\times 1} = \left[\sum_{i=1}^{n} \boldsymbol{t}_{ij}\right]'_{1\times n} \quad (8)$$

Table 6. Full influence matrix.

Aspect	PI	EQ	BE	WE	Sum
Public Infrastructure (PI)	7.575	7.684	7.732	8.009	31.000
Environmental Quality (EQ)	7.598	7.214	7.499	7.772	30.082
Business Environment (BE)	7.561	7.412	7.239	7.750	29.961
Working Environment (WE)	7.744	7.602	7.664	7.679	30.688
Sum	30.477	29.911	30.134	31.209	-

It can be seen from Table 7 that the Working Environment (WE) aspect ($d_i + r_i$= 61.897) is the aspect with the largest total impact, while the net influence of Public Infrastructure (PI) aspect ($d_i - r_i$= 0.522) and the Environmental Quality (EQ) aspect ($d_i - r_i$= 0.171) are above 0, so improving the development of science parks can start from the Working Environment (WE) and Public Infrastructure (PI) aspects.

Table 7. Net influence comparison.

Aspect	d_i	r_i	$d_i + r_i$	$d_i - r_i$
Public Infrastructure (PI)	31.000	30.477	61.477	0.522
Environmental Quality (EQ)	30.082	29.911	59.993	0.171
Business Environment (BE)	29.961	30.134	60.095	−0.173
Working Environment (WE)	30.688	31.209	61.897	−0.521

3.1.5. Proposing the Structural Correlation Analysis

To obtain the net relevance influence (dominance) matrix, the lower triangular matrix and the upper triangular matrix need to be subtracted to obtain the net relevance influence matrix or calculated by Equation (9), as shown in Table 8. After the calculations by Equation (9), the value of the upper triangle will be the same as the value of the lower triangle but with the opposite sign, so just choose one of them. Then, take the sum of rows and columns $(d_i + r_i)$ and the difference between rows and columns $(d_i - r_i)$ in Table 8 as the X-axis and Y-axis, and we can draw the structural correlation influence diagram in Figure 2. From Figure 2, we can see that Public Infrastructure (PI) aspect is the main net impact aspect in a structural correlation influence diagram, and the Working Environment

(WE) aspect is the main affected aspect in the structural correlation influence diagram, because the Working Environment (WE) aspect is also the aspect with the greatest total relevance influence.

$$N = nt_{ij} = t_{ij} - t_{ji} \tag{9}$$

Table 8. Total net correlation influence matrix.

Aspect	PI	EQ	BE	WE
Public Infrastructure (PI)	-			
Environmental Quality (EQ)	−0.086	-		
Business Environment (BE)	−0.171	−0.087	-	
Working Environment (WE)	−0.265	−0.170	−0.086	-

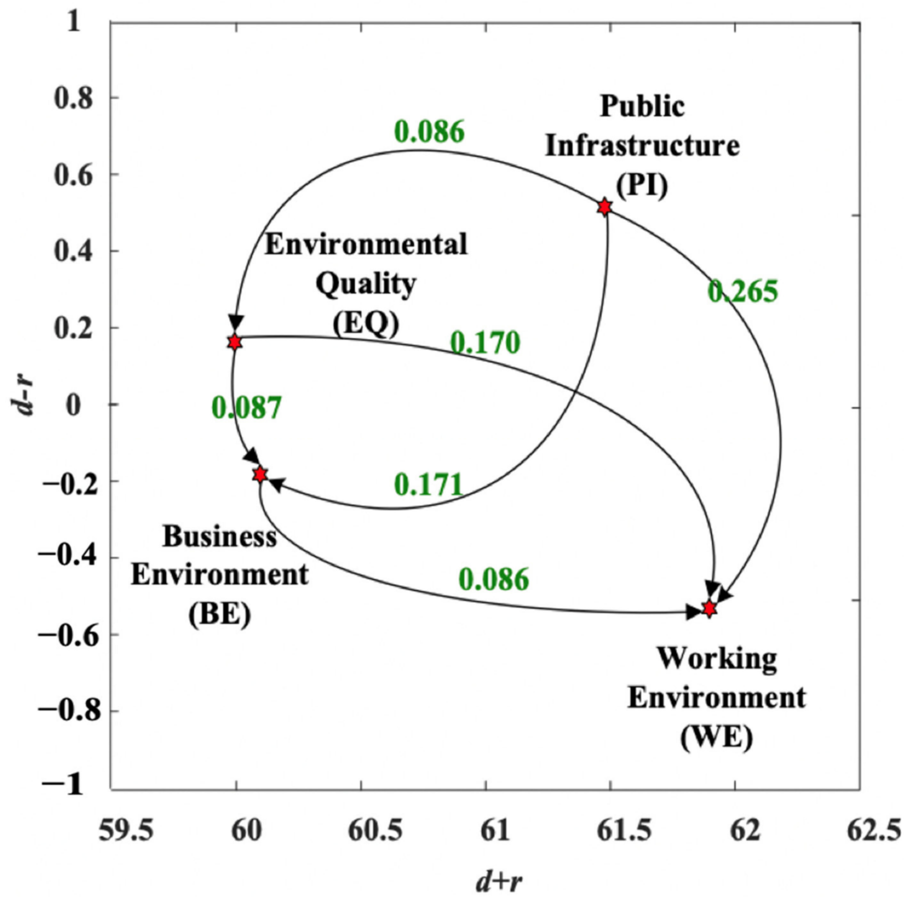

Figure 2. Structural correlation diagram.

3.2. Principal Component Analysis (PCA)

The Principal Component Analysis (PCA) method is used to determine the number of principal components in this study. If the characteristic value is greater than 1 ($\lambda_j > 1$), the potential of the factor is retained; otherwise, delete the factor. It can be seen from Table 9 that a principal component can be extracted from Public Infrastructure (PI) aspect, which is named Information and Transportation Infrastructure (PIP1), the eigenvalue λ is 3.401, and the cumulative interpretation rate is 82.030%. The value of Cronbach's α is 0.941, and the value of Cronbach's α is greater than 0.7, which is regarded as highly credible.

Table 9. Principal component analysis.

Aspect	Principal Component	Criteria	Principal Component 1	Communality
Public infrastructure(PI)	Information and transportation infrastructure (PIP1)	Information infrastructure (PE2)	0.917	0.842
		Living infrastructure (PE4)	0.913	0.834
		Transportation infrastructure (PE1)	0.898	0.807
		Leisure infrastructure (PE3)	0.897	0.804
	Eigenvalue λ	3.287		
	% of Variance	82.184		
	Cumulative (%)	82.184		
	Cronbach's α	0.928		

3.3. Analytic Network Process

Saaty [34] proposed the concept of Analytic Network Process (ANP) to improve the shortcomings of hierarchical analysis. The Analytic Network Process method can deal with the dependence of the criteria and the feedback relationship, making this evaluation method more suitable for the application of actual problems. The evaluation of decision-making problems using network analysis mainly includes the following three phases of work [35]: Phase one is to establish the network hierarchy of the evaluation. Phase two is to calculate the weight of each level. Phase 3 is to calculate the weight of the overall level. This study divides the hierarchical network analysis method into the following steps: (1) decision-making problem definition and criterion structure establishment; (2) questionnaire design and survey; (3) establishment of pairwise comparison weights, calculation of the weights, and the consistency test; (4) calculation of transposed relative weight incidence matrix; (5) supermatrix calculations; and (6) optimal weight determination.

3.3.1. Define the Problem and Construct Criteria

According to the nature of the decision-making problem, all elements that may affect the decision-making problem need to be included. The planning team sorts out and summarizes relevant information about decision-making issues, provides decision-making experts for reference, and uses brainstorming methods to determine the elements that affect decision-making issues, including goals, levels, criteria, and feasible solutions. When building the structure, the levels are connected by circular arcs and one-way and two-way arrow lines to indicate their subordination and even their own feedback relationships.

3.3.2. Design Questionnaire and Investigate

According to the hierarchical structure of the evaluation, under the influence of each upper element, experts will judge the relative importance of the criteria. Generally, the survey can be conducted by designing a questionnaire, and the questionnaire must also clearly describe each pair of comparison questions to assist experts in judgment.

3.3.3. Establish Paired Weights, Calculate Weights and Verify Consistency

According to the expert's preference judgment, the paired comparison matrix can be obtained. After calculating the eigenvalues and eigenvectors of each comparison matrix, the consistency test is performed to make the expert's judgments reach the theoretical consistency of $C.I. \leq 0.1$; finally, the relevant weights of the criteria are calculated.

3.3.4. Calculate the Transposed Relative Weight Incidence Matrix

Use Formula (4) and Formula (5) to obtain the total influence matrix (T), as shown in Formula (10), add the columns of the total influence matrix to get the column sum (d_i), and then use the Formula (11) to get the untransposed relative weight incidence matrix (T_D). After that, use the Formula (12) to transpose the untransposed relative weight incidence matrix (T_D) to obtain the transposed relative weight incidence matrix (T_D^α). To deal with the problem of the interdependence between the criteria and the criteria and their own feedback relationship, the hierarchical network analysis method uses the hypermatrix to calculate the weight of the elements. The unweighted supermatrix (W_p) is composed of many submatrices (W_{ij}). The submatrix is the pairwise comparison matrix obtained in step (3). If there is no correlation between the elements, the pairwise comparison value of the submatrix is zero. Since there is only one principal component in each aspect in the current study, the total influence matrix is directly transposed and normalized to find the relative weight correlation matrix between aspects (Table 10), which is used as the correlation weight under the principal component of each aspect. In this way, the assumption that the weights of all aspects are equal in the ANP method can be improved [34].

$$T_D = \begin{bmatrix} t_{11} & \cdots & t_{1j} & \cdots & t_{1n} \\ \vdots & \ddots & \vdots & \ddots & \vdots \\ t_{i1} & \cdots & t_{ij} & \cdots & t_{in} \\ \vdots & \ddots & \vdots & \ddots & \vdots \\ t_{n1} & \cdots & t_{nj} & \cdots & t_{nn} \end{bmatrix} \begin{matrix} \rightarrow d_1 = \sum_{j=1}^{n} t_{1j} \\ \rightarrow d_i = \sum_{j=1}^{n} t_{ij} \\ \rightarrow d_n = \sum_{j=1}^{n} t_{nj} \end{matrix} \quad (10)$$

Table 10. Relative weight matrix.

Aspect	PI	EQ	BE	WE
Public Infrastructure (PI)	0.244	0.253	0.252	0.252
Environmental Quality (EQ)	0.248	0.240	0.247	0.248
Business Environment (BE)	0.249	0.249	0.242	0.250
Working Environment (WE)	0.258	0.258	0.259	0.250
Sum	1.000	1.000	1.000	1.000

Here $d_i = \sum_{j=1}^{n} t_{ij}, i = 1, 2, \ldots, n$

$$T_N = \begin{bmatrix} t_{11}/d_1 & \cdots & t_{1j}/d_1 & \cdots & t_{1n}/d_1 \\ \vdots & \ddots & \vdots & \ddots & \vdots \\ t_{i1}/d_i & \cdots & t_{ij}/d_i & \cdots & t_{in}/d_i \\ \vdots & \ddots & \vdots & \ddots & \vdots \\ t_{n1}/d_n & \cdots & t_{nj}/d_n & \cdots & t_{nn}/d_n \end{bmatrix} = \begin{bmatrix} t_{11}^N & \cdots & t_{1j}^N & \cdots & t_{1n}^N \\ \vdots & \ddots & \vdots & \ddots & \vdots \\ t_{i1}^N & \cdots & t_{ij}^N & \cdots & t_{in}^N \\ \vdots & \ddots & \vdots & \ddots & \vdots \\ t_{n1}^N & \cdots & t_{nj}^N & \cdots & t_{nn}^N \end{bmatrix} \quad (11)$$

$$T_D^\alpha = (T_D)' = \begin{bmatrix} t_D^{11} & \cdots & t_D^{i1} & \cdots & t_D^{n1} \\ \vdots & \ddots & \vdots & \ddots & \vdots \\ t_D^{1j} & \cdots & t_D^{ij} & \cdots & t_D^{nj} \\ \vdots & \ddots & \vdots & \ddots & \vdots \\ t_D^{1n} & \cdots & t_D^{in} & \cdots & t_D^{nn} \end{bmatrix} \quad (12)$$

3.3.5. Calculate the Supermatrix

The unweighted supermatrix (W_p) is shown in Formula (13), which is composed of many submatrices (W_{ij}). To deal with the dependence relationship between the principal components and the principal components in the problem structure and its own feedback relationship, the ANP method uses the pairwise comparison to obtain the weight value of the sub-matrix. As shown in Formula (14), if there is only one principal component in the aspect, then the submatrix (W_{ij}) is the 1×1 identity matrix (I); if the submatrix has more than one principal component, the sum of total weights of the principal components of the individual submatrices is 1. The improved supermatrix calculation method is to multiply the original supermatrix (W_p) of Formula (13) by the transposed relative weight matrix (T_D^{α}) from Formula (12), as shown in Formula (15). If the number of principal components in the aspects is a complex number, it must be adjusted by Formula (16) first, and then, the calculation of Formula (15) is performed. Considering the relative weight relationships of all levels, the submatrices of the evaluation criteria need to be given relative importance weights respectively to obtain the weighted supermatrix. Since there is only one principal component under each aspect, the principal components are compared in the matrix with all one consideration factors (Table 11), and the weighted supermatrix (Table 12) can be obtained by multiplying each element of the transposed relative weight correlation matrix (Table 10).

$$W_P = \begin{bmatrix} W_{11} & W_{12} & W_{1j} & \cdots & W_{1m} \\ W_{21} & W_{22} & \vdots & & \vdots \\ W_{i1} & \cdots & W_{ij} & \cdots & W_{im} \\ \vdots & & \vdots & & \vdots \\ W_{m1} & \cdots & W_{mj} & \cdots & W_{mm} \end{bmatrix} \tag{13}$$

$$W_{21} = \begin{bmatrix} w_{P_{11}} & \cdots & w_{P_{1j}} & \cdots & w_{P_{1m}} \\ \vdots & & \vdots & & \vdots \\ w_{P_{i1}} & \cdots & w_{P_{ij}} & \cdots & w_{P_{im}} \\ \vdots & & \vdots & & \vdots \\ w_{P_{m1}} & \cdots & w_{P_{mj}} & \cdots & w_{P_{mm}} \end{bmatrix} \tag{14}$$

Here $w_P = \sum_{i=1}^{m} w_{P_{i1}} = \sum_{i=1}^{m} w_{P_{ij}} = \sum_{i=1}^{m} w_{P_{im}} = 1$

$$W_L = T_D^{\alpha} \times W_P = \begin{bmatrix} t_D^{11} \times W_{11} & \cdots & t_D^{i1} \times W_{1j} & \cdots & t_D^{n1} \times W_{1m} \\ \vdots & & \vdots & & \vdots \\ t_D^{1j} \times W_{i1} & \cdots & t_D^{ij} \times W_{ij} & \cdots & t_D^{nj} \times W_{im} \\ \vdots & & \vdots & & \vdots \\ t_D^{1n} \times W_{m1} & \cdots & t_D^{in} \times W_{mj} & \cdots & t_D^{nn} \times W_{mm} \end{bmatrix} \tag{15}$$

$$t_D^{ij} \times W_{ij} = \begin{bmatrix} t_D^{11} \times w_{P_{11}} & \cdots & t_D^{11} \times w_{P_{1j}} & \cdots & t_D^{11} \times w_{P_{1m}} \\ \vdots & & \vdots & & \vdots \\ t_D^{11} \times w_{P_{i1}} & \cdots & t_D^{11} \times w_{P_{ij}} & \cdots & t_D^{11} \times w_{P_{im}} \\ \vdots & & \vdots & & \vdots \\ t_D^{11} \times w_{P_{m1}} & \cdots & t_D^{11} \times w_{P_{mj}} & \cdots & t_D^{11} \times w_{P_{mm}} \end{bmatrix} \tag{16}$$

3.3.6. Optimal Weight Determination

Through the above conversion procedure, after the process of limiting, multiply W_L and W_L to $2k + 1$ (the value of k subjectively determined), the dependence relationship will gradually converge, and the ultimate supermatrix can be obtained (Table 13). The obtained limiting weight value is the optimal weight (Table 14). This research further takes the weight matrix to the third decimal place and calculates the individual principal component weight values.

Table 11. Unweighted supermatrix.

Aspect	Component	PIP1	EQP1	BEP1	WEP1
Public Infrastructure (PI)	Information and transportation infrastructure (PIP1)	1.000	1.000	1.000	1.000
Environmental Quality (EQ)	Secure and public services (EQP1)	1.000	1.000	1.000	1.000
Business Environment (BE)	Policy and investment incentives (BEP1)	1.000	1.000	1.000	1.000
Working Environment (WE)	Consumption and labor conditions (WEP1)	1.000	1.000	1.000	1.000
	Sum	4.000	4.000	4.000	4.000

Table 12. Weighted supermatrix.

Aspect	Component	PIP1	EQP1	BEP1	WEP1
Public Infrastructure (PI)	Information and transportation infrastructure (PIP1)	0.244	0.253	0.252	0.252
Environmental Quality (EQ)	Secure and public services (EQP1)	0.248	0.240	0.247	0.248
Business Environment (BE)	Policy and investment incentives (BEP1)	0.249	0.249	0.242	0.250
Working Environment (WE)	Consumption and labor conditions (WEP1)	0.258	0.258	0.259	0.250
	Sum	1.000	1.000	1.000	1.000

Table 13. Limited supermatrix.

Aspect	Component	PIP1	EQP1	BEP1	WEP1
Public Infrastructure (PI)	Information and transportation infrastructure (PIP1)	0.250	0.250	0.250	0.250
Environmental Quality (EQ)	Secure and public services (EQP1)	0.246	0.246	0.246	0.246
Business Environment (BE)	Policy and investment incentives (BEP1)	0.248	0.248	0.248	0.248
Working Environment (WE)	Consumption and labor conditions (WEP1)	0.256	0.256	0.256	0.256
	Sum	1.000	1.000	1.000	1.000

Table 14. Optimal weight.

Aspect	Component	Weight
Public Infrastructure (PI)	Information and transportation infrastructure (PIP1)	0.250
Environmental Quality (EQ)	Secure and public services (EQP1)	0.246
Business Environment (BE)	Policy and investment incentives (BEP1)	0.248
Working Environment (WE)	Consumption and labor conditions (WEP1)	0.256
	Sum	1.000

3.4. Aspect Preference Selection—VIKOR

After completing the selection of the evaluation criteria for the development driving forces of the science park and the establishment of the criteria weights, we enter another stage—the performance evaluation of alternative programs. In actual evaluation problems, there are often competition or conflicts between evaluation criteria, which leads to no means of identifying a solution that can meet all criteria at the same time. Through MCDM, a compromised solution can be produced between conflicting evaluation criteria to assist decision makers in making the final decision. Due to the conflicting characteristics of the selection criteria, this study adopts the VIKOR method [36–42] to evaluate and rank the development driving force evaluation aspects/criteria of science parks.

VIKOR's aggregation method is developed from the Lp metric of the eclectic planning method. Its main feature is to provide maximum "group utilities" and minimize "individual regrets of objections". The compromise solution can be accepted by the decision maker. The calculation steps of VIKOR are as follows:

1. Find the Positive Ideal Solution and the Negative Ideal Solution

We use the following formula to find positive and negative ideal solutions, with k is the alternative, and i is the evaluation criteria; f_{ik} is the performance value of the i evaluation criteria of the alternative k, which is obtained through questionnaires. I_1 is the set of benefit evaluation criteria and I_2 is the set of cost evaluation criteria; f_i^* is the positive ideal solution or the desired level set by the decision maker, and f_i^- is the negative ideal solution or the minimum level set by the decision maker.

$$f_i^* = \left\{ \left(\underset{k}{max} f_{ik} | k \in I_1 \right), \left(\underset{k}{\min} f_{ik} | k \in I_2 \right) | \forall k = 1, 2, \ldots, m \right\}, \text{ or the decision maker sets } f_i^* \text{ as the desired value} \quad (17)$$

$$f_i^- = \left\{ \left(\underset{k}{\min} f_{ik} | k \in I_1 \right), \left(\underset{k}{\max} f_{ik} | k \in I_2 \right) | \forall k = 1, 2, \ldots, m \right\}, \text{ or the decision maker sets } f_i^- \text{ as the minimum value} \quad (18)$$

2. Calculate S_k and R_k

We use the following two formulas to calculate S_k and R_k, with w_i is the relative weight between the evaluation criteria, that is, the relative weight value of each criterion derived by using ANP in this study.

$$S_k = \sum_{i=1}^{n} w_i (f_i^* - f_{ik}) / (f_i^* - f_i^-) \ \ \forall k = 1, 2, \ldots, m \quad (19)$$

$$R_k = \max_i [(f_i^* - f_{ik}) / (f_i^* - f_i^-)] \ \ \forall k = 1, 2, \ldots, m \quad (20)$$

3. Calculate Q_k

We use the formula (21) to calculate, with v is the coefficient of the decision-making mechanism. When v is greater than 0.5, it means that the decision is made according to most of the resolutions. When v is approximately 0.5, it means that the decision is made based on the approval situation, and when v is less than 0.5, it means that the decision is made based on rejection. In VIKOR, v is set to 0.5 to pursue maximization of group utility and minimization of individual regrets at the same time. The value $\min_k S_k$ obtained is the majority rule of the group, and the value $\min_k S_k$ obtained is the smallest individual regret. The meaning of Q_k is the ratio of benefits that can be generated by the k scheme.

$$Q_k = v(S_k - S^*) / (S^- - S^*) + (1 - v)(R_k - R^*) / (R^- - R^*) \ \forall k = 1, 2, \ldots, m \quad (21)$$

and

$$S^* = \min_k S_k; \ S^- \max_k S_k \quad (22)$$

$$R^* = \min_k R_k; \ R^- \max_k R_k \quad (23)$$

4. Rank the Alternatives

This research uses the v value of 0.5 to establish stakeholder satisfaction (SSI) in the development of urban and rural areas. The research selects Q_k when the v value is 0.5 to establish the maximum group utility and the minimum individual regrets at the same time. However, because the value of Q_k is a STB index (the smaller the value, the better), and its range is between 0 and 1, this study converts it into an LTB index (the larger the value, the better). When the value of satisfaction v is 0.5, v is equal to the Q_k value, and its SSI index is $1 - Q_k$, and different stakeholders' satisfactions (SSI) can be obtained.

4. The Analysis of the Driving Force for Science Park Development

This section is divided into four parts. The first part is the reliability and validity analysis, the second part is the analysis of the driving forces of science park development, and the third part is the principal component analysis. The criteria of the aspects are divided into several principal components and the principal components are named. The fourth part is the analytic network process (ANP) model, which is designed to find the weight of the principal components of the stakeholders in the development of the science park, and later, the VIKOR model is used to calculate the scores of the stakeholders for the development driving force of the science park.

4.1. Reliability and Validity Analysis

This research first identified relevant research aspects and criteria through a literature review and confirmed relevant evaluation aspects and criteria through expert interviews (including questionnaires), then conducted expert reliability tests and distributed 200 research questionnaires to stakeholders in the science park (managers, workers, investors, and residents). This study adopted online questionnaires, and a total of 145 questionnaires were collected. The effective recovery rate was 81.5%. The results of the reliability and validity analysis show that the four aspects' overall Cronbach's Alpha is 0.925, the Cronbach's Alpha of Public Infrastructure (PI) is 0.928, the Cronbach's Alpha of Environmental Quality (EQ) is 0.885, the Cronbach's Alpha of Business Environment (BE) is 0.930, and the Cronbach's Alpha of Working Environment (WE) is 0.938; all are highly reliable in Cronbach's α credibility recommendations, indicating that the research design in this study is highly reliable (Table 15).

Table 15. Reliability and validity analysis of the aspects.

Item	Alpha	Results
Overall	0.922	Highly credible
Public Infrastructure (PI)	0.928	Highly credible
Environmental Quality (EQ)	0.885	Highly credible
Business Environment (BE)	0.930	Highly credible
Working Environment (WE)	0.938	Highly credible

Note: The reliability of Cronbachα is that $\alpha < 0.35$ is low reliability, $0.35 < \alpha < 0.7$ is moderate reliability, and $\alpha > 0.7$ is high reliability.

4.2. Driving Forces of Science Park Development

This study uses four aspects, which are Public Infrastructure (PI), Environmental Quality (EQ), Business Environment (BE), and Working Environment (WE) to examine the performance of different stakeholders in the science park in each evaluation aspect. From Figure 3 and Table 16, the four stakeholders have different performances in the evaluation aspects of the development of the science park. The following is an explanation for each aspect. Under the Public Infrastructure (PI) aspect, the residents' satisfaction is the highest, while the investors' satisfaction is relatively low. Under the Environmental Quality (EQ) and Business Environment (BE) aspects, the investors think they are satisfied, but workers' satisfaction is relatively low. In the Working Environment (WE) aspect, the residents' satisfaction is the highest, while the workers' satisfaction is relatively low.

The Public Infrastructure (PI) aspect uses the four criteria, which are Transportation Infrastructure (PI1), Information Infrastructure (PI2), Sports and Leisure Infrastructure (PI3), and Basic Infrastructure (PI4) to examine the performance of the four criteria in PI aspect. It can be seen from Figure 4 and Table 17 that the four stakeholders have the same satisfaction in the evaluation of the development of the science park. The following is an explanation of each criterion. Under the standards of Transportation Infrastructure (PI1), Information Infrastructure (PI2), Basic Infrastructure (PI4), and Sports and Leisure Infrastructure (PI3), investors' satisfaction is the highest, while that of workers is relatively low.

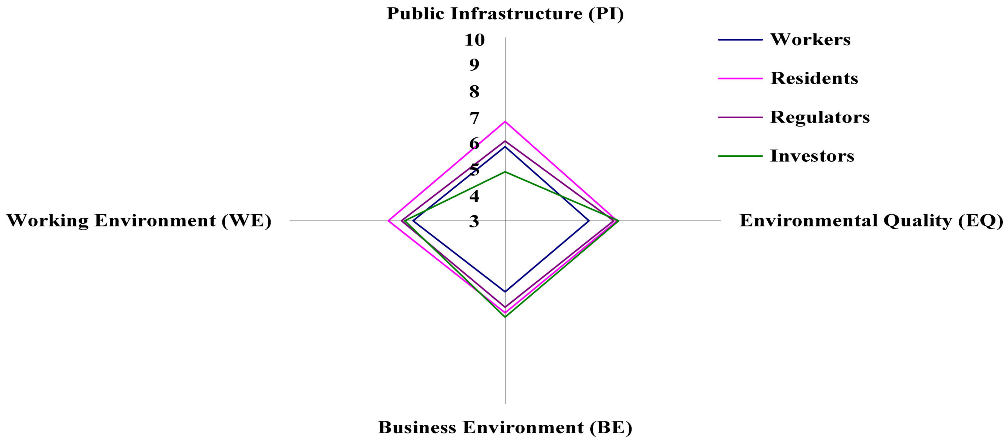

Figure 3. The driving forces of science park development (all aspects).

Table 16. The driving forces of science park development (all aspects).

	Workers	Residents	Regulators	Investors
Horizontal analysis				
Public Infrastructure (PI)	5.856 (3)	6.813 (1)	6.066 (2)	4.882 (4)
Environmental Quality (EQ)	5.740 (4)	6.614 (3)	6.553 (2)	6.691 (1)
Business Environment (BE)	5.731 (4)	6.518 (2)	6.329 (3)	6.706 (1)
Working Environment (WE)	5.990 (4)	6.804 (1)	6.355 (2)	6.250 (3)
Vertical analysis				
Public Infrastructure (PI)	5.856 (2)	6.813 (1)	6.066 (4)	4.882 (4)
Environmental Quality (EQ)	5.740 (3)	6.614 [(3)	6.553 (1)	6.691 (2)
Business Environment (BE)	5.731 (4)	6.518 (4)	6.329 (3)	6.706 (1)
Working Environment (WE)	5.990 (1)	6.804 (2)	6.355 (2)	6.250 (3)

The Environmental Quality aspect (EQ) uses the following four criteria: Living Quality (EQ1), Rental Cost (EQ2), Environmental Maintenance (EQ3), and Public Service (EQ4) to examine the performance of the four criteria in the aspect. From Figure 5 and Table 18, the four stakeholders have different evaluations of the development of the science park. The following is an explanation of each criterion. Under the Living Quality (EQ1) aspect, the residents' satisfaction is the highest, while the regulators' satisfaction is relatively low. Under Rental Cost (EQ2) criteria, the investors' satisfaction is the highest, and the residents' satisfaction is relatively low. Under Environmental Maintenance (EQ3) criteria, workers' satisfaction is the highest, while investors' satisfaction is relatively low. Under Public Service (EQ4) criteria, the residents' satisfaction is the highest, and the workers' satisfaction is relatively low.

The Business Environment (BE) aspect is based on the following four criteria: Tax Concessions (BE1), New Ventures (BE2), Business Activities (BE3), and Industrial Policies (BE4) to examine the performance of the four criteria in the aspect. From Figure 6 and Table 19, the four kinds of stakeholders have similar evaluation of the development of the science park. The following is an explanation of each criterion. Under the Tax Concession (BE1) aspect, residents' satisfaction is the highest, while the regulators' satisfaction is relatively low. In Tax Concessions (BE1), New Ventures (BE2), Business Activities (BE3), and Industrial Policies (BE4), investors' satisfaction is the highest while workers' satisfaction is relatively low.

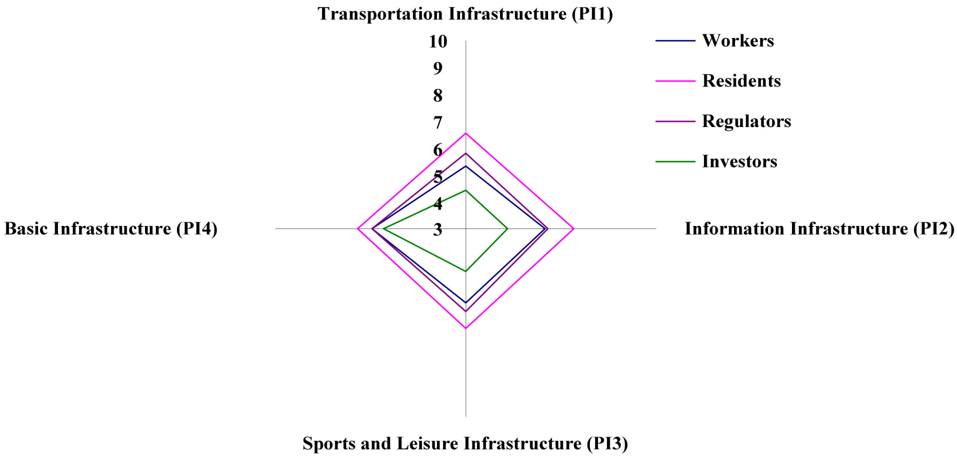

Figure 4. The driving forces of science park development (PI aspect).

Table 17. The driving forces of science park development (PI aspect).

	Workers	Residents	Regulators	Investors
Horizontal analysis				
Transportation Infrastructure (PI1)	5.308 (3)	6.578 (1)	5.789 (2)	4.412 (4)
Information Infrastructure (PI2)	5.923 (3)	6.952 (1)	6.000 (2)	4.529 (4)
Sports and Leisure Infrastructure (PI3)	5.769 (3)	6.735 (1)	6.053 (2)	4.588 (4)
Basic Infrastructure (PI4)	6.423 (2)	6.988 (1)	6.421 (3)	6.000 (4)
Vertical analysis				
Transportation Infrastructure (PI1)	5.308 (4)	6.578 (4)	5.789 (4)	4.412 (4)
Information Infrastructure (PI2)	5.923 (2)	6.952 (2)	6.000 (3)	4.529 (3)
Sports and Leisure Infrastructure (PI3)	5.769 (3)	6.735 (3)	6.053 (2)	4.588 (2)
Basic Infrastructure (PI4)	6.423 (1)	6.988 (1)	6.421 (1)	6.000 (1)

The Working Environment (WE) aspect uses the four criteria: Employment Opportunities (WE1), Working Conditions (WE2), Living Functions (WE3), and Price Levels (WE4) to examine the performance of the four criteria in the aspect. From Figure 7 and Table 20, the four kinds of stakeholders have different evaluations of the development of the science park. The following is an explanation of each criterion. Under all the four criteria, workers' satisfaction is the highest. Under the Employment Opportunities (WE1) and Living Function (WE3) criteria, regulators' satisfaction is relatively low. Under the Working Conditions (WE2) and Price Levels (WE4) criteria, investors' satisfaction is relatively low.

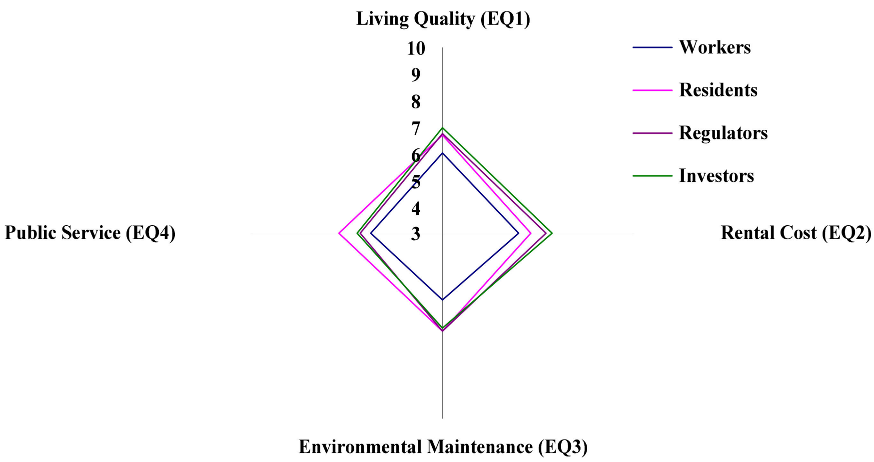

Figure 5. The driving forces of science park development (EQ aspects).

Table 18. The driving forces of science park development (EQ aspects).

	Workers	Residents	Regulators	Investors
Horizontal analysis				
Living Quality (EQ1)	6.038 (4)	6.699 (3)	6.737 (2)	7.000 (1)
Rental Cost (EQ2)	5.808 (4)	6.229 (3)	6.789 (2)	7.059 (1)
Environmental Maintenance (EQ3)	5.500 (4)	6.699 (1)	6.684 (2)	6.588 (3)
Public Service (EQ4)	5.615 (4)	6.831 (1)	6.000 (3)	6.118 (2)
Vertical analysis				
Living Quality (EQ1)	6.038 (1)	6.699 (2)	6.737 (2)	7.000 (2)
Rental Cost (EQ2)	5.808 (2)	6.229 (4)	6.789 (1)	7.059 (1)
Environmental Maintenance (EQ3)	5.500 (4)	6.699 (2)	6.684 (3)	6.588 (3)
Public Service (EQ4)	5.615 (3)	6.831 (1)	6.000 (4)	6.118 (4)

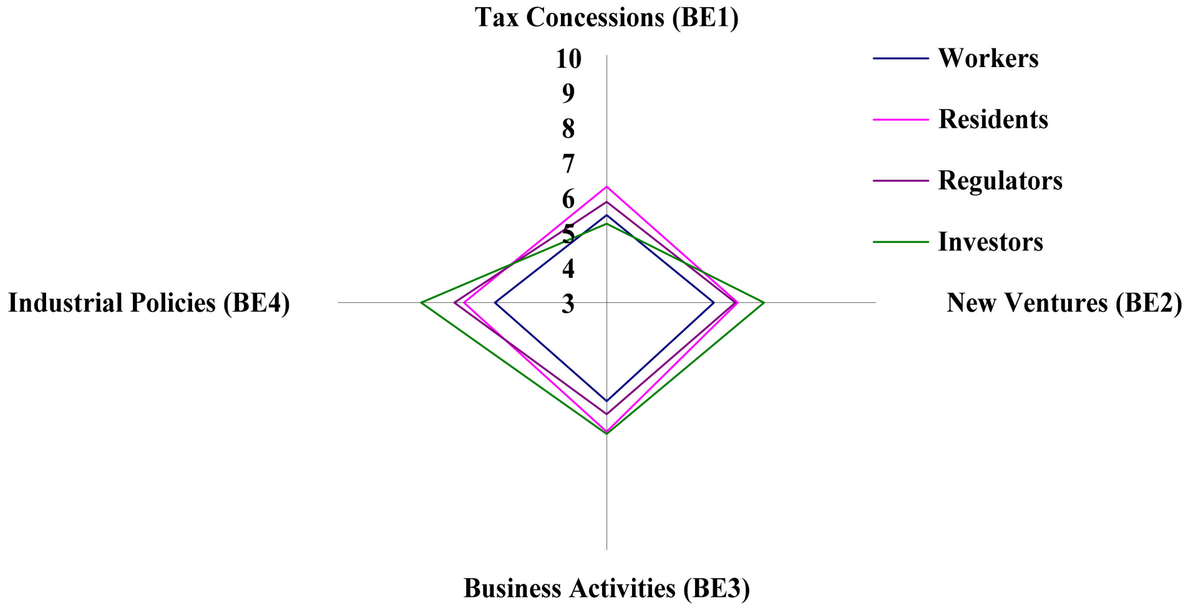

Figure 6. The driving forces of science park development (BE aspects).

Table 19. The driving forces of science park development (BE aspects).

	Workers	Residents	Regulators	Investors
Horizontal analysis				
Tax Concessions (BE1)	5.500 (3)	6.313 (1)	5.842 (2)	5.235 (4)
New Ventures (BE2)	5.769 (4)	6.422 (2)	6.368 (3)	7.059 (1)
Business Activities (BE3)	5.769 (4)	6.627 (2)	6.158 (3)	6.706 (1)
Industrial Policies (BE4)	5.885 (4)	6.711 (3)	6.947 (2)	7.824 (1)
Vertical analysis				
Tax Concessions (BE1)	5.500 (4)	6.313 (4)	5.842 (4)	5.235 (4)
New Ventures (BE2)	5.769 (1)	6.422 (3)	6.368 (2)	7.059 (2)
Business Activities (BE3)	5.769 (1)	6.627 (2)	6.158 (3)	6.706 (3)
Industrial Policies (BE4)	5.885 (3)	6.711 (1)	6.947 (1)	7.824 (1)

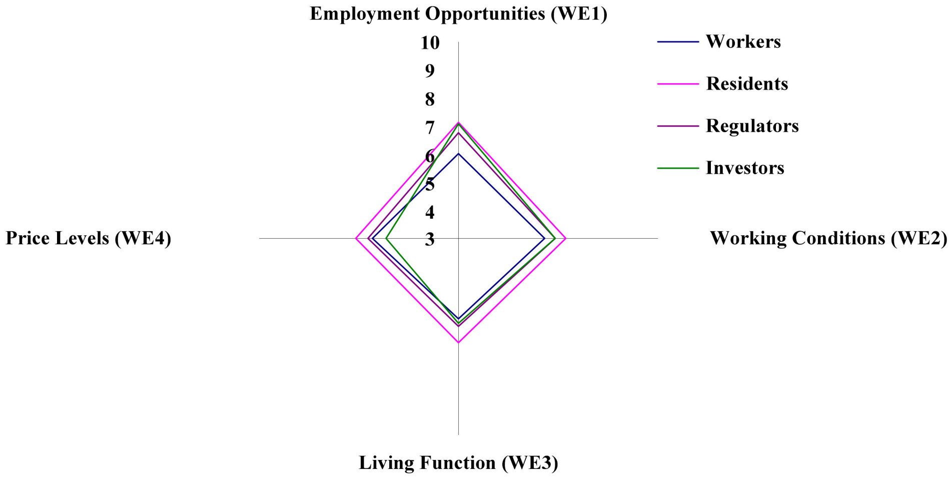

Figure 7. The driving forces of science park development (WE aspects).

Table 20. The driving forces of science park development (WE aspects).

	Workers	Residents	Regulators	Investors
Horizontal analysis				
Employment Opportunities (WE1)	6.038 (4)	7.157 (1)	6.789 (3)	7.059 (2)
Working Conditions (WE2)	6.038 (4)	6.747 (1)	6.368 (3)	6.412 (2)
Living Function (WE3)	5.885 (4)	6.711 (1)	6.105 (2)	6.000 (3)
Price Levels (WE4)	6.000 (3)	6.602 (1)	6.158 (2)	5.529 (4)
Vertical analysis				
Employment Opportunities (WE1)	6.038 (1)	7.157 (1)	6.789 (1)	7.059 (1)
Working Conditions (WE2)	6.038 (1)	6.747 (2)	6.368 (2)	6.412 (2)
Living Function (WE3)	5.885 (4)	6.711 (3)	6.105 (4)	6.000 (3)
Price Levels (WE4)	6.000 (3)	6.602 (4)	6.158 (3)	5.529 (4)

4.3. Principal Component Analysis

The number of principal components is determined by the principal component analysis method. If the eigenvalue value is greater than 1 ($\lambda_j > 1$), the jth factor will be retained; otherwise, the factor will be deleted. Table 21 shows that there is only one principal component under each aspect. The principal component under Public Infrastructure (PI) is named "Information and Transportation Infrastructure (PIP1)", and the eigenvalue value is 3.287, and the cumulative is 82.184%. The principal component under the Environmental Quality (EQ) aspect is named "Security and Public Service (EQP1)", and the eigenvalue value is 2.987, and the cumulative is 74.677%. The principal component under the Business Environment (BE) aspect is named "Policy and Investment Incentives (BEP1)", and the characteristic value is 3.309 and cumulative is 82.729%. The principal component under Working Environment (WE) aspect is named "Consumption and Labor Conditions (WEP1)", and the eigenvalue value is 3.377, and the cumulative is 84.435%.

4.4. Aspect Preference Selection—VIKOR

4.4.1. Find the Ideal Solution and the Negative Ideal Solution

The average scores of each scheme are shown in Table 22, and the scheme ranges from 0 to 10, applied from Equations (17) and (18). In the equation, j is each alternative scheme, i is each evaluation criteria. f_{ij} is the performance evaluation value of i criteria in the alternative plan, which is obtained through questionnaires. I_1 is the set of satisfaction evaluation for the first aspect, and I_2 is a set of satisfaction evaluations for the second aspect. f_i^* is the positive ideal solution, and f_i^- is the negative ideal solution. This study assigns the positive ideal solution (f_i^*) as 10 and the negative ideal solution (f_i^-) as 0 to obtain the satisfactory gap of the solution.

Table 21. Principal component analysis.

Aspect	Principal Component	Criteria	Principal Component 1	Communality
Public Infrastructure (PI)	Information and Transportation Infrastructure (PIP1)	Information Infrastructure (PI2)	0.917	0.842
		Basic Infrastructure (PI4)	0.913	0.834
		Transportation Infrastructure (PI1)	0.898	0.807
		Sports and Leisure Infrastructure (PI3)	0.897	0.804
	Eigenvalue λ	3.287		
	% of Variance	82.184		
	Cumulative (%)	82.184		
	Cronbach's α	0.928		
Environmental Quality (EQ)	Security and Public Service (EQP1)	Environmental Maintenance (EQ3)	0.927	0.859
		Living Quality (EQ1)	0.903	0.815
		Public Service (EQ4)	0.871	0.758
		Rental Cost (EQ2)	0.745	0.554
	Eigenvalue λ	2.987		
	% of Variance	74.677		
	Cumulative (%)	74.677		
	Cronbach's α	0.885		
Business Environment (BE)	Policy and Investment Incentives (BEP1)	New Ventures (BE2)	0.959	0.920
		Business Activities (BE3)	0.913	0.834
		Industrial Policies (BE4)	0.905	0.819
		Tax Concessions (BE1)	0.858	0.737
	Eigenvalue λ	3.309		
	% of Variance	82.729		
	Cumulative (%)	82.729		
	Cronbach's α	0.930		
Working Environment (WE)	Consumption and Labor Conditions (WEP1)	Working Conditions (WE2)	0.951	0.905
		Living Function (WE3)	0.937	0.879
		Employment Opportunities (WE1)	0.917	0.841
		Price Levels (WE4)	0.868	0.753
	Eigenvalue λ	3.377		
	% of Variance	84.435		
	Cumulative (%)	84.435		
	Cronbach's α	0.938		

Table 22. Original satisfaction value of each aspect.

Aspect	Weight	Workers	Residents	Regulators	Investors	f_k^*	f_k^-
Public Infrastructure (PI)	0.250	5.856	6.813	6.066	4.882	10	0
Environmental Quality (EQ)	0.246	5.740	6.614	6.553	6.691	10	0
Business Environment (BE)	0.248	5.731	6.518	6.329	6.706	10	0
Working Environment (WE)	0.256	5.990	6.804	6.355	6.250	10	0

4.4.2. Calculate S_k and R_k

In Equations (19) and (20), w_j is the relative weight between the evaluation criteria, that is, the relative weight value of each criterion derived by ANP in this study. The results are shown in Table 23. Among all the satisfactory between stakeholders toward the aspect and criteria of the development of the science park, S_{vk} is the minimum 0.331 (residents), and the highest is 0.417 (workers). The highest is 0.512 (investors), and the lowest is 0.348 (residents).

Table 23. Weighted satisfaction value of each aspect.

Aspect	ANP	Weight	Workers	Residents	Regulators
	Weight	**B1**	**B2**	**B3**	**B4**
Public Infrastructure (PI)	0.250	0.414	0.319	0.393	0.512
Environmental Quality (EQ)	0.246	0.426	0.339	0.345	0.331
Business Environment (BE)	0.248	0.427	0.348	0.367	0.329
Working Environment (WE)	0.256	0.401	0.320	0.364	0.375
S_{vk}		0.417	0.331	0.367	0.387
R_{vk}		0.427	0.348	0.393	0.512

4.4.3. Calculate Q_k

In Equation (21), when calculating Q_{vk}, v is the coefficient of the decision-making mechanism. When v is greater than 0.5, it means that the decision is made according to most resolutions. When v is approximately 0.5, it means that the decision is made based on the approval situation, and when v is less than 0.5, it means that the decision is made based on the rejection situation. In VIKOR, v is set to 0.5 to pursue maximization of group utility and minimization of individual regrets at the same time. As shown in Equations (19) and (20), the value $\underset{j}{Min}S_j$ obtained is the majority rule of the group, and the value of $\underset{j}{Min}S_j$ obtained is the smallest individual regret. The meaning of Q_{vk} is the ratio of benefits that can be generated by aspect j. Table 24 shows the satisfaction value Q_{vk} of stakeholders in the development of science parks for each plan. The value of Q_{vk} in all aspects decreases as the value of v increases.

Table 24. The value of Q_{vk} under different v (stakeholders' satisfaction toward science park development).

v	Workers	Residents	Regulators	Investors
0.00	0.427	0.348	0.393	0.512
0.10	0.426	0.346	0.391	0.499
0.20	0.425	0.345	0.388	0.487
0.30	0.424	0.343	0.386	0.474
0.40	0.423	0.341	0.383	0.462
0.50	0.422	0.340	0.380	0.449
0.60	0.421	0.338	0.378	0.437
0.70	0.420	0.336	0.375	0.424
0.80	0.419	0.334	0.373	0.412
0.90	0.418	0.333	0.370	0.400
1.00	0.417	0.331	0.367	0.387

4.4.4. Rank the Alternatives

From Table 25, we can see Q_{vk} value under different v conditions. The study selected the value when v is 0.5 to establish a satisfaction index that simultaneously pursues the maximization of group utility and minimization of individual regrets. However, because Q_{vk} value is an STB index (the smaller the better) and its range is between 0 and 1, this study converts it into an LTB index (the larger, the better). Therefore, when the v value of the value satisfaction is 0.5, its SSI indicator will be $1-Q_{vk}$; then, we can get stakeholders' satisfaction (SSI) of the science park development from different aspects. As shown in Table 25, the Q_{vk} value of residents is 0.340 when the v value is 0.5, and the stakeholders' satisfaction (SSI) value for the development of the science park is 0.660, which is the highest SSI value driving force for the development of the science park. The Q_{vk} value of the investors is 0.449 when the v value is 0.5, and the stakeholders' satisfaction (SSI) value for the development of the science park is 0.551, which is the lowest SSI value driving force for the development of the science park. From Table 25, it can be found that, although the current residents have the highest satisfaction with the driving forces for the development of the science park, there is still a slight gap (0.340) that can be further improved based on the best level of stakeholders for the development of the science park (1.000).

Table 25. SSI when $v = 0$, $v = 0.5$, and $v = 1.0$.

v	Workers	Residents	Regulators	Investors
Q_{vk} ($v = 0$)	0.427	0.348	0.393	0.512
VSI	0.573	0.652	0.607	0.488
Rank	3	1	2	4
Q_{vk} ($v = 0.5$)	0.422	0.340	0.380	0.449
VSI	0.578	0.660	0.620	0.551
Rank	3	1	2	4
Q_{vk} ($v = 1.0$)	0.417	0.331	0.367	0.387
VSI	0.583	0.669	0.633	0.613
Rank	4	1	2	3

4.5. Results and Discussion

4.5.1. Satisfaction of Different Stakeholders with the Driving Factors for Science Park Development

According to the research results, it can be known that "residents" are currently the most satisfied with the driving factors for the development of the science park, followed by "regulators", "workers", and "investors". Although "residents" currently have the highest stakeholder satisfaction (SSI) value, there is still room for improvement to the ideal solution (highest satisfaction). Therefore, it is necessary to find the disadvantaged aspects/criteria of the development driving force of the science park. In the aspect of Public Infrastructure (PI), the "residents" are the most satisfied while the "investors" are relatively less satisfied. In the aspects of Environmental Quality (EQ) and Business Environment (BE), "Investors" are the most satisfied, and "workers" are the ones with relatively low satisfaction. In Working Environment (WE) aspect, "residents" are the ones who are the most satisfied, while "workers" are the ones with relatively low satisfaction.

4.5.2. Strategies to Improve the Satisfaction of Different Stakeholders

From Figure 2 and Table 16, we can summarize the most needed to improve aspects/criteria of the science park development. From Table 26, in the development of the science park, each stakeholder has different opinions on the strengths and weaknesses of the four development driving factors and the improvement path.

In "workers" opinions, among the four development driving factors, Working Environment (WE) is a strong driving aspect, and Business Environment (BE) is a weak driving aspect (WE(1) > PI(2) > EQ(3) > BE(4)). Public Infrastructure (PI) development has no impact on Working Environment (WE) aspect (PI(2) → WE(1)). In addition, in the empirical results of stakeholders' satisfaction with the driving factors of science park development (SSI), "workers" are relatively less satisfied with the aspects of Environmental Quality (EQ), Business Environment (BE), and Working Environment (WE). Therefore, there are three improvement paths suggested in this study. One is to influence Business Environment (BE) aspect through Public Infrastructure (PI) aspect ($\underline{\text{PI(2)} \to \text{BE(4)}} \to$ WE(1)); the second is to influence Environmental Quality (EQ) aspect through Public Infrastructure (PI) aspect ($\underline{\text{PI(2)} \to \text{EQ(3)}} \to$ WE(1)). The other is to influence Environmental Quality (EQ) aspect through Public Infrastructure (PI) and then influence the Business Environment (BE) aspect through the Environmental Quality (EQ) aspect ($\underline{\text{PI(2)} \to \text{EQ(3)} \to \text{BE(4)}} \to$ WE(1)).

Table 26. The improvement strategy based on aspect/criteria of the driving forces of science park development.

Stakeholders: Workers	
Rank of four aspects: WE(1) > PI(2) > EQ(3) > BE(4)	
Development path: PI(2) → WE(1) {N} PI(2) → BE(4) → WE(1) {Y} PI(2) → EQ(3) → WE(1) {Y} PI(2) → EQ(3) →BE(4) → WE(1) {Y}	**Suggested improvement path**: PI(2) → BE(4) → WE(1) {Y} PI(2) → EQ(3) → WE(1) {Y} PI(2) → EQ(3) →BE(4) → WE(1) {Y}
Stakeholders: Residents	
Rank of four aspects: PI(1) > WE(2) > EQ(3) > BE(4)	
Development path: PI(1) → WE(2) {Y} PI(1) → BE(4) → WE(2) {Y} PI(1) → EQ(3) → WE(2) {Y} PI(1) → EQ(3) →BE(4) → WE(2) {Y}	**Suggested improvement path**: PI(1) → WE(2) {Y} PI(1) → BE(4) → WE(2) {Y} PI(1) → EQ(3) → WE(2) {Y} PI(1) → EQ(3) →BE(4) → WE(2) {Y}
Stakeholders: Regulators	
Rank of four aspects: EQ(1) > WE(2) > BE(3) > PI(4)	
Development path: PI(4) → WE(2) {N} PI(4) → BE(3) → WE(2) {N} PI(4) → EQ(1) → WE(2) {Y} PI(4) → EQ(1) →BE(3) → WE(2) {Y}	**Suggested improvement path**: PI(4) → EQ(1) → WE(2) {Y} PI(4) → EQ(1) →BE(3) → WE(2) {Y}
Stakeholders: Investors	
Rank of four aspects: BE(1) > EQ(2) > WE(3) > PI(4)	
Development path: PI(4) → WE(3) {N} PI(4) → BE(1) → WE(3) {Y} PI(4) → EQ(2) → WE(3) {Y} PI(4) → EQ(2) →BE(1) → WE(3) {Y}	**Suggested improvement path**: PI(4) → BE(1) → WE(3) {Y} PI(4) → EQ(2) → WE(3) {Y} PI(4) → EQ(2) →BE(1) → WE(3) {Y}

Note: The underline is the suggested development strategy path.

The "residents" believe that among the four development driving factors, and the Public Infrastructure (PI) aspect is more advantageous, whereas the Business Environment (BE) aspect is more disadvantageous (PI(1) > WE(2) > EQ(3) > BE(4)). In addition, in the empirical results of stakeholders' satisfaction with the driving factors of science park development (SSI), "residents" are relatively satisfied with the aspects of Public Infrastructure (PI) and Working Environment (WE). Therefore, there are four improvement paths suggested in this study, through which Public Infrastructure (PI) affects the Working Environment (WE) aspect (PI(1) → WE(2)); the second is through Public Infrastructure (PI) to affect the Business Environment (BE) aspect (PI(1) → BE(4) → WE(2)). The third is through Public Infrastructure (PI) to affect the Environmental Quality (EQ) aspect (PI(1) → EQ(3) → WE(2)). The fourth is to use Public Infrastructure (PI) to affect the Environmental Quality (EQ) aspect and then affect the Environmental Quality (EQ) aspect (PI(1) → EQ(3) → BE(4) → WE(2)).

The "regulators" believe that among the four development drivers, the Environmental Quality (EQ) aspect is more advantageous, while the Public Infrastructure (PI) aspect is more disadvantageous (EQ(1) > WE(2)> BE(3) > PI(4)). In addition, according to the empirical results, the Satisfaction (SSI) of the "regulators" with the driving factors of the development of the science park is medium, and from the perspective of the "regulators" role, the development of Public Infrastructure (PI) has no impact on the Working Environment (WE) aspect (PI(4) → WE(2)), or Public Infrastructure (PI) development has no effect on Business Environment (BE) and Working Environment (WE) aspect (PI(4) → BE(3) → WE(2)). Therefore, there are two ways to improve in this research. One is to influence the Working Environment (WE) aspect through Environmental Quality (EQ) aspect (PI(4) → EQ(1) → WE(2)); the other is to influence the Business Environment (BE) through the Environmental Quality (EQ) aspect (PI(4) → EQ(1) → BE(3) → WE(2)).

The "investors" believe that, among the four development drivers, the Business Environment (BE) aspect is more advantageous, while the Public Infrastructure (PI) aspect is more disadvantageous (BE(1) > EQ(2) > WE(3) > PI(4)). In addition, in the empirical results of stakeholders' satisfaction with the driving factors of science park development (SSI), "investors" are relatively satisfied with the Environmental Quality (EQ) and Business Environment (BE) aspect but relatively low in the Public Infrastructure (PI) aspect. Therefore, there are two improvement paths suggested in this study. One is to influence the Working Environment (WE) aspect through the Business Environment (BE) aspect (PI(4) → BE(1) → WE(3) or PI(4) → EQ(2) → BE(1) → WE(3)); the other is Environmental Quality (EQ) influences on the Working Environment (WE) aspect (PI(4) → EQ(2) → WE(3)).

From this research, both workers and residents suggest that the development strategy of the science park should start from the perspective of Public Infrastructure (PI); by continuously providing relevant public construction and improving environmental space design, we can create a livable city. This study confirms that Sun, Li and Chen [43] found that planning for transportation and leisure infrastructure is necessary to develop a perfect park. Wang, Zhu and Yang [13] emphasized that transportation infrastructure is conducive to improving industrial cluster effects and scales. Therefore, this study believes that the effective implementation of public infrastructure and the promotion of various public infrastructures can expand the domestic demand market and activate the development of industrial settlements. The benefit that effectively improves the business investment environment can promote employment, drive economic growth, regional balance development, and improve the quality of life of the people.

However, regulators and investors in this study share different perspectives. Regulators and investors believe that improvements should start from the dimension of Environmental Quality (EQ). Their perspective is more concerned with environmental quality. The main reason is that environmental quality affects the working environment, and protecting the environment and natural resources is an important challenge for sustainable development. This study confirms Huang, Chau, Yin and Chen [16] that the government should pay attention to environmental issues while managing science parks to achieve sustainable economic development. As for work pressure and human management in the high-tech industry, attention should also be paid to workers' quality of life and working conditions [30] to improve the physical and psychological problems caused by work pressure and help improve work productivity [29].

In addition to improving Environmental Quality (EQ), from investors' perspective, it is also suggested to start from the aspect of the Business Environment (BE). A complete science park should promote various innovations, continuously optimize the economic environment for business, trade, and investment, and enhance the competitiveness of the business environment. Furthermore, the global economy is showing a slowdown under the influence of the COVID-19 epidemic. Facing the challenges of the internal and external environment, only through innovation and rapid and active response to industrial needs can we bring about an investment momentum, create value, and promote economic growth. Therefore, the government should propose appropriate industrial policies at different times to attract investors [25] to create more employment opportunities, attract outstanding talents to invest in development, shape innovation and entrepreneurship, improve the business environment, and ultimately enhance industrial competitiveness.

5. Conclusions

Taking advantage of the impact of the US-China trade war, the Taiwan government has promoted many favorable policies to attract foreign capital to repatriate and to attract Taiwanese businesses to relocate to Taiwan. However, under the influence of the COVID-19 pandemic since 2020, the global economy has shown a slowing trend. In the face of rapid changes in the international economic situation, creating a sound and friendly environment conducive to industrial development and attracting domestic and foreign enterprises to invest has been a problem worth concerning to lay the foundation for sustainable development and strengthen the competitiveness of the industry, it will be a challenge for all stakeholders (regulators, investors, residents, and workers) to build a LOHAS city.

The stakeholders in the science park development have different satisfaction with the development driving factors. Therefore, this study introduces VIKOR to solve the appropriate solution to the multiple decision-making goals and select the options to understand whether different decision-making options can be closer to the ideal solution. In addition, this research uses NRM analysis to re-deconstruct the correlation structure among the four evaluation aspects of Public Infrastructure (PI), Environmental Quality (EQ), Business Environment (BE), and Working Environment (WE), instead of breaking away from a single evaluation structure. Through NRM analysis, it is found that Public Infrastructure (PI), Environmental Quality (EQ), and Business Environment (BE) aspects are the main dominating dimensions. From the perspective of the overall network in-fluence relationship, Public Infrastructure (PI) influences the Environmental Quality (EQ) aspect, Business Environment (BE), and Working Environment (WE) aspects. Environmental Quality (EQ) affects Business Environment (BE) and Working Environment (WE) aspects, and finally, the Business Environment (BE) affects the Working Environment (WE) aspect.

Past research has pointed out the conflict between environmental quality, business environment, and work environment. According to the results of this study, policymakers can adopt a development path (PI $\rightarrow$ EQ $\rightarrow$ BE $\rightarrow$ WE) to improve the development of science parks strategy and meet stakeholders' satisfaction. Therefore, from the public infrastructure perspective, to improve the peak time congestion problem, support the investment in infrastructure resources such as stable water and electricity supply, provide more favorable land and plant rents to drive investment capacity, and maintain and improve environmental quality are needed to be implemented. Through the environmental planning and management thinking of pursuing sustainable development, it will naturally attract domestic and foreign manufacturers to settle in, expand the park's scale, and enhance the business environment and business activities. Thereby promoting the joint research and development of emerging technologies through industry-university links, adding values to talent training, recruiting domestic and foreign technical talents, improving the talent retention environment and enriching human capital, creating employment opportunities, and increasing the popularity of the park can accelerate economic transformation and bring the science park permanent continued development.

This study provides a reference for the science park to make decisions for stakeholders; at the same time, it can also serve as a reference for the government when formulating relevant policies and planning related strategies, focusing on future economic development needs, deploying ahead of time, and implementing the sustainable development of science parks according to local conditions.

However, this study only investigates and analyzes a single case of Hsinchu Science Park in Taiwan. It can be further expanded to other science parks in Taiwan in the future, namely: Central Taiwan Science Park, Southern Taiwan Science Park, Nangang Science Park, Neihu Science Park, etc. In addition, this research is analyzed in a quantitative manner. It is recommended that mixed research methods (qualitative and quantitative mix) be used in the future to avoid the objectivity of research interpretation and increase the quality of the research results.

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