

Article

Establishing Urban Revitalization and Regional Development Strategies with Consideration of Urban Stakeholders Based on the ISA-NRM Approach

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Abstract: Urban revitalization has already become the main goal for urban managers. However, various stakeholders may have different perspectives on urban revitalization. Therefore, how urban managers understand various stakeholders' urban revitalization needs and determine urban sustainable development strategies has become a significant challenge. This study defines four driving aspects of urban revitalization (infrastructure construction, living environment, trade and investment, and urban consciousness). It analyzes the status of importance and satisfaction for various stakeholders (residents, sojourners, travelers) for urban revitalization using the ISA (importance satisfaction analysis) approach. The study also adopted the NRM (network relation map) approach to evaluate the network relation structure based on the DEMATEL (Decision Making Trial and Evaluation Laboratory) approach. This study integrates the ISA and NRM approaches and proposes using the ISA-NRM approach to assess the acceptance strategies and common suitable paths for various stakeholders. The proposed model can aid urban managers in understanding the various stakeholders' perspectives for urban sustainable development strategies and determine the urban revitalization paths based on diverse perspectives of groups of stakeholders.

Keywords: urban revitalization; urban stakeholders; diverse perspectives; ISA-NRM; DEMATEL



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1. Introduction

City governments should strive to facilitate local economic development in their jurisdiction to achieve regional revitalization and sustainable urban development. The benefits are numerous, including creating job opportunities from investments in manufacturing and businesses; increasing tourism revenues by developing recreational facilities in attractive scenic locations, etc. However, each region has its unique characteristics and limitations. Different strategies should be adopted to gather resources to put in the most critical areas of improvement, in order to maximize opportunities and overcome weaknesses. The major stakeholders' interests and needs must be considered and communicated, to reach the compromised best interest of them all. For example, new manufacturing plants can certainly bring in new job opportunities, however, local residents may complain about rising housing and living costs, traffic congestion, and air pollution. Therefore, local government authorities must balance the needs of all involved stakeholders while pursuing the long-term success of urban revitalization and environmental sustainability.

Jokinen, Leino, Backlund, and Laine (2018) explored the waterfront development concept to attract new inhabitants and promote economic development. The global carbon control demands influence Tampere city's spatial planning process. They tried to analyze two interdependent policy goals to create the city policy domain and lead the city toward sustainable development. Their research results indicated that global policy models can aid decision-makers in creating urban sustainability solutions. The intertwining of diverse policy models can create recursive cycles in the city planning process and renew to

define the city's vision and find sustainable development strategies for intercity networks. The perspective becomes more and more critical in the local policy narrative and urban strategic planning and can become a solution to inherently ambivalent practices in urban sustainability [1].

The residents may work and live in one place for a long time in the urban or metropolitan areas. So, urban revitalization and regional development will change their work style and affect their living environment. Due to study, work, or other particular purpose, the sojourners move to one city and work and live in the urban area. However, the individuals may want to study new things or gain new work opportunities. Therefore, urban revitalization can bring various opportunities and challenges. Due to business activities, tourism, leisure, and vacation, travelers visit and stay in the urban environment for a short time, and will perhaps leave the city after their vacation day. Thus, this study accesses the driving forces of urban revitalization and regional development based on the three urban stakeholders (residents, sojourners, and travelers). This study also evaluates the various perspective of three urban stakeholders (residents, sojourners, and travelers). Through the research results, local authorities and urban stakeholders can reaccess their future direction of urban revitalization and regional development, find new urban development opportunities, and create a suitable urban living environment.

The presented study has been organized into five sections. The research background of urban revitalization and regional development issues is explained in Section 1. The critical driving forces of urban revitalization are explored in Section 2. The ISA-NRM (importance satisfaction analysis and network relation map) approach is described in Section 3. The acceptance strategies and suitable acceptance paths for various stakeholders using the ISA-NRM approach are described in Section 4. The common suitable acceptance paths proposed to aid the urban managers to engage in urban revitalization. Section 5 concludes with the value of this model, to assist urban managers in recommending urban sustainable development strategies and determining the urban revitalization paths.

2. Literature Review and Research Framework

City revitalization can encourage cities to change and become more livable for their citizens. Gotovac and Kerbler (2019) explored the process of city transformation in Ljubljana City, Slovenia. City revitalization can often reflect urban life quality improvement. The city managers can create more public spaces in the city center through policies (bicycle and pedestrian expansion, reducing or closing certain streets for car use, and encouraging more citizens to use public transport tools). The study adopted the semi-structured interview methods through expert focus groups of various disciplines. The research results showed that a more favorable policy can push Ljubljana to succeed in the revitalization transformation process. Although some experts still noted some shortcomings in the city's transformation, Ljubljana's success can still become a development pattern for other cities [2]. Through expert interviews and literature reviews, this study constructs a model of four driving aspects (infrastructure construction, living environment, trade and investment, and urban consciousness) and 16 criteria of driving forces to analyze urban revitalization and regional development strategies. Concerning the IC (infrastructure construction) aspect, four driving forces are identified: transportation infrastructure (IC1), information infrastructure (IC2), public service construction (IC3), and art recreational and exhibition construction (IC4). Associated with the LE (living environment) aspect, there are four driving forces: natural landscape maintenance (LE1), ecological environment protection (LE2), maintenance of historical monuments (LE3), and religious cultural heritage (LE4). Associated with the TI (trade and investment) aspect, there are four driving forces: industrial operation activities (TI1), economic and trade activities (TI2), industry investment incentives (TI3), and employment opportunities (TI4). Associated with the UC (urban consciousness) aspect, there are four driving forces: cultural celebration (UC1), multicultural integration (UC2), sporting events organized (UC3), and local cultural promotion

(UC4). The four aspects, their associated driving forces, and their respective descriptions are shown in Table 1.

Table 1. The descriptions of aspects/criteria for urban revitalization.

Aspects/Criteria	Descriptions
Infrastructure construction (IC)	
Transportation infrastructure (IC1)	Convenient transportation infrastructure can satisfy citizens' daily commuting needs and promote local commerce activities.
Information infrastructure (IC2)	Excellent information infrastructure can provide citizens with diverse information service needs and attract more manufacturers to settle in the region.
Public service construction (IC3)	Complete education, medical, and social welfare can satisfy citizens' public service needs in their daily life.
Recreational and exhibition construction (IC4)	Diverse cultural and recreation spaces can meet the citizen's need to watch and perform outdoor sports and recreational activities.
Living environment (LE)	
Natural landscape maintenance (LE1)	Urban natural landscape maintenance can ensure that citizens enjoy the original natural and ecological landscape.
Ecological environment protection (LE2)	The ecological environment protection can let urban citizens own a sustainable ecological environment.
Maintenance of historical monuments (LE3)	Complete maintenance of historical monuments can allow citizens to understand the city's history and urban development track.
Religious cultural heritage (LE4)	Preservation and promotion of cultural festivals can enable citizens to learn about local religious festivals and cultural contexts.
Trade and investment (TI)	
Industrial operation activities (TI1)	Primary industries and industrial production activities can drive local employment and promote the formation of local industrial settlements.
Economic and trade activities (TI2)	Services and business activities can activate local consumption, help attract foreign investment, and promote the formation of business circles.
Industry investment incentives (TI3)	Complete municipal infrastructure and employment and migrant policies can attract manufacturers and workers to settle in and promote local economic development.
Employment opportunities (TI4)	Appropriate investment incentives and preferential tax policies can attract foreign manufacturers to settle and drive local employment opportunities.
Urban consciousness (UC)	
Cultural celebration (UC1)	The inheritance and promotion of festival events will enable citizens to better understand local folk events and emerging festivals.
Multicultural integration (UC2)	The citizens' diversity can strengthen the local cultural integration and enrich the local culture connotation.
Sporting events organized (UC3)	Various sports events can activate urban tourism and promote the citizens' leisure sports and recreational atmosphere.
Local cultural promotion (UC4)	Promoting local cultural characteristics can improve the citizens' identity and promote the local tourism industrial development.

2.1. Infrastructure Construction (IC)

Transportation service quality includes the core transportation service and the transportation's physical environment. The study analyzed the satisfaction of transportation service quality and explored the relationship between the transportation service quality and the image of a sustainable city. Besides, the study also examined the moderating role of satisfaction for transportation service quality and sustainable city image. The research indicated that the core transportation service and physical environment positively influence satisfaction and the sustainable city image. So, satisfaction played a mediating role between the transportation service quality and service quality image, and the satisfaction effect became more significant as the involvement increased [3]. Szmelter-Jarosz and Rzesny-Cieplinska (2020) compared various urban crowd logistics (CL) solutions and analyzed the preferences of different urban logistics stakeholders. The study established the evaluation aspects/criteria of sustainable urban development and explored various stakeholders' priorities. Researchers adopted text mining and text analysis methods to analyze the expert interviews and used the chi-square tests to determine the stakeholders. Besides, the study integrates the AHP (analytic hierarchy process) and DEMATEL (decision-making trial and evaluation laboratory) to evaluate the stakeholders' priorities based on the questionnaire.

The study defined the demand characteristics and determined the stakeholders' preferences for crowd logistics (CL) solutions [4]. The sharing economy has become more and more critical to modern urban development. So, the study explored the sharing economy applications in Polish cities' freight deliveries. Researchers analyzed the sharing economy to push sustainable urban development by adopting green vehicles and reducing delivery vans. The study examined the two solutions of the vehicle-sharing service platform (crowd shipping and LCV-sharing) for light commercial vehicles. Besides, researchers also explored the Polish citizens' attitude and motivation for vehicle-sharing service platforms through the two research models. The service styles of the sharing economy can be adapted for urban logistics services. Although the sharing urban logistics services have small market sizes, the LCV-sharing has more and more new customers. The study considered that service styles of car-sharing were more environmentally friendly and economical than traditional leasing services and can reduce companies to rent the delivery vans individually. The service style of sharing urban logistics services has already been adopted by Polish citizens. However, the development of LCV-sharing still needs to affect its service availability and service pricing to strengthen users' confidence [5].

2.2. *Living Environment (LE)*

In the coming decades, social and environmental factors will influence city development. So, urban managers should consider demographic shifts, climate change, and biodiversity conservation, and plan urban green spaces to reduce urban development pressure. Urban green spaces can provide various service benefits to multiple ecosystems. Based on a face-to-face questionnaire, the study analyzed the inhabitants' perceptions of cultural ecosystem services through Berlin's urban green spaces. Researchers adopted proportionate cluster sampling and analyzed the non-monetary statements' perceived importance for comprehensive cultural ecosystem services. The research results showed that bundles can perceive cultural ecosystem services, but those bundles may negatively affect each other. The cultural ecosystem services' perceived importance will be influenced by social and spatial factors. Younger inner-city dwellers prefer cultural ecosystem services that facilitate social interactions. Older inhabitants living in problematic areas prefer nature experiences and cultural ecosystem services. To respond to global environmental changes, the city should consider establishing sustainable city planning through the ecosystem service framework. The ecosystem service framework can provide urban managers with a more participatory planning process and solve urban sustainability challenges [6]. Sustainable tourism achieves true sustainability through being environmentally friendly and economically designed. The study explored the various approaches to sustainable tourism and suggested that new technology adoption was the future development trend. Environmentally friendly tour services can be achieved through the electric buses in the city tour bus service. Besides, the social energy-saving program can reduce the economic burden for service providers and provide environmental contributions through financial incentives. The study proposed two mathematical models to plan the sustainable city tour bus service. Model one includes two objective functions: minimizing CO₂ emissions and total investment cost and obtaining the Pareto solutions through diverse battery capacities and an electric bus portfolio. Model two analyzes the optimal unit service price, and the research result is already in use in the Seoul city tour bus service. These two proposed models provide new concepts to establish the scientific sustainable tourism system and offer new opportunities and applications in other fields [7]. The continually increasing urban population makes the urban resources become scarce and overloads the ecosystem. Therefore, sustainable urban development becomes more critical for city managers and citizens. Sustainable cities hope to use minimal natural resources to support the excellent life quality and not overuse the natural resources to influence future life quality. Green buildings, eco-friendly ecosystems, and energy efficiency can reduce the use of natural resources through regular monitoring. Then, the energy-efficient wireless sensor network can improve the efficiency for regular monitoring by internet connectivity. Various monitoring

sensors' received data can aid decision-makers in understanding and predicting future situations. Besides, some optimization approaches, such as the genetic algorithm, can reduce the computational overhead and energy usage and improve the use performance of natural resources [8].

2.3. Trade and Investment (TI)

Due to cities facing more and more global competition, the competitiveness performance indicators become more critical for evaluating policy adoption and implementation. However, one city can establish an evaluation system to assess the social, economic, and environmental indicators and provide a better living environment. A study analyzed the Brazilian cities' indicators of supporting the development of smart or sustainable cities through a set of 3150 data points. Researchers evaluated the 150 best cities' performance through 21 indicators and divided these cities into three groups (big cities, medium-sized cities, and small cities). The research showed that Brazilian cities' managers pay attention to the current evaluation system's ICT (information and communication technology) and socio-economic issues. Hence, the current evaluation system can reflect smart cities more than sustainable cities. Besides, the researcher also found that the small cities have competitive advantage in the social indicators and the big cities have competitive advantage in the general indicators [9]. Local governments often need guidance to aid their target setting, policymaking, and evaluation of the effects of implementation. However, city managers often do not understand how to choose the ranking system and establish a suitable indicator framework for sustainable urban development. Therefore, the study compares seven smart cities' /sustainable cities' evaluation systems and their indicator frameworks. Researchers propose the taxonomy of five urban conceptual focuses (smartness and urban sustainability) and 10 application domains (economy, transport, energy, ICT, etc.). The sustainable urban development evaluation system includes five evaluation processes (input, process, output, outcome, and impact) for the smart city. The evaluation system also proposes fully oriented standards and smart urban-oriented standards to satisfy the needs of different urban styles. The study also suggests that the city managers should establish their vision and goal and choose appropriate evaluation indicators and ranking systems to evaluate and guide urban shifts to a sustainable smart city [10]. The need for facilities becomes more and more critical for sustainable smart cities in developing countries. So, three Indian smart cities propose the SSCDI (smart and sustainable city development index) through the hierarchical approach. The SSCDI includes multiple indicators (lifestyle, culture, environment, economic, and social). The study adopts the SSCDI to evaluate the three cities' performances on various indicators and provides the conceptual landscape of sustainable urban development for the developing countries [11]. The adoption of information and communications technology (ICT) to solve the urban issue has become more popular. The concept of smart cities has already become a solution to sustainable urban development. Due to the differences in governmental structures, urban characteristics, and social needs, the development direction and strategies of smart cities are variable. The NSSP (National Strategic Smart City Program) proposed establishing smart cities' standards and a new technological ecosystem in Korea. The study introduced the smart city services of Korean NSSP and compared these services with the other 15 smart cities in North America, Europe, and Asia. The NSSP services focused on the 5G telecommunication technology applications and widened the smart cities' industrial territories. The study found that established public information systems can support the cities' sustainable development and create a new vision and perspective for smart cities [12].

2.4. Urban Consciousness (UC)

Institutions of higher education can serve as the planner and executors of natural capital projects. The study explores the role of the University of Lodz (UL) as the originator of maintaining and restoring the natural capital for sustainable urban development. The study analyzed three cases performed by the University of Lodz. These cases evaluated the

local river and green infrastructure and explored their policy planning and implementation in different stages. The research indicated that the natural capital projects will influence sustainable urban development on different levels, so the city manager can maintain and restore natural capital through legal protection initiations, river rehabilitation, and establishing strategic urban development policy. The higher education institution has the multidisciplinary planning and implementation capacity to engage the large-scale urban sustainable development projects. However, academics also facilitate knowledge-building and transferring and can provide their know-how, innovation, and technology transfer in the implementation of natural capital projects. They can also strengthen the cities' natural capital for sustainable urban development [13]. As Cambodia does not have sustainable urban indicators, a study explored the UN sustainable development goal 11 (SDG 11) and green and clean city indicators. The researcher proposed Cambodia's sustainable city indicators and addressed the limitation of green and clean city indicators. The study adopted three rounds of Delphi processes to establish the evaluation indicators and determine 32 validated indicators in the third round. The proposed evaluation indicators integrate the UN SDG 11 and the green and clean city indicators. The 32 consensus indicators of Cambodia's sustainable city indicators can aid Cambodia in achieving the UN SDG 11 and moving to a sustainable development city [14].

Due to ICT (information and communications technology) progress, digital participatory planning (DPP) has become more and more popular in smart cities. Some studies have explored the factors influencing digital participatory planning (DPP) for smart cities. A study examined social and organization-related aspects of DPP in small European cities. Researchers adopted the hybrid approach to analyze two groups of factors in Schiedam, Netherlands using SPSS and NVIVO software. The research found that the cities introducing DPP have excellent practice in conventional participatory planning. Besides, the researchers found that these DPP cities also have a high literacy of digital technology and relatively high trust in community engagement processes. The study can aid the relative authorities in making policies and successfully moving to be sustainable smart cities [15]. Smart cities have become more and more important in global urban development, but the knowledge and technologies of smart cities are still not enough. So, the study tried to explore the knowledge and technologies of smart cities and understand what factors influence citizen perception of smart urban development. The study adopted the social media analysis approach (systematic geo-Twitter analysis), which included analyzing descriptive and spatial content and policy based on the Australian context. The study indicated that: (1) the most popular smart city concepts include sustainability, innovation, and governance; (2) the most popular technologies of smart cities were autonomous vehicle technology, internet-of-things, and artificial intelligence; (3) smart city concepts and technologies were equally critical; (4) Australia's leading smart cities are Brisbane, Sydney, and Melbourne; the systematic geo-Twitter analysis can aid the decision-makers in understanding the utilization and perception of smart city concepts and technologies. The research results reflect citizen perception of concepts and technologies of smart cities, and the information can aid city managers in making relative smart city development strategies [16].

3. Methodology

The ISA (importance satisfaction analysis) approach and NRM (network relation map) approach can improve the evaluation system of urban revitalization. First, this study defines the critical decision problem of urban revitalization. Then, in the second stage, this study determines the driving aspects/criteria for the evaluation system through literature reviews and expert interviews. This study surveys the importance and satisfaction levels for each aspect/criterion and evaluates the status of importance and satisfaction by the ISA approach in the third stage. In the fourth stage, this study analyzes the influence relation structure for the evaluation system by the NRM approach. It establishes the acceptance strategy based on the ISA-NRM approach for the evaluation system in the fifth stage. It determines the common acceptance paths in the sixth stage and the suited acceptance paths

in the seventh stage. Finally, this study combines the ISA and NRM approaches to choose the adoption strategies and common suitable acceptance paths by the ISA-NRM approach, as shown in Figure 1.

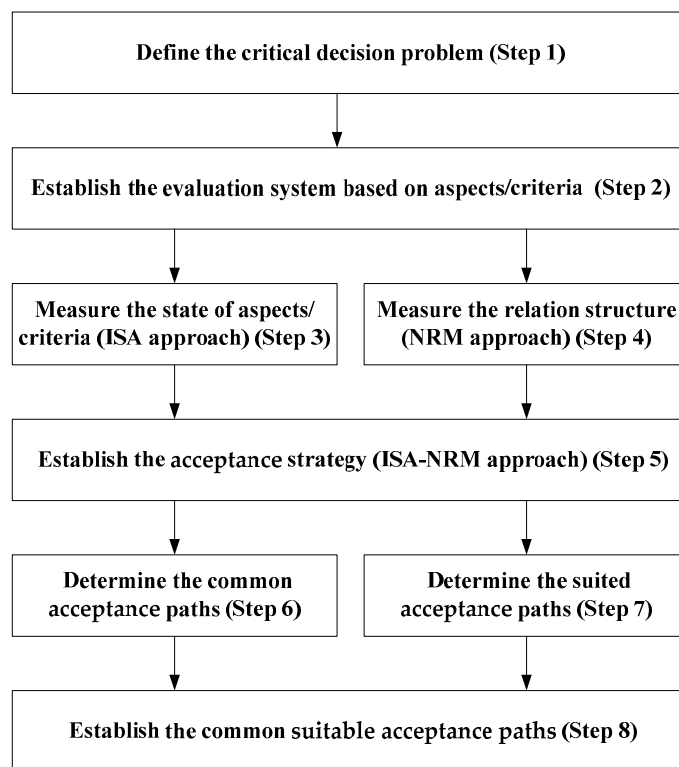


Figure 1. The ISA-NRM approach for urban revitalization.

3.1. The Survey Subjects and Reliability Analysis

This study defines four aspects (infrastructure construction, living environment, trade and investment, and urban consciousness) and 16 criteria through expert interviews and literature reviews. The study used an 11-point Likert Scale (0~10) to collect stakeholder opinions about the relative importance of the driving aspects/criteria. Among the 160 responses, only 118 are valid responses (75 residents, 36 sojourners, and 7 travelers). Cronbach's alpha establishes the reliability of importance and satisfaction. The reliability of importance and satisfaction are 0.988 and 0.985. Both are higher than 0.7, the suggested reliable level. It means that both the status importance index and the satisfaction index have high reliability. The reliability aspect of the evaluation system is 0.937. It means that the reliability of this model is highly consistent (Table 2).

Table 2. The analysis of reliability (Cronbach α).

Items	Alpha	Result
Importance index	0.988	High
Satisfaction index	0.985	High
Aspects of evaluation system	0.937	High

Note: Cronbach suggests Alpha α -value: $\alpha \leq 0.35$ are low reliability, $0.35 < \alpha < 0.7$ middle reliability, $\alpha \geq 0.7$ is high reliability.

3.2. The ISA (Importance Satisfaction Analysis) Approach

The study evaluates the importance and satisfaction status for each criterion and standardizes these surveyed data. Through the standardized process of the analyzed data, these criteria can be divided into four quadrants: the high importance and high satisfaction

status located in the first quadrant (H, H), the low importance and high satisfaction status in the second quadrant (L, H), the low importance and high satisfaction status in the third quadrant (L, L), and the high importance and low satisfaction status in the fourth quadrant (H, L). The aspects/criteria of the fourth quadrant (H, L) were high importance and low satisfaction, therefore the aspect located in the fourth quadrant (H, L), such as IC (infrastructure construction), should improve in the first step, based on the ISA analysis. Besides, the aspects/criteria of the third quadrant (L, L) were of low importance and low satisfaction status, therefore the aspect located in the third quadrant (H, L), such as the TI (trade and investment), should improve in the second step, as illustrated in Table 3 and Figure 2.

Table 3. The importance satisfaction analysis (ISA) for urban revitalization.

Aspects	Importance Index		Satisfaction Index		(II, SI)
	MI	SI	MS	SS	MI
Infrastructure construction (IC)	6.913	0.362	5.413	−0.386	(H, L)
Living environment (LE)	7.089	1.044	5.627	0.926	(H, H)
Trade and investment (TI)	6.477	−1.332	5.275	−1.231	(L, L)
Urban consciousness (UC)	6.801	−0.074	5.589	0.692	(L, H)
Average	6.820	0.000	5.476	0.000	
Standard deviation	0.258	1.000	0.163	1.000	
Maximum	7.089	1.044	5.627	0.926	
Minimum	6.477	−1.332	5.275	−1.231	

Note 1: The aspect of (H, H) means high importance and high satisfaction; (L, H) means low importance and high satisfaction. The aspect of (L, L) means low importance and low satisfaction, and (H, L) means high importance and low satisfaction. Note 2: MI, SI, MS, and SS mean importance level, standardized importance level, satisfaction level, and standardized satisfaction level respectively.

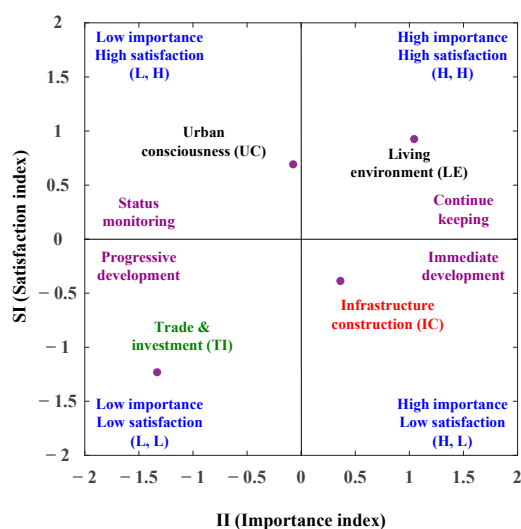


Figure 2. The ISA analysis map for urban revitalization.

3.3. The NRM Analysis Based on the DEMATEL Approach

The DEMATEL approach can aid the decision-maker in establishing the influence relation structure based on the NRM (network relation map) approach for the complex decision problem. Recent studies solve decision problems through the DEMATEL approach, such as the user interface analysis through the DEMATEL approach [17], the evaluation system of failure sorting [18], the airline safety evaluation system [19], the value-created systems of science (technology) parks based on the DEMATEL approach [20], determining the threshold value for DEMATEL approach [21], establishing the service selection strategies of vehicle telematics service systems [22], evaluating product position of vehicle telematics systems (VTS) based on the hybrid MCDM approach [23], establishing

the digital music service evaluation model based on the hybrid MCDM approach [24], establishing the sustainable consumption and production adoption through the structural model based on the A grey-DEMATEL based approach [25], the challenges of environmentally sustainable manufacturing for Indian automobile industry based on the DEMATEL approach [26], establishing the service position model of package tour based on the hybrid MCDM approach [27], establishing the sustainable development strategies of industrial tourism using the IOA-NRM technique [28], establishing the sustainable environment development strategies of urban and rural tourism based on the MCDM approach [29], and establishing emerging culture festival events' service evaluation model using the MCDM approach [30], the barriers and adoption of renewable energy sources based on the uncertainty multi-criteria assessment [31], establishing the common suitable paths and urban sustainable development strategies considering various stakeholders [32], establishing the CSF (Critical success factors) of abandoned industrial building projects' safety program implementation of regeneration based on the Fuzzy DEMATEL approach [33]. The DEMATEL approach can be described as follows, including five steps: (1) evaluate the original average matrix; (2) calculate the direct influence matrix; (3) calculate the indirect influence matrix; (4) evaluate the full influence matrix; and (5) determine the network relation map (NRM).

1. Evaluate the original average matrix

The respondents evaluate the influence each aspect has on the others by scales ranging from 4 to 0. "4" means extremely strong influence on others, and "0" indicates no influence on others between aspect/criterion; "3", "2", and "1" indicate "high influence on others", "medium influence on others", and "low influence on others", respectively. The influence that infrastructure construction (IC) has on the LE (living environment) is 3.000, which means "high influence". The impact that TI (trade and investment) has on UC (urban consciousness) is 2.508, which also means "medium influence", as shown in Table 4.

Table 4. The original average influence matrix (A).

Aspects	IC	LE	TI	UC	Total
Infrastructure construction (IC)	0.000	3.000	2.703	2.729	8.432
Living environment (LE)	2.881	0.000	2.644	2.847	8.373
Trade and investment (TI)	2.822	2.669	0.000	2.508	8.000
Urban consciousness (UC)	2.653	2.788	2.593	0.000	8.034
Total	8.356	8.458	7.941	8.085	-

2. Calculate the direct influence matrix

The *D* (direct influence matrix) can be obtained through *A* (initial average influence matrix) using Equations (1) and (2), as shown in Table 5. The *D* (direct influence matrix) represents each direct influence, and the numbers on the diagonal are 0. The sum of each column and row is 1 in maximum (only one equals 1) in the matrix. Adding the sums of each row and column in the matrix could obtain the direct influence value. Table 6 can be obtained by adding up rows and columns, and the sum of rows and columns for the "living environment" (LE) is 1.990, which is the most important influence aspect. Besides, the sum of rows and columns for "trade and investment" (TI) is 1.885, which is the least essential influence aspect, as illustrated in Table 6.

$$D = sA, \quad s > 0 \quad (1)$$

$$\begin{aligned}
&\text{where } s = \min_{i,j} [1 / \max_{1 \leq i \leq n} \sum_{j=1}^n a_{ij}, 1 / \max_{1 \leq j \leq n} \sum_{i=1}^n a_{ij}], i, j = 1, 2, \dots, n \\
&\text{and } \lim_{m \rightarrow \infty} D^m = [0]_{n \times n}, \text{ where } D = [x_{ij}]_{n \times n}, \text{ when } 0 < \sum_{j=1}^n x_{ij} \leq 1 \text{ or} \\
&0 < \sum_{i=1}^n x_{ij} \leq 1, \text{ and at least one } \sum_{j=1}^n x_{ij} \text{ or } \sum_{i=1}^n x_{ij} \text{ equals one, but not all. So,} \\
&\text{we can guarantee } \lim_{m \rightarrow \infty} D^m = [0]_{n \times n}.
\end{aligned} \tag{2}$$

Table 5. The direct influence matrix (*D*).

Aspects	IC	LE	TI	UC	Total
Infrastructure construction (IC)	0.000	0.355	0.320	0.323	0.997
Living environment (LE)	0.341	0.000	0.313	0.337	0.990
Trade and investment (TI)	0.334	0.316	0.000	0.297	0.946
Urban consciousness (UC)	0.314	0.330	0.307	0.000	0.950
Total	0.988	1.000	0.939	0.956	-

Table 6. The degree of direct influence.

Aspects	Sum of Row	Sum of Column	Sum of Row and Column	Importance of Influence
Infrastructure construction (IC)	0.997	0.988	1.985	2
Living environment (LE)	0.990	1.000	1.990	1
Trade and investment (TI)	0.946	0.939	1.885	4
Urban consciousness (UC)	0.950	0.956	1.906	3

3. Calculate the indirect influence matrix

The indirect influence matrix can be obtained by Equation (3), as illustrated in Table 7.

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

Table 7. The indirect influence matrix (*ID*).

Aspects	IC	LE	TI	UC	Total
Infrastructure construction (IC)	8.834	8.824	8.422	8.543	34.622
Living environment (LE)	8.698	8.868	8.378	8.489	34.433
Trade and investment (TI)	8.407	8.495	8.169	8.219	33.289
Urban consciousness (UC)	8.440	8.513	8.121	8.311	33.385
Total	34.379	34.700	33.089	33.562	-

4. Evaluate the full influence matrix

T (full influence matrix) can be obtained by Equation (4) or (5), as shown in Table 8. As indicated in Equation (6), the *T* (full influence matrix) includes multiple elements. The *d* is the sum vector of row value, and the *r* is the sum vector of column value; the *d_i + r_i* is the sum vector of row value plus column value, and *d_i − r_i* is the sum of row value minus column value. If *d_i − r_i* > 0, it means the aspect affects other aspects more strongly than the aspect being affected. The LE (living environment) aspect was the highest full influence (*d₂ + r₂* = 71.125), as illustrated in Table 9. The IC (infrastructure construction) aspect has the highest net influence (*d₁ − r₁* = 0.252). The order of other net influences is as follows: TI

(trade and investment) ($d_3 - r_3 = 0.207$), UC (urban consciousness) ($d_4 - r_4 = -0.183$), and living environment (LE) ($d_2 - r_2 = -0.276$).

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

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

$$T = [t_{ij}], \quad i, j \in \{1, 2, \dots, n\} \quad (6)$$

$$d = d_{n \times 1} = \left[\sum_{j=1}^n t_{ij} \right]_{n \times 1} = (d_1, \dots, d_i, \dots, d_n) \quad (7)$$

$$r = r_{n \times 1} = \left[\sum_{i=1}^n t_{ij} \right]_{1 \times n}' = (r_1, \dots, r_j, \dots, r_n) \quad (8)$$

Table 8. The full influence matrix (T).

Aspects	IC	LE	TI	UC	d
Infrastructure construction (IC)	8.834	9.179	8.742	8.866	35.620
Living environment (LE)	9.039	8.868	8.691	8.826	35.424
Trade and investment (TI)	8.741	8.811	8.169	8.516	34.236
Urban consciousness (UC)	8.754	8.843	8.428	8.311	34.336
r	35.368	35.701	34.029	34.519	-

Table 9. The degree of full influence.

Aspects	d_i	r_i	$d_i + r_i$	$d_i - r_i$
Infrastructure construction (IC)	35.620	35.368	70.987	0.252
Living environment (LE)	35.424	35.701	71.125	-0.276
Trade and investment (TI)	34.236	34.029	68.265	0.207
Urban consciousness (UC)	34.336	34.519	68.855	-0.183

5. Determine the network relation map (NRM)

Then, this study uses the T_{net} (net influence matrix) to determine the net influence matrix through Equation (9).

$$C_{net} = [t_{ij} - t_{ji}], \quad i, j \in \{1, 2, \dots, n\} \quad (9)$$

The diagonal items of the matrix are all 0. In other words, the matrix contains a strictly lower triangular matrix and a strictly upper triangular matrix. Moreover, while the values of the strictly upper triangular matrix and strictly lower triangular matrix are the same, their symbols are opposite. This property helps to choose one of the strictly triangular matrices. The net influence matrix can be obtained through Equation (9), as illustrated in Table 8. The X-axis and Y-axis can plot the $(d + r)$ and $(d - r)$, respectively, as shown in Table 9, and the NRM (network relation map) can be drawn, as shown in Figure 2. The IC (infrastructure construction) aspect is the primary aspect with net influence, while the LE (living environment) aspect is the primary aspect being influenced. The aspect of LE has the highest full influence, while the aspect of TI (trade and investment) has the least full influence, as shown in Figure 3 and Table 10.

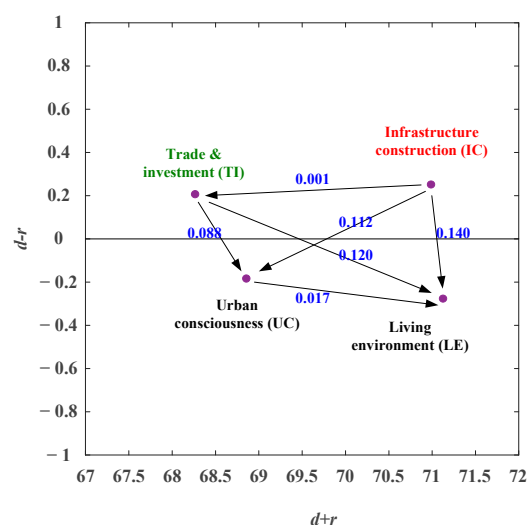


Figure 3. The NRM for urban revitalization.

Table 10. The net influence matrix for urban revitalization.

Aspects	IC	LE	TI	UC
Infrastructure construction (IC)	-			
Living environment (LE)	−0.140	-		
Trade and investment (TI)	−0.001	0.120	-	
Urban consciousness (UC)	−0.112	0.017	−0.088	-

3.4. The ISA-NRM Approach

The ISA-NRM approach integrates the two approaches, which include the ISA (importance and satisfaction analysis) and NRM (network relation map). The ISA approach evaluates the importance and satisfaction status of the evaluation system of urban revitalization. The NRM approach evaluates the influence relation structure based on the DEMATEL approach. The four acceptance strategies are present, as illustrated in Figure 4 and Table 11. Acceptance strategy A (continue keeping) can apply in the LE (living environment) aspect. Acceptance strategy B (status monitoring) can apply in the UC (urban consciousness) aspect. Acceptance strategy C (progressive development) can apply in the TI (trade and investment) aspect. Acceptance strategy D (immediate development) can apply in the IC (infrastructure construction) aspect. The aspects/criteria should be affected by the ISA approach and determine the acceptance path by the NRM approach. The aspect satisfaction level is less than the average satisfaction level, so the TI aspect and the IC aspects should improve. The IC aspect is the primary net influence aspect, so the IC aspect can affect the TI aspect. The LE (living environment) is the aspect being influenced; therefore, the LE aspect can be improved by the IC, TI, and UC aspects, as shown in Figure 4 and Table 11.

Table 11. The acceptance strategy of urban revitalization.

Aspects	ISA			NRM			Strategy
	II	SI	(II, AI)	$d + r$	$d - r$	(R, D)	
Infrastructure construction (IC)	0.362	−0.386	H, L	70.987	0.252	D (+, +)	D
Living environment (LE)	1.044	0.926	H, H	71.125	−0.276	ID (+, −)	A
Trade and investment (TI)	−1.332	−1.231	L, L	68.265	0.207	D (+, +)	C
Urban consciousness (UC)	−0.074	0.692	L, H	68.855	−0.183	ID (+, −)	B

Notes: The four acceptance strategies include: Acceptance strategy A (continue keeping), Acceptance strategy B (status monitoring), Acceptance strategy C (progressive development), and Acceptance strategy D (immediate development).

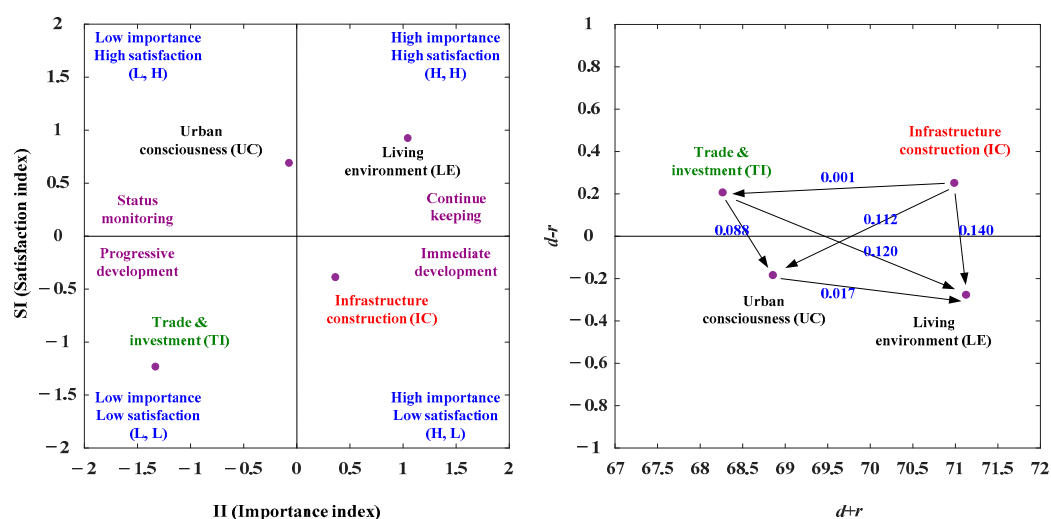


Figure 4. The improvement strategy map of urban revitalization.

3.5. Evaluation the Suitable Acceptance Paths through the Rank of Aspects

Through the suitable acceptance path analysis, the II (importance index) ranking is $LE \supset IC \supset UC \supset TI$ and the SI (satisfaction index) ranking is $LE \supset UC \supset IC \supset TI$. The four acceptance paths ($IC \rightarrow LE$; $IC \rightarrow UC \rightarrow LE$; $IC \rightarrow TI \rightarrow LE$; $IC \rightarrow TI \rightarrow UC \rightarrow LE$) can be determined using the NRM approach. The II (importance index) ranking is $LE \supset IC \supset UC \supset TI$, and the IC (infrastructure construction) aspect cannot affect the LE (living environment) aspect by the first acceptance path ($IC[2] \rightarrow LE[1]$). The IC (infrastructure construction) aspect can affect the UC (urban consciousness) aspect by the second acceptance path ($IC[2] \rightarrow UC[3] \rightarrow LE[1]$). The IC (infrastructure construction) aspect can affect the aspect of TI (trade and investment) by the third acceptance path ($IC[2] \rightarrow TI[4] \rightarrow LE[1]$). The aspect of IC (infrastructure construction) can affect the TI (trade and investment) aspect by the fourth acceptance path ($IC[2] \rightarrow TI[4] \rightarrow UC[3] \rightarrow LE[1]$), as illustrated in Table 12.

Table 12. The suitable acceptance paths of urban revitalization.

	II (Importance Index)	SI (Satisfaction Index)
Rank	$LE[1] > IC[2] > UC[3] > TI[4]$	$LE[1] > UC[2] > IC[3] > TI[4]$
Acceptance paths	1. $IC[2] \rightarrow LE[1]$ {N}	1. $IC[3] \rightarrow LE[1]$ {N}
	2. $IC[2] \rightarrow UC[3] \rightarrow LE[1]$ {Y}	2. $IC[3] \rightarrow UC[2] \rightarrow LE[1]$ {N}
	3. $IC[2] \rightarrow TI[4] \rightarrow LE[1]$ {Y}	3. $IC[3] \rightarrow TI[4] \rightarrow LE[1]$ {Y}
	4. $IC[2] \rightarrow TI[4] \rightarrow UC[3] \rightarrow LE[1]$ {Y}	4. $IC[3] \rightarrow TI[4] \rightarrow UC[2] \rightarrow LE[1]$ {Y}
Suitable acceptance paths	3. $IC \rightarrow TI \rightarrow LE$	4. $IC \rightarrow TI \rightarrow UC \rightarrow LE$

The SI ranking is $LE \supset UC \supset IC \supset TI$, and the aspect of IC (infrastructure construction) cannot affect the aspect of LE (living environment) by the first acceptance path ($IC[3] \rightarrow LE[1]$). The aspect of IC cannot affect the aspect of UC (urban consciousness), and the UC aspect cannot affect the aspect of LE (living environment) through the second acceptance path ($IC[3] \rightarrow UC[2] \rightarrow LE[1]$). The aspect of IC can affect the aspect of TI (trade and investment) by the third acceptance path ($IC[3] \rightarrow TI[4] \rightarrow LE[1]$), and the IC (infrastructure construction) aspect can affect the TI aspect through the fourth acceptance path ($IC[3] \rightarrow TI[4] \rightarrow UC[2] \rightarrow LE[1]$). The acceptance paths of importance index and satisfaction index were integrated and found the two suitable acceptance paths ($IC \rightarrow TI \rightarrow LE$; $IC \rightarrow TI \rightarrow UC \rightarrow LE$) as illustrated in Table 12.

3.6. Determine the Common Acceptance Paths Using the Aspects Rank for Diverse Stakeholders

In the common acceptance path analysis of the importance index (II), the II ranking is $LE \supset IC \supset UC \supset TI$ based on the resident perspective. The II (importance index) ranking is $LE \supset IC \supset UC \supset TI$ based on the sojourners' perspectives. This study can find the four acceptance paths ($IC \rightarrow LE$; $IC \rightarrow UC \rightarrow LE$; $IC \rightarrow TI \rightarrow LE$; $IC \rightarrow TI \rightarrow UC \rightarrow LE$) by the NRM approach. Based on the residents' perspectives, the II (importance index) ranking is $LE \supset IC \supset UC \supset TI$. The aspect of IC (infrastructure construction) cannot affect the LE (living environment) aspect through the first acceptance path ($IC[2] \rightarrow LE[1]$), but the IC (infrastructure construction) aspect can affect the aspect of UC (urban consciousness) through the second acceptance path ($IC[2] \rightarrow UC[3] \rightarrow LE[1]$). The IC (infrastructure construction) aspect can affect the aspect of TI (trade and investment) through the third acceptance path ($IC[2] \rightarrow TI[4] \rightarrow LE[1]$). Then, the IC (infrastructure construction) aspect can affect the aspect of TI through the fourth acceptance path ($IC[2] \rightarrow TI[4] \rightarrow UC[3] \rightarrow LE[1]$), as illustrated in Table 13. Based on the sojourners' perspective, the ranking of the II (importance index) is $LE \supset IC \supset UC \supset TI$. The aspect of IC (infrastructure construction) cannot affect the aspect of LE (living environment) by the first acceptance path ($IC[2] \rightarrow LE[1]$), and the aspect of IC can affect the UC (urban consciousness) aspect by the second acceptance path ($IC[2] \rightarrow UC[3] \rightarrow LE[1]$). The IC (infrastructure construction) aspect can affect the TI (trade and investment) aspect by the third acceptance path ($IC[2] \rightarrow TI[4] \rightarrow LE[1]$). The IC (infrastructure construction) aspect can affect the TI (trade and investment) aspect through the fourth acceptance path ($IC[2] \rightarrow TI[4] \rightarrow UC[3] \rightarrow LE[1]$) as shown in Table 13.

Table 13. The common paths of urban revitalization for residents and sojourners.

II (Importance Index)		SI (Satisfaction Index)
Residents		
Rank	$LE[1] > IC[2] > UC[3] > TI[4]$	$LE[1] > UC[2] > IC[3] > TI[4]$
Acceptance paths	1. $IC[2] \rightarrow LE[1] \{N\}$ 2. $IC[2] \rightarrow UC[3] \rightarrow LE[1] \{Y\}$ 3. $IC[2] \rightarrow TI[4] \rightarrow LE[1] \{Y\}$ 4. $IC[2] \rightarrow TI[4] \rightarrow UC[3] \rightarrow LE[1] \{Y\}$	1. $IC[3] \rightarrow LE[1] \{N\}$ 2. $IC[3] \rightarrow UC[2] \rightarrow LE[1] \{N\}$ 3. $IC[3] \rightarrow TI[4] \rightarrow LE[1] \{Y\}$ 4. $IC[3] \rightarrow TI[4] \rightarrow UC[2] \rightarrow LE[1] \{Y\}$
Sojourners		
Rank	$LE[1] > IC[2] > UC[3] > TI[4]$	$LE[1] > UC[2] > IC[3] > TI[4]$
Acceptance paths	1. $IC[2] \rightarrow LE[1] \{N\}$ 2. $IC[2] \rightarrow UC[3] \rightarrow LE[1] \{Y\}$ 3. $IC[2] \rightarrow TI[4] \rightarrow LE[1] \{Y\}$ 4. $IC[2] \rightarrow TI[4] \rightarrow UC[3] \rightarrow LE[1] \{Y\}$	1. $IC[3] \rightarrow LE[1] \{N\}$ 2. $IC[3] \rightarrow UC[2] \rightarrow LE[1] \{N\}$ 3. $IC[3] \rightarrow TI[4] \rightarrow LE[1] \{Y\}$ 4. $IC[3] \rightarrow TI[4] \rightarrow UC[2] \rightarrow LE[1] \{Y\}$
Common paths	2. $IC \rightarrow UC \rightarrow LE$ 3. $IC \rightarrow TI \rightarrow LE$ 4. $IC \rightarrow TI \rightarrow UC \rightarrow LE$	

In the common acceptance path analysis of SI (satisfaction index), the SI ranking is $LE \supset UC \supset IC \supset TI$ based on the residents' perspective and the SI (satisfaction index) ranking is $LE \supset UC \supset IC \supset TI$ based on the sojourners' perspective. This study can obtain the four acceptance paths ($IC \rightarrow LE$; $IC \rightarrow UC \rightarrow LE$; $IC \rightarrow TI \rightarrow LE$; $IC \rightarrow TI \rightarrow UC \rightarrow LE$) using the NRM approach. Based on the residents' perspectives, the SI (satisfaction index) ranking is $LE \supset UC \supset IC \supset TI$. The aspect of IC (infrastructure construction) cannot affect the aspect of LE (living environment) by the first acceptance path ($IC[3] \rightarrow LE[1]$). The IC (infrastructure construction) aspect cannot affect the aspect of UC (urban consciousness), and the UC (urban consciousness) aspect cannot affect the aspect of LE by the second acceptance path ($IC[3] \rightarrow UC[2] \rightarrow LE[1]$). The IC aspect can affect the aspect of TI (trade and investment) through the third acceptance path ($IC[3] \rightarrow TI[4] \rightarrow LE[1]$). The IC (infrastructure construction) aspect can affect the TI (trade and investment) aspect through the fourth acceptance path ($IC[3] \rightarrow TI[4] \rightarrow UC[2] \rightarrow LE[1]$), as illustrated in Table 13. Based on the sojourners' perspective, the SI (satisfaction index) ranking is $LE \supset UC \supset IC \supset TI$. The IC aspect cannot affect the LE (living environment) aspect by the first acceptance path

(IC[3]→LE[1]). The aspect of IC cannot affect the aspect of UC (urban consciousness), and the UC aspect cannot affect the aspect of LE (living environment) through the second acceptance path (IC[3]→UC[2]→LE[1]). The IC (infrastructure construction) aspect can affect the TI (trade and investment) aspect by the third acceptance path (IC[3]→TI[4]→LE[1]). The IC aspect can affect the TI (trade and investment) aspect by the fourth acceptance path (IC[3]→TI[4]→UC[2]→LE[1]), as illustrated in Table 13.

4. The Analysis of the ISA-NRM Approach for Diverse Stakeholders

This study investigated the status of importance and satisfaction through paper and online questionnaires. The ISA approach was applied to analyze the importance and satisfaction status, and the NRM approach was used to determine the network relation structure based on the DEMATEL approach. Besides, this study integrates the ISA and NRM approaches to find the acceptance strategy and acceptance paths of the urban revitalization for various stakeholders in Section 4.1. Some research results and discussion were presented in Section 4.2.

4.1. The Acceptance Strategy and Suitable Acceptance paths

The ISA-NRM approach is introduced in Section 4.1. The ISA approach can analyze the importance and satisfaction status and determine the aspects that can be affected; the NRM approach can assess the acceptance strategies and suitable acceptance paths. The ISA-NRM approach combines the ISA and NRM approaches to determine the acceptance strategies and common suitable acceptance paths for urban revitalization.

(1) The suitable acceptance paths for residents

The acceptance strategies and acceptance paths were present through the ISA-NRM approach based on the resident's perspective. Through the ISA analysis, the IC (infrastructure construction) aspect is higher than the average level of importance, and the satisfaction level is also lower than the average level of satisfaction. So, the IC aspect should improve. Besides, the TI (trade and investment) aspect also should improve while the aspect's importance level increases more than the average level of importance ($II > 0$). In the NRM analysis, the IC and TI aspects have a positive net influence effect ($d - r > 0$), so the aspect of IC can affect the TI aspect. The IC aspect only improves through itself. There are four acceptance strategies proposed in Table 14. The acceptance strategy A (continue keeping) can apply for the LE (living environment) aspect. Acceptance strategy B (status monitoring) can apply for the UC (urban consciousness) aspect, and acceptance strategy C (progressive development) can apply for the TI aspect. Acceptance strategy D (immediate development) can apply to the IC aspect. The TI aspect is in the third quadrant [(L, L)], and the IC aspect is in the fourth quadrant [(H, L)], so the two aspects could improve. The IC aspect can only improve by itself, and the TI aspect can be affected through the IC aspect, as shown in Figure 5 and Table 14.

Table 14. The acceptance strategy of residents.

Aspects	ISA				NRM		Strategy
	II	SI	(II, SI)	$d + r$	$d - r$	(R, D)	
Infrastructure construction (IC)	0.541	−0.789	H, L	70.987	0.252	D (+, +)	D
Living environment (LE)	1.001	1.176	H, H	71.125	−0.276	ID (+, −)	A
Trade and investment (TI)	−1.279	−0.872	L, L	68.265	0.207	D (+, +)	C
Urban consciousness (UC)	−0.262	0.484	L, H	68.855	−0.183	ID (+, −)	B

Notes: The four acceptance strategies include: Acceptance strategy A (continue keeping), Acceptance strategy B (status monitoring), Acceptance strategy C (progressive development) and Acceptance strategy D (immediate development).

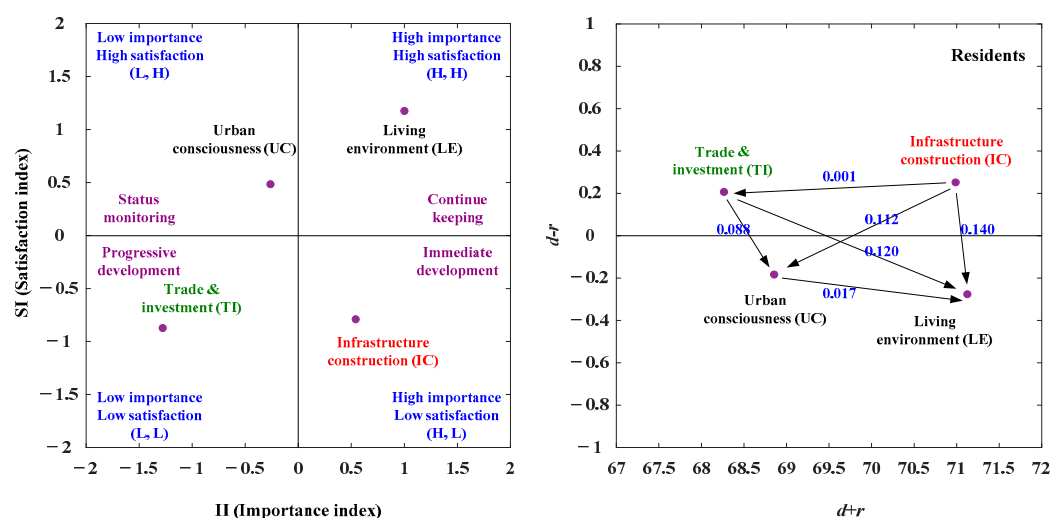


Figure 5. The analysis of ISA-NRM for residents.

In the suitable acceptance path analysis, the II (importance index) ranking is $LE \supset IC \supset UC \supset TI$ and the SI (satisfaction index) ranking is $LE \supset UC \supset IC \supset TI$ for the residents. The NRM approach can find the four available paths ($IC \rightarrow LE$; $IC \rightarrow UC \rightarrow LE$; $IC \rightarrow TI \rightarrow LE$; $IC \rightarrow TI \rightarrow UC \rightarrow LE$). The II (importance index) ranking is $LE \supset IC \supset UC \supset TI$, and the IC (infrastructure construction) aspect cannot affect the LE (living environment) aspect through the first acceptance path ($IC[2] \rightarrow LE[1]$). The IC (infrastructure construction) aspect can affect the UC (urban consciousness) aspect through the second acceptance path ($IC[2] \rightarrow UC[3] \rightarrow LE[1]$). Then, the aspect of IC can affect the TI (trade and investment) aspect through the third acceptance path ($IC[2] \rightarrow TI[4] \rightarrow LE[1]$). The IC aspect can improve the TI (trade and investment) aspect through the fourth acceptance path ($IC[2] \rightarrow TI[4] \rightarrow UC[3] \rightarrow LE[1]$). The SI (satisfaction index) ranking is $LE \supset UC \supset IC \supset TI$, and the aspect of IC cannot affect the LE aspect through the first acceptance path ($IC[3] \rightarrow LE[1]$); the aspect of IC cannot improve the UC aspect; the UC aspect cannot improve LE aspect in the second acceptance path ($IC[3] \rightarrow UC[2] \rightarrow LE[1]$). The IC (infrastructure construction) aspect can affect the TI (trade and investment) aspect through the third acceptance path ($IC[3] \rightarrow TI[4] \rightarrow LE[1]$). The IC aspect can affect the TI (trade and investment) aspect by the fourth acceptance path ($IC[3] \rightarrow TI[4] \rightarrow UC[2] \rightarrow LE[1]$). Besides, the ISA-NRM approach integrates the acceptance paths of the II (importance index) and SI (satisfaction index). The suitable acceptance paths include the two acceptance paths ($IC \rightarrow TI \rightarrow LE$; $IC \rightarrow TI \rightarrow UC \rightarrow LE$) for residents, as shown in Table 15.

Table 15. The suitable acceptance paths of residents.

	II (Importance Index)	SI (Satisfaction Index)
Rank	$LE[1] > IC[2] > UC[3] > TI[4]$	$LE[1] > UC[2] > IC[3] > TI[4]$
Acceptance paths	1. $IC[2] \rightarrow LE[1]$ {N} 2. $IC[2] \rightarrow UC[3] \rightarrow LE[1]$ {Y} 3. $IC[2] \rightarrow TI[4] \rightarrow LE[1]$ {Y} 4. $IC[2] \rightarrow TI[4] \rightarrow UC[3] \rightarrow LE[1]$ {Y}	1. $IC[3] \rightarrow LE[1]$ {N} 2. $IC[3] \rightarrow UC[2] \rightarrow LE[1]$ {N} 3. $IC[3] \rightarrow TI[4] \rightarrow LE[1]$ {Y} 4. $IC[3] \rightarrow TI[4] \rightarrow UC[2] \rightarrow LE[1]$ {Y}
Suitable acceptance paths	3. $IC \rightarrow TI \rightarrow LE$	4. $IC \rightarrow TI \rightarrow UC \rightarrow LE$

(2) The suitable acceptance paths for sojourners

Based on the sojourner's perspective, the acceptance strategies and development strategy map were present through the ISA-NRM approach. In the ISA analysis, the IC (infrastructure construction) aspect is higher than the average level of importance ($II > 0$), but the satisfaction level is lower than the average level of satisfaction level ($SI < 0$). The

aspect of TI (trade and investment) is II (importance index) less than the average importance level ($II > 0$), and the SI (satisfaction index) is also less than the average satisfaction level ($SI > 0$). So, the aspects of IC and TI should be improved. Based on the NRM analysis, the aspects of IC and TI have a positive net influence effect ($d - r > 0$), so the aspect of IC can improve the aspect of TI, UC (urban consciousness), and LE (living environment). The TI aspect can affect the aspects of UC and LE. The UC (urban consciousness) aspect can influence the LE aspect. The three acceptance strategies are presented in Figure 6 and Table 16. Acceptance strategy A (continue keeping) can apply in the LE and UC aspects. Acceptance strategy C (progressive development) can apply in the TI aspect, and Acceptance strategy D (immediate development) can apply in the IC aspect. The TI aspect is in the third quadrant, and the TI aspect can improve through IC aspect. The IC aspect is in the fourth quadrant, and the IC aspect can only be improved by itself, as presented in Figure 6 and Table 16.

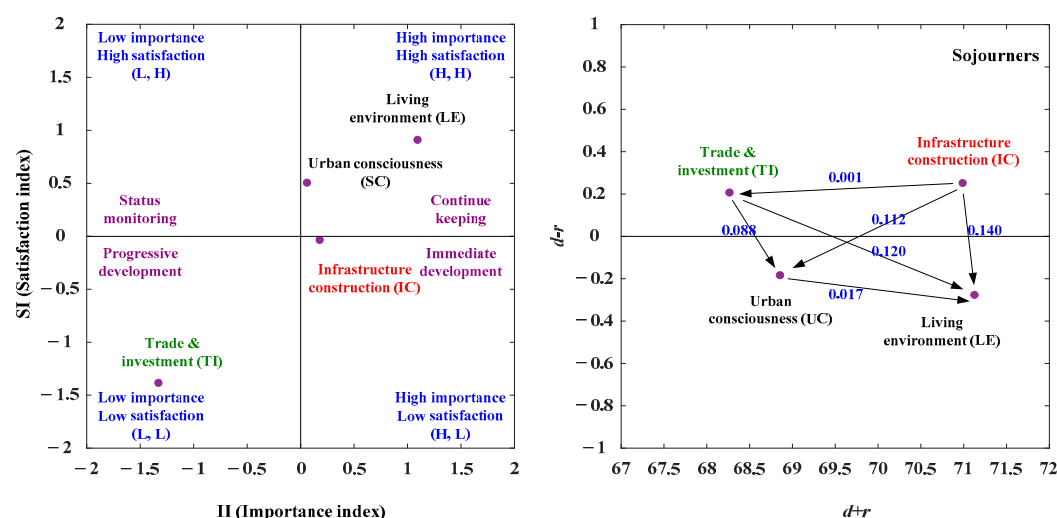


Figure 6. The analysis of ISA-NRM for sojourners.

Table 16. The acceptance strategy of sojourners.

Aspects	ISA			NRM			Strategy
	II	SI	(II, SI)	$d + r$	$d - r$	(R, D)	
Infrastructure construction (IC)	0.178	−0.034	H, L	70.987	0.252	D (+, +)	D
Living environment (LE)	1.093	0.911	H, H	71.125	−0.276	ID (+, −)	A
Trade and investment (TI)	−1.330	−1.383	L, L	68.265	0.207	D (+, +)	C
Urban consciousness (UC)	0.059	0.506	H, H	68.855	−0.183	ID (+, −)	A

Notes: The four acceptance strategies include: Acceptance strategy A (continue keeping), Acceptance strategy B (status monitoring), Acceptance strategy C (progressive development) and Acceptance strategy D (immediate development).

In the suitable acceptance paths analysis, the II (importance index) ranking is $LE \supset IC \supset UC \supset TI$ and the SI (satisfaction index) ranking is $LE \supset UC \supset IC \supset TI$ for sojourners. The NRM approach can find the four available paths ($IC \rightarrow LE$; $IC \rightarrow UC \rightarrow LE$; $IC \rightarrow TI \rightarrow LE$; $IC \rightarrow TI \rightarrow UC \rightarrow LE$) through the NRM approach. The importance index (II) ranking is $LE \supset IC \supset UC \supset TI$, and the aspect of IC (infrastructure construction) cannot affect the LE (living environment) aspect through the first acceptance path ($IC[2] \rightarrow LE[1]$). The IC aspect can improve the aspect of UC (urban consciousness) through the second acceptance path ($IC[2] \rightarrow UC[3] \rightarrow LE[1]$). Then, the IC (infrastructure construction) aspect can affect the TI (trade and investment) aspect through the third acceptance path ($IC[2] \rightarrow TI[4] \rightarrow LE[1]$). The IC aspect can affect the TI aspect by the fourth acceptance path ($IC[2] \rightarrow TI[4] \rightarrow UC[3] \rightarrow LE[1]$), as presented in Table 17.

Table 17. The suitable acceptance paths of sojourners.

Rank	II (Importance Index)	SI (Satisfaction Index)
	LE[1] > IC[2] > UC[3] > TI[4]	LE[1] > UC[2] > IC[3] > TI[4]
Acceptance paths	1. IC[2]→LE[1] {N}	1. IC[3]→LE[1] {N}
	2. IC[2]→UC[3]→LE[1] {Y}	2. IC[3]→UC[2]→LE[1] {N}
	3. IC[2]→TI[4]→LE[1] {Y}	3. IC[3]→TI[4]→LE[1] {Y}
	4. IC[2]→TI[4]→UC[3]→LE[1] {Y}	4. IC[3]→TI[4]→UC[2]→LE[1] {Y}
Suitable acceptance paths	3. IC→TI→LE 4. IC→TI→UC→LE	

The SI (satisfaction index) ranking is $LE \supset UC \supset IC \supset TI$, and the IC (infrastructure construction) aspect cannot affect the LE (living environment) aspect through the first acceptance path (IC[3]→LE[1]). The aspect of IC (infrastructure construction) cannot affect the UC (urban consciousness) aspect, and the UC aspect cannot affect the LE aspect by the second acceptance path (IC[3]→UC[2]→LE[1]). The IC (infrastructure construction) aspect can affect the aspect of TI (trade and investment) by the third acceptance path (IC[3]→TI[4]→LE[1]). The IC aspect can affect the TI aspect through the fourth acceptance path (IC[3]→TI[4]→UC[2]→LE[1]). The study integrates the acceptance paths of importance index and satisfaction index and proposes two suitable acceptance paths (IC→TI→LE; IC→TI→UC→LE) for sojourners, as shown in Table 17.

(3) The suitable acceptance paths for travelers

Based on the traveler's perspective, the acceptance strategies and development strategy map were present through the ISA-NRM approach. Through the ISA analysis, the LE (living environment) aspect is higher than the average level of importance ($II > 0$), but the satisfaction level is lower than the average level of satisfaction ($SI < 0$). The TI (trade and investment) aspect is lower than the average level of importance ($II < 0$), and the satisfaction level is also lower than the average level of satisfaction ($SI < 0$). Consequently, the LE and TI (trade and investment) aspects should be improved. Through the NRM analysis, the IC (infrastructure construction) and TI aspects have a positive net influence effect ($d - r > 0$), and IC can influence the aspects of TI, UC (urban consciousness), and LE (living environment). Then, the TI aspect can influence the aspects of UC and LE, and the UC aspect can affect the LE (living environment). There are three acceptance strategies presented in Figure 7 and Table 18. Acceptance strategy A (continue keeping) can apply for the UC and IC aspects and Acceptance strategy C (progressive development) can apply for the TI aspect. Acceptance strategy D (immediate development) can apply in the LE aspect, as presented in Figure 7 and Table 18.

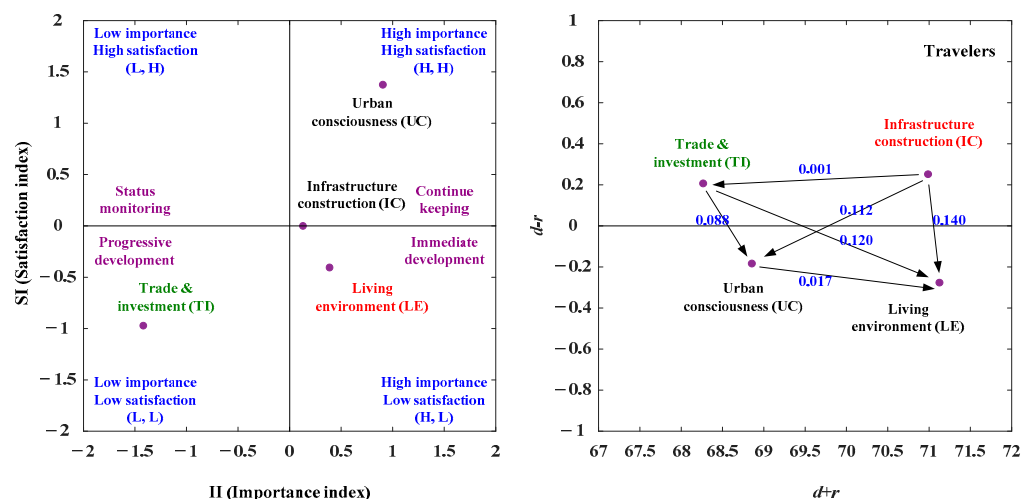
**Figure 7.** The analysis of ISA-NRM for travellers.

Table 18. The acceptance strategy for travellers.

Aspects	ISA			ISA			Strategy
	II	SI	(II, SI)	$d + r$	$d - r$	(R, D)	
Infrastructure construction (IC)	0.129	0.000	H, H	70.987	0.252	D (+, +)	A
Living environment (LE)	0.387	−0.405	H, L	71.125	−0.276	ID (+, −)	D
Trade and investment (TI)	−1.420	−0.971	L, L	68.265	0.207	D (+, +)	C
Urban consciousness (UC)	0.904	1.376	H, H	68.855	−0.183	ID (+, −)	A

Notes: The four acceptance strategies include: Acceptance strategy A (continue keeping), Acceptance strategy B (status monitoring), Acceptance strategy C (progressive development) and Acceptance strategy D (immediate development).

Based on the suitable acceptance path analysis, the importance index (II) ranking is $UC \supset LE \supset IC \supset TI$, and the satisfaction index (SI) ranking is $UC \supset IC \supset LE \supset TI$ for the travelers. The NRM approach can find the four available paths ($IC \rightarrow LE$; $IC \rightarrow UC \rightarrow LE$; $IC \rightarrow TI \rightarrow LE$; $IC \rightarrow TI \rightarrow UC \rightarrow LE$). The II (importance index) ranking is $UC \supset LE \supset IC \supset TI$, and the aspect of IC (infrastructure construction) cannot affect the LE (living environment) aspect through the first acceptance path ($IC[3] \rightarrow LE[2]$). The UC (urban consciousness) aspect can improve the LE (living environment) aspect through the second acceptance path ($IC[3] \rightarrow UC[1] \rightarrow LE[2]$). The aspect of IC (infrastructure construction) can affect the aspect of TI (trade and investment) through the third acceptance path ($IC[3] \rightarrow TI[4] \rightarrow LE[2]$). The aspect of IC can affect the aspect of TI (trade and investment), and the aspect of UC (urban consciousness) can affect the aspect of LE (living environment) by the fourth acceptance path ($IC[3] \rightarrow TI[4] \rightarrow UC[1] \rightarrow LE[2]$), as presented in Table 19.

Table 19. The suitable acceptance paths of travellers.

Rank	II (Importance Index)	SI (Satisfaction Index)
	$UC[1] > LE[2] > IC[3] > TI[4]$	$UC[1] > IC[2] > LE[3] > TI[4]$
Acceptance paths	1. $IC[3] \rightarrow LE[2]$ {N}	1. $IC[2] \rightarrow LE[3]$ {Y}
	2. $IC[3] \rightarrow UC[1] \rightarrow LE[2]$ {Y}	2. $IC[2] \rightarrow UC[1] \rightarrow LE[3]$ {Y}
	3. $IC[3] \rightarrow TI[4] \rightarrow LE[2]$ {Y}	3. $IC[2] \rightarrow TI[4] \rightarrow LE[3]$ {Y}
	4. $IC[3] \rightarrow TI[4] \rightarrow UC[1] \rightarrow LE[2]$ {Y}	4. $IC[2] \rightarrow TI[4] \rightarrow UC[1] \rightarrow LE[3]$ {Y}
Suitable acceptance paths	2. $IC \rightarrow UC \rightarrow LE$	3. $IC \rightarrow TI \rightarrow LE$
		4. $IC \rightarrow TI \rightarrow UC \rightarrow LE$

The SI (satisfaction index) ranking is $UC \supset IC \supset LE \supset TI$, and the aspect of IC (infrastructure construction) can affect the aspect of LE (living environment) through the first acceptance path ($IC[2] \rightarrow LE[3]$). The aspect of UC (urban consciousness) can affect the aspect of LE (living environment) through the second acceptance path ($IC[2] \rightarrow UC[1] \rightarrow LE[3]$). Then, the IC (infrastructure construction) aspect can affect the aspect of TI (trade and investment) through the third acceptance path ($IC[2] \rightarrow TI[4] \rightarrow LE[3]$). The aspect of IC can improve the aspect of TI (trade and investment), and the aspect of UC (urban consciousness) can affect the LE aspect by the fourth acceptance path ($IC[2] \rightarrow TI[4] \rightarrow UC[1] \rightarrow LE[3]$). Besides, the ISA-NRM approach integrates the acceptance paths of II (importance index) and SI (satisfaction index). The three acceptance paths ($IC \rightarrow UC \rightarrow LE$; $IC \rightarrow TI \rightarrow LE$; $IC \rightarrow TI \rightarrow UC \rightarrow LE$) were present for travelers, as presented in Table 19.

4.2. The Common Acceptance Paths

4.2.1. The Common Acceptance Paths for II (Importance Index)

The II (importance index) ranking is $LE \supset IC \supset UC \supset TI$ based on the residents' perspective, which is founded on the common path analysis. The II (importance index) ranking is $LE \supset IC \supset UC \supset TI$, based on the perspective of sojourners. The II ranking is $UC \supset LE \supset IC \supset TI$ based on the travelers' perspective. The NRM approach can determine the four available paths ($IC \rightarrow LE$; $IC \rightarrow UC \rightarrow LE$; $IC \rightarrow TI \rightarrow LE$;

IC→TI→UC→LE). The II (importance index) ranking is $LE \supset IC \supset UC \supset TI$ based on the residents' perspective. The IC aspect can affect the UC (urban consciousness) aspect through the second acceptance path (IC[2]→UC[3]→LE[1]). The IC aspect can affect the TI (trade and investment) aspect through the third acceptance path (IC[2]→TI[4]→LE[1]). The IC (infrastructure construction) aspect can affect the TI aspect by the fourth acceptance path (IC[2]→TI[4]→UC[3]→LE[1]) as presented in Table 20. The II ranking is $LE \supset IC \supset UC \supset TI$, based on the sojourners' perspective. The IC aspect can affect the UC aspect by the second acceptance path (IC[2]→UC[3]→LE[1]). The IC aspect can affect the TI aspect through the third acceptance path (IC[2]→TI[4]→LE[1]). The IC aspect can affect the TI aspect by the fourth acceptance path (IC[2]→TI[4]→UC[3]→LE[1]), as presented in Table 20. The II ranking is $UC \supset LE \supset IC \supset TI$ based on the travelers' perspective. The UC aspect can improve the aspect of LE through the second acceptance path (IC[3]→UC[1]→LE[2]). The IC aspect can affect the TI aspect through the third acceptance path (IC[3]→TI[4]→LE[2]). The IC aspect can affect the TI aspect, and the UC aspect can affect the LE aspect through the fourth acceptance path (IC[3]→TI[4]→UC[1]→LE[2]). Besides, the ISA-NRM approach integrates the perspectives of residents, sojourners, and travelers. There are three common paths (IC→UC→LE; IC→TI→LE; IC→TI→UC→LE), as presented in Table 20.

Table 20. The common acceptance paths for II (importance index).

II (Importance Index)			
Residents			
Rank	LE[1] > IC[2] > UC[3] > TI[4]		
Acceptance paths	1. IC[2]→LE[1] {N} 3. IC[2]→TI[4]→LE[1] {Y}	2. IC[2]→UC[3]→LE[1] {Y} 4. IC[2]→TI[4]→UC[3]→LE[1] {Y}	
Sojourners			
Rank	LE[1] > IC[2] > UC[3] > TI[4]		
Acceptance paths	1. IC[2]→LE[1] {N} 3. IC[2]→TI[4]→LE[1] {Y}	2. IC[2]→UC[3]→LE[1] {Y} 4. IC[2]→TI[4]→UC[3]→LE[1] {Y}	
Travelers			
Rank	UC[1] > LE[2] > IC[3] > TI[4]		
Acceptance paths	1. IC[3]→LE[2] {N} 3. IC[3]→TI[4]→LE[2] {Y}	2. IC[3]→UC[1]→LE[2] {Y} 4. IC[3]→TI[4]→UC[1]→LE[2] {Y}	
Common acceptance paths	2. IC→UC→LE	3. IC→TI→LE	4. IC→TI→UC→LE

4.2.2. The Common Acceptance Paths for SI (Satisfaction Index)

In the common acceptance path analysis, the SI (satisfaction index) ranking is $LE \supset UC \supset IC \supset TI$ based on the residents' perspective, and the SI ranking is $LE \supset UC \supset IC \supset TI$ based on the sojourners' perspective. The ID ranking is $UC \supset IC \supset LE \supset TI$ based on the travelers' perspective. The NRM approach can determine the four acceptance paths (IC→LE; IC→UC→LE; IC→TI→LE; IC→TI→UC→LE). The SI (satisfaction index) ranking is $LE \supset UC \supset IC \supset TI$, based on the perspective of residents. The IC aspect can affect the TI (trade and investment) aspect by the third acceptance path (IC[3]→TI[4]→LE[1]). The IC (infrastructure construction) aspect can affect the TI aspect by the fourth acceptance path (IC[3]→TI[4]→UC[2]→LE[1]).

The SI (satisfaction index) ranking is $LE \supset UC \supset IC \supset TI$ based on the perspective of sojourners. The IC aspect can affect the TI (trade and investment) aspect by the third acceptance path (IC[3]→TI[4]→LE[1]). The IC aspect can affect the TI (trade and investment) aspect through the fourth acceptance path (IC[3]→TI[4]→UC[2]→LE[1]), as illustrated in Table 21. The SI (satisfaction index) ranking is $UC \supset IC \supset LE \supset TI$ based on the perspective of travelers. The IC aspect can affect the LE aspect through the first acceptance path (IC[2]→LE[3]), and the UC aspect can affect the LE (living environment) aspect through the second acceptance path (IC[2]→UC[1]→LE[3]), as illustrated in Table 21.

The IC aspect can affect the TI (trade and investment) aspect through the third acceptance path ($IC[2] \rightarrow TI[4] \rightarrow LE[3]$). The IC aspect can affect the TI (trade and investment) aspect, and the UC (urban consciousness) aspect can affect the LE (living environment) aspect through the fourth acceptance path ($IC[2] \rightarrow TI[4] \rightarrow UC[1] \rightarrow LE[3]$). Hence, the ISA-NRM approach combines the perspectives of residents, sojourners, and travelers. There are two common acceptance paths ($IC \rightarrow TI \rightarrow LE$; $IC \rightarrow TI \rightarrow UC \rightarrow LE$), as illustrated in Table 21.

Table 21. The common acceptance paths for SI (satisfaction index).

SI (Satisfaction Index)			
Residents			
Rank	LE[1] > UC[2] > IC[3] > TI[4]		
Acceptance paths	1. $IC[3] \rightarrow LE[1]$ {N}	2. $IC[3] \rightarrow UC[2] \rightarrow LE[1]$ {N}	
	3. $IC[3] \rightarrow TI[4] \rightarrow LE[1]$ {Y}	4. $IC[3] \rightarrow TI[4] \rightarrow UC[2] \rightarrow LE[1]$ {Y}	
Sojourners			
Rank	LE[1] > UC[2] > IC[3] > TI[4]		
Acceptance paths	1. $IC[3] \rightarrow LE[1]$ {N}	2. $IC[3] \rightarrow UC[2] \rightarrow LE[1]$ {N}	
	3. $IC[3] \rightarrow TI[4] \rightarrow LE[1]$ {Y}	4. $IC[3] \rightarrow TI[4] \rightarrow UC[2] \rightarrow LE[1]$ {Y}	
Travelers			
Rank	UC[1] > IC[2] > LE[3] > TI[4]		
Acceptance paths	1. $IC[2] \rightarrow LE[3]$ {Y}	2. $IC[2] \rightarrow UC[1] \rightarrow LE[3]$ {Y}	
	3. $IC[2] \rightarrow TI[4] \rightarrow LE[3]$ {Y}	4. $IC[2] \rightarrow TI[4] \rightarrow UC[1] \rightarrow LE[3]$ {Y}	
Common acceptance paths	3. $IC \rightarrow TI \rightarrow LE$	4. $IC \rightarrow TI \rightarrow UC \rightarrow LE$	

4.3. Discussion

4.3.1. Suitable Acceptance Paths

The aspect of LE (living environment) was in the first quadrant, and the aspect of UC (urban consciousness) was in the second quadrant. The aspect of TI (trade and investment) was in the third quadrant, and the aspect of IC (infrastructure construction) was in the fourth quadrant for residents. Acceptance strategy A (continue keeping) can adapt to the LE (living environment) aspect, and acceptance strategy B (status monitoring) can apply for the UC aspect. Acceptance strategy C (progressive development) can adapt to the TI (trade and investment) aspect, and acceptance strategy D (immediate development) can apply for the IC aspect for residents. There are two suitable acceptance paths ($IC \rightarrow TI \rightarrow LE$; $IC \rightarrow TI \rightarrow UC \rightarrow LE$) for residents. The third suitable acceptance path is that the IC aspect affects the TI aspect, and the TI aspect influences the LE (living environment) for residents. The fourth suitable acceptance path is that the IC aspect affects the TI aspect, and TI (trade and investment) aspect affects the UC aspect, and the UC aspect affects the LE (living environment) aspect, as illustrated in Table 22.

The LE (living environment) and UC (urban consciousness) aspects were in the first quadrant. The TI (trade and investment) aspect was in the third quadrant, and the IC (infrastructure construction) aspect was in the fourth quadrant. The acceptance strategy A (continue keeping) can use the aspects of LE and UC, and acceptance strategy C (progressive development) can adapt to the TI aspect. Acceptance strategy D (immediate development) can adapt to the IC aspect for sojourners. There are two suitable acceptance paths ($IC \rightarrow TI \rightarrow LE$; $IC \rightarrow TI \rightarrow UC \rightarrow LE$) for sojourners. The third suitable acceptance path is that the IC aspect affects the TI aspect, and TI aspect influences the LE aspect. The fourth suitable acceptance path is that the IC aspect affects the TI aspect. The TI aspect affects the UC aspect, and the UC aspect influences the LE aspect, as shown in Table 22.

Table 22. The acceptance strategies and improvement priority for various stakeholders.

Stakeholders \ Acceptance Strategy	Acceptance Strategy A (Continue Keeping)	Acceptance Strategy B (Status Monitoring)	Acceptance Strategy C (Progressive Development)	Acceptance Strategy D (Immediate Development)
Improvement priority	Step 3	Step 4	Step 2	Step 1
Residents	Living environment (LE)	Urban consciousness (UC)	Trade and investment (TI)	Infrastructure construction (IC)
Suitable acceptance paths	3. IC→TI→LE		4. IC→TI→UC→LE	
Sojourners	Living environment (LE) Urban consciousness (UC)		Trade and investment (TI)	Infrastructure construction (IC)
Suitable acceptance paths	3. IC→TI→LE		4. IC→TI→UC→LE	
Travelers	Infrastructure construction (IC) Urban consciousness (UC)		Trade and investment (TI)	Living environment (LE)
Suitable acceptance paths	2. IC→UC→LE	3. IC→TI→LE	4. IC→TI→UC→LE	

The IC (infrastructure construction) and UC (urban consciousness) aspects were in the first quadrant. The TI (trade and investment) aspect was in the third quadrant, and the LE (living environment) aspect was in the fourth quadrant. Acceptance strategy A (continue keeping) can use the aspects of IC and UC, and acceptance strategy C (progressive development) can adapt to the TI aspect. Acceptance strategy D (immediate development) can adapt to the LE aspect for travelers. There are three suitable acceptance paths (IC→UC→LE; IC→TI→LE; IC→TI→UC→LE) for travelers. The second suitable acceptance path is that the IC aspect affects the UC aspect, and the UC aspect influences the LE (living environment) aspect. The third suitable acceptance path is that the IC aspect affects the TI aspect, and the TI aspect influences the LE aspect. The fourth suitable acceptance path is that the IC aspect affects the TI aspect. The TI aspect affects the UC aspect, and the UC aspect influences the LE aspect, as illustrated in Table 22.

4.3.2. Common Acceptance Paths

(1) The common acceptance path of II (importance index)

Based on the internal stakeholders' (residents and sojourners) perspectives, the II (importance index) ranking is $LE \supset IC \supset UC \supset TI$. There are three acceptance paths (IC→UC→LE; IC→TI→LE; IC→TI→UC→LE) based on the internal stakeholders (residents and sojourners). Based on the perspective of external stakeholders (travelers), the II ranking is $UC \supset LE \supset IC \supset TI$, and there are three acceptance paths (IC→UC→LE; IC→TI→LE; IC→TI→UC→LE) for the external stakeholder (travelers) perspectives. This study combined the perspectives of internal stakeholders (residents and sojourners) and external stakeholders (travelers), and there are three common acceptance paths (IC→UC→LE; IC→TI→LE; IC→TI→UC→LE) in the importance index (II). The second common path is that the IC (infrastructure construction) aspect affects the UC (urban consciousness) aspect, and the UC aspect affects the LE (living environment) aspect. The third common acceptance path is that the IC aspect affects the TI (trade and investment) aspect, and the TI aspect influences the LE aspect. The fourth common acceptance path is that the IC aspect improves the TI aspect, and the TI aspect influences the UC aspect, and the UC aspect affects the LE aspect, as illustrated in Table 23.

Table 23. The suitable acceptance paths for urban-rural sustainable development (residents, sojourners, and travelers).

	II (Importance Index)	SI (Satisfaction Index)	Suitable Paths
Internal stakeholders-Residents			
Rank	LE[1] > IC[2] > UC[3] > TI[4]	LE[1] > UC[2] > IC[3] > TI[4]	
Acceptance paths	1. IC[2]→LE[1]{N} 2. IC[2]→UC[3]→LE[1]{Y} 3. IC[2]→TI[4]→LE[1]{Y} 4. IC[2]→TI[4]→UC[3]→LE[1]{Y}	1. IC[3]→LE[1]{N} 2. IC[3]→UC[2]→LE[1]{N} 3. IC[3]→TI[4]→LE[1]{Y} 4. IC[3]→TI[4]→UC[2]→LE[1]{Y}	3. IC→TI→LE 4. IC→TI→UC→LE
Internal stakeholders-Sojourners			
Rank	LE[1] > IC[2] > UC[3] > TI[4]	LE[1] > UC[2] > IC[3] > TI[4]	
Acceptance paths	1. IC[2]→LE[1]{N} 2. IC[2]→UC[3]→LE[1]{Y} 3. IC[2]→TI[4]→LE[1]{Y} 4. IC[2]→TI[4]→UC[3]→LE[1]{Y}	1. IC[3]→LE[1]{N} 2. IC[3]→UC[2]→LE[1]{N} 3. IC[3]→TI[4]→LE[1]{Y} 4. IC[3]→TI[4]→UC[2]→LE[1]{Y}	3. IC→TI→LE 4. IC→TI→UC→LE
Common paths (Residents and Sojourners)	2. IC→UC→LE 3. IC→TI→LE 4. IC→TI→UC→LE	3. IC→TI→LE 4. IC→TI→UC→LE	3. IC→TI→LE 4. IC→TI→UC→LE
External stakeholders-Travelers			
Rank	UC[1] > LE[2] > IC[3] > TI[4]	UC[1] > IC[2] > LE[3] > TI[4]	
Acceptance paths	1. IC[3]→LE[2]{N} 2. IC[3]→UC[1]→LE[2]{Y} 3. IC[3]→TI[4]→LE[2]{Y} 4. IC[3]→TI[4]→UC[1]→LE[2]{Y}	1. IC[2]→LE[3]{Y} 2. IC[2]→UC[1]→LE[3]{Y} 3. IC[2]→TI[4]→LE[3]{Y} 4. IC[2]→TI[4]→UC[1]→LE[3]{Y}	2. IC→UC→LE 3. IC→TI→LE 4. IC→TI→UC→LE
Common paths (Residents, Sojourners and Travelers)	2. IC→UC→LE 3. IC→TI→LE 4. IC→TI→UC→LE	3. IC→TI→LE 4. IC→TI→UC→LE	

(2) The common acceptance path of SI (satisfaction index)

Based on the perspective of internal stakeholders (residents and sojourners), the SI (satisfaction index) ranking is $LE \supset UC \supset IC \supset TI$ for internal stakeholders. There are two acceptance paths ($IC \rightarrow TI \rightarrow LE$; $IC \rightarrow TI \rightarrow UC \rightarrow LE$) for internal stakeholders. Based on the perspective of external stakeholders (travelers), the SI (satisfaction index) ranking is $UC \supset IC \supset LE \supset TI$, and there are two acceptance paths ($IC \rightarrow TI \rightarrow LE$; $IC \rightarrow TI \rightarrow UC \rightarrow LE$) for the external stakeholders' perspectives. This study integrates these perspectives of internal stakeholders (residents and sojourners) and external stakeholders (travelers), and there are two common acceptance paths ($IC \rightarrow TI \rightarrow LE$; $IC \rightarrow TI \rightarrow UC \rightarrow LE$) in the SI (satisfaction index), as illustrated in Table 23. The third common acceptance path is that the IC (infrastructure construction) aspect influences the TI (trade and investment) aspect, and the TI aspect influences the LE (living environment) aspect. The fourth common acceptance path is that the IC (infrastructure construction) aspect affects the TI aspect, and the TI aspect influences the UC (urban consciousness) aspect, and the UC aspect affects the LE aspect, as illustrated in Table 23.

4.3.3. Common Suitable Paths

This study explores different urban stakeholders, which include the internal stakeholders (residents and sojourners) and external stakeholders (travelers). Therefore, there are two common suitable paths ($IC \rightarrow TI \rightarrow LE$; $IC \rightarrow TI \rightarrow UC \rightarrow LE$) through the three urban stakeholders (residents, sojourners, and travelers). The third suitable acceptance path is that the IC (infrastructure construction) aspect affects the TI (trade and investment) aspect, and the TI aspect affects the LE (living environment) for residents, as shown in Table 22. Public works in disrepair influence the living environment and urban sustainable development. So, urban managers can attract new enterprise investment and commerce activities by maintaining and improving the urban infrastructure. New enterprise investment can create

new job opportunities and attract talent returns. Active business and private investment can bring tax income for local government. Enough tax income and enterprise financial support can push the improvement of the living environment.

The fourth suitable acceptance path is that the IC (infrastructure construction) aspect affects the TI (trade and investment) aspect, and the TI aspect affects the UC (urban consciousness) aspect. The UC aspect affects the LE (living environment) aspect, as shown in Table 23. To support urban development and improve the living environment, the urban managers should evaluate the status of urban infrastructure construction and then maintain and renew these old transportation infrastructures and information infrastructures. Urban managers should increase education, medical and social welfare services to satisfy citizens' public service needs daily. Urban managers should also build diversified cultural and recreation spaces to fulfill the citizens' needs to watch and perform outdoor sport and recreational activities. Complete urban infrastructure and employment and migrant policies can attract manufacturers and talents to settle in and promote local economic development. Furthermore, appropriate investment incentives and preferential tax policies can attract foreign manufacturers to settle in and drive local employment opportunities. So, the urban managers can attract more manufacturers to drive local employment opportunities through industry investment incentives. Besides, the urban stakeholders and managers should care about regional multicultural integration and local cultural promotion. As the citizens' diversity can strengthen the local cultural integration and enrich the local culture connotation, promoting local cultural characteristics can improve the citizens' identity and bring local tourism industrial development. Urban revitalization should create employment opportunities and develop the living environment. The urban stakeholders will affect the common urban consciousness and determine the urban development direction, as shown in Table 23.

The study can also assist urban managers in re-examining the future direction of sustainable urban development through various urban stakeholders and determine the acceptance strategies and common suited paths for urban revitalization and sustainable urban development.

- (1) The IC (infrastructure construction) aspect is in the fourth quadrant (high importance and low satisfaction) for internal stakeholders (residents and sojourners). The IC (infrastructure construction) aspect includes four criteria: transportation infrastructure, information infrastructure, public service construction, and recreational and exhibition construction. The LE (living environment) aspect is in the fourth quadrant (H, L) for external stakeholders (travelers). The LE (living environment) aspect includes the four criteria (natural landscape maintenance, ecological environment protection, maintenance of historical monuments, and religious, cultural heritage). Natural landscape maintenance can allow citizens to enjoy the original environmental and natural landscape, and the ecological environmental protection can foster a sustainable ecological environment. Maintaining historical monuments can let citizens understand the city's history and urban development track. Preserving and promoting cultural festivals can enable citizens to learn about cultural context and local religious festivals.
- (2) In the II (importance index), the LE (living environment) aspect is more critical than the IC (infrastructure construction) aspect, and the IC aspect is also more important than the TI (trade and investment) aspect. Besides, the LE (living environment) aspect is more satisfied than the IC (infrastructure construction) aspect, and the IC aspect is also more satisfied than the TI (trade and investment) aspect in the SI (satisfaction index). Therefore, urban managers should understand that citizens care more about the living environment and infrastructure construction and pay more attention to infrastructure construction than trade and investment. So, urban managers should build the infrastructure construction and promote trade and investment and maintain the sustainable living environment.
- (3) Urban managers should pay attention to the balance of urban development and environmental sustainability. Some new urban revitalization plans may increase new

infrastructure construction and attract more manufacturers to settle here. Still, too much new infrastructure construction and industrial investment may lead to a rise in the cost of living and housing. Residents may not enjoy urban revitalization benefits but instead may face resource competition and price inflation problems. Besides, some new infrastructure construction and industrial investment may need more natural resources (land, water, energy, etc.), so the residents' living environment may change. With the lack of water, power, and labor, more and more farmlands may be turned into factories, and regional agriculture may decline.

- (4) With urban aging, essential infrastructure needs to renew to support urban development. The internal stakeholders (residents and sojourners) pay attention to the problem of urban aging and the renewal of essential infrastructure more than external stakeholders (travelers). Enhancing transportation infrastructure can improve the citizens' daily commuting needs and promote local commerce activities. Improving information infrastructure also can satisfy citizens' ICT (information and communication technology) service needs and attract more manufacturers to settle. Strengthening public service construction can provide citizens' education, medical and social welfare needs, and promoting recreational and exhibition construction can increase cultural and recreation spaces for citizens.
- (5) Therefore, the external stakeholders (travelers) care about the issues for the living environment in urban revitalization. The external stakeholders (travelers) consider the living environment more critical for sustainable urban development. Hence, maintaining a natural landscape can let the citizens enjoy the original and natural landscape and protect the ecological environment. Keeping historical monuments can let citizens understand the city's history and urban development track. Preserving and promoting cultural festivals can enable citizens to learn about cultural context and local religious festivals.
- (6) The two common suitable adoption paths [IC (infrastructure construction)→TI (trade and investment)→LE (living environment); IC (infrastructure construction)→TI (trade and investment)→UC (urban consciousness)→LE (living environment)] were adopted to affect the urban revitalization and sustainable urban development for three urban stakeholders. The IC (infrastructure construction) aspect influences the TI (trade and investment) aspect, and the TI aspect affects the LE (living environment) aspect based on the third common suitable path. The urban managers can strengthen the urban infrastructure construction (transportation infrastructure, information infrastructure, public service construction, and recreational and exhibition construction) to attract new trade and investment activities. Besides, relevant authorities can improve the living environment (natural landscape maintenance, ecological environment protection, historical monuments maintenance, and religious cultural heritage) for urban stakeholders through public and private department' policy and financial support. The IC (infrastructure construction) aspect affects the TI (trade and investment) aspect, the TI (trade and investment) aspect affects the UC (urban consciousness) aspect, and the UC aspect influences the LE (living environment) aspect based on the fourth common-suitable path. Urban managers can promote business and trade development through improving the basic infrastructure construction and strengthening the urban stakeholders' urban consciousness. Then, the urban stakeholders also ensure regional sustainable development through their urban consciousness.

5. Conclusions and Recommendations

5.1. Conclusions

With the challenge of aging urban essential infrastructure and the rise of intelligent and sustainable cities, more and more urban managers are considering supporting urban revitalization. Therefore, more cities are promoting urban renewal, developing urban digital transformation, and attracting emerging technology businesses and technology-intensive industries to settle through urban re-positioning and transformation. Therefore, urban

managers should understand the preferences and needs of different urban stakeholders. This study explores the critical driving factors that influence urban revitalization and sustainable development and defines the four aspects (infrastructure construction, living environment, trade and investment, and urban consciousness) and 16 evaluation criteria for urban revitalization. The study also employs the ISA-NRM (importance satisfaction analysis-network relation map) approach to analyze the critical driving forces for urban revitalization for different urban stakeholders (residents, sojourners, and travelers). This study provides some valuable suggestions for relevant authorities and urban managers to affect urban revitalization and sustainable urban development.

Based on the ISA analysis, the LE (living environment) aspect is in the first quadrant (H, H), and UC (urban consciousness) is in the second quadrant (L, H). The TI (trade and investment) aspect is in the third quadrant (L, L), and the IC (infrastructure construction) is located in the fourth quadrant (H, L). Acceptance strategy A (continue keeping) can apply to the LE (living environment) aspect, and acceptance strategy B (status monitoring) can apply to the UC (urban consciousness) aspect. Acceptance strategy C (progressive development) can apply to the TI (trade and investment) aspect and acceptance strategy D (immediate development) can apply to the IC (infrastructure construction) aspect. Based on the NRM analysis, the IC (infrastructure construction) aspect is the dominant aspect, and the LE (living environment) aspect is being dominated for urban revitalization. With the net impact effect, the IC (infrastructure construction) aspect influences TI, UC, and LE; the TI (trade and investment) aspect influences the aspects of UC and LE, and the UC (urban consciousness) aspect influences the LE (living environment) aspect. This study provides valuable suggestions for relevant authorities and urban managers to affect urban revitalization and sustainable urban development.

The study integrates the ISA and NRM approaches, establishes the ISA-NRM approach, and determines common acceptance paths. The ISA approach can aid authorities in understanding the importance and satisfaction of different urban stakeholders (residents, sojourners, and travelers). The NRM approach can determine the network relation structure of urban revitalization. The ISA-NRM approach can aid urban managers in establishing the acceptance strategies and determining the common suited paths for urban stakeholders. Besides, this study can aid the relative authorities in evaluating the preferences and needs based on the different urban stakeholders' perspectives.

5.2. Academic Contributions

This study initiates using the ISA (importance satisfaction analysis) approach to analyze the status of importance and satisfaction for three stakeholders (residents, sojourners, and travelers). The study also adopts the NRM (network relation map) approach to evaluate the network relation structure based on the DEMATEL (Decision Making Trial and Evaluation Laboratory) methodology. The integrated ISA-NRM approach provides a useful tool for urban managers to understand the involved stakeholders' perspectives for urban sustainable development strategies and determine suitable urban revitalization paths. This study uses survey methodology to investigate the needs of stakeholders in the Taiwanese region. The preferences of stakeholders in other cities or other countries might be similar but certainly won't be the same. Consequently, the appropriate urban revitalization development strategies adopted by other cities in other countries won't be the same either. However, the approaches, methodologies, areas of concern, and different interests of each group of stakeholders presented in this study could provide insightful information and valuable guidelines.

5.3. Future Studies

Since each region has its unique characteristics and limitations, different stakeholders may play different key roles in pursuit of urban revitalization. The major stakeholders' interests and needs must be considered and communicated, to reach the compromised best interest of them all. The three stakeholders (residents, sojourners, and travelers), which are

referenced from related literature, are selected by the authors as the major study subjects of this research. There exist other stakeholders such as local government.

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