Urban Civilization Model: An International Image Indicator System Study

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Abstract: *The international image of a city is crucial for the development of urban civilization and is an important indicator for measuring a city's comprehensive strength and attractiveness. This article explores the impact of high-quality economic development, technological innovation ability, urban governance, cultural soft power, the urban security system, and the citizen living environment on the international image of cities, and it constructs corresponding evaluation indicators based on these dimensions. Research has shown that by creating a good international image, a city can attract foreign tourists and investors, enhance its own soft power, enhance residents' sense of pride and belonging, and demonstrate a high level of governance and ability. Therefore, city managers and relevant institutions should recognize this importance, take effective measures, increase investment, and make every effort to create a liveable, prosperous, and civilized international city image.*

Keywords: *Urban civilization; International image; Comprehensive strength; Urban governance; Cultural soft power*

1. INTRODUCTION

In recent years, the international image of urban civilization has become a goal pursued by various cities. In the context of globalization and the information age, urban image is not only an external representation of urban development but also an important indicator for measuring a city's comprehensive strength and attractiveness (Dastgerdi&Luca,2019).Therefore, studying the international image of urban civilization has become a focus of attention for both academia and practitioners. In the context of globalization and the information age, the international image of urban civilization has become a goal pursued by various cities.

In recent years, with the continuous acceleration of economic development and urbanization in various countries around the world, the international image of cities has become increasingly important. The international image of urban civilization has become a goal pursued by various cities. In the context of globalization and the information age, the shaping and dissemination of urban image have enormous influence. First, the international image of a city holds great significance for attracting foreign tourists and investors. If a city can create a good international image and attract foreign tourists to come for sightseeing, it can not only drive the development of the tourism industry but also promote the prosperity of the local economy. At the same time, attracting foreign investors is also an important way to enhance urban development. Cities with a good international image often receive more attention and favour, attracting foreign investment and promoting the rapid development of their economy. Second, the international image of urban civilization directly affects the soft power of a city. A city with a civilized, friendly, and liveable environment can not only leave a deep and beautiful impression on people but also showcase its social, cultural, and spiritual qualities. By creating a good international image, a city can effectively enhance its soft power as well as its voice and influence on the international stage (Heere et al., 2019).In addition, the international image of a city is closely related to the pride and sense of belonging of its residents. The pride and sense of belonging of residents towards the city they reside in is the foundation for building a civilized image of the city. A prosperous, civilized and liveable city can not only provide residents with a high-quality

living environment but also stimulate residents' sense of belonging to the city and form common values and cultural identity so that they work together to build a better city. In addition, the international image of a city reflects the level and capacity of urban governance(Szubert et al., 2021).A city with a good international image often means that the city has a high level of governance and ability to provide safe, convenient, and efficient public services and infrastructure for residents and visitors. This ability not only enhances the competitiveness of the city but also lays a solid foundation for its sustainable development.

Therefore, city managers and relevant institutions should recognize this importance, take effective measures, increase investment, and make every effort to create a liveable, prosperous, and civilized international city image.

2. LITERATURE REVIEW

The international image indicator system for a city is an important field for studying the evaluation and enhancement of a city's international image. Many scholars and institutions have proposed a comprehensive system of international image indicators for cities to comprehensively consider their performance in different aspects. These indicator systems typically include multiple dimensions, such as the economy, culture, society, and the environment, and they cover their respective sub-indicators. For example, the economic dimension can include indicators such as GDP and foreign direct investment; the cultural dimension can include indicators such as cultural heritage and artistic activities; the social dimension can include indicators such as social stability and human rights status; and the environmental dimension can include indicators such as air quality and sustainable development policies. The following are some related research findings and discussions:

First, scholars have classified and constructed indicators. The classification and construction of indicators are an important link in evaluating the international image of a city. Researchers usually classify the international image indicators of cities into four aspects: economic, cultural, social, and environmental. The following provides a detailed explanation of each aspect. (1)Economic indicators are important indicators for evaluating the economic strength and competitiveness of cities. Common economic indicators include Gross Domestic Product (GDP), which is used to measure the economic size and growth rate of cities (Mandeli, 2019); foreign direct investment (FDI, which measures the ability and degree of a city to attract foreign investment; The trade volume, which includes indicators such as the total import and export volume and the proportion of foreign trade, reflecting the international trade activities of a city; The employment rate, which evaluates the employment level and labour market situation of a city; and innovation capability, which includes research and development investment, the number of patent applications, etc., reflecting the innovation capability and technological level of a city. (2) Cultural indicators are used to evaluate the cultural attractiveness and diversity of a city and to measure its influence in the cultural field. Common cultural indicators include the number of cultural heritage sites, such as world heritage sites, national heritage sites, and local heritage sites, reflecting the historical and cultural accumulation of a city. The number of museums and art institutions reflects the richness of a city's artistic and cultural facilities. Cultural activities, including art exhibitions, concerts, and theatrical performances, reflect the cultural life and creative industries of a city (Picaud, 2019).(3)Social indicators are used to evaluate the social development and level of humanistic care in cities. Common social indicators include the educational level, including the level of education, educational resources, and proportion of students, reflecting the quality and popularity of education in cities; The human rights situation, which includes civil rights, social equity, and human rights protection, evaluating the social justice and human rights situation in cities; and social stability, which includes the crime rate, social discipline, and social harmony, reflecting the social order and stability level of cities(Acuto et al., 2021).(4)Environmental indicators are used to evaluate the environmental protection and sustainable development of cities. Common environmental indicators include air quality, including the PM2.5 concentration and the air pollution index. (Bibri et al., 2021)

Second, scholars have also discussed indicator weights and calculation methods. Researchers have attempted to assign weights to different indicators and calculate the comprehensive image score of a city based on the weights. Indicator weights and calculation methods play a crucial role in comprehensively evaluating the international image of cities. Researchers have attempted to calculate

the comprehensive image score of a city by assigning appropriate weights to different indicators and using computational methods. The following are commonly used methods:(1) The analytic hierarchy process (AHP) is a commonly used method of determining indicator weights. This method divides indicators into different levels by constructing a hierarchical structure, and then, it compares and evaluates the relative importance of indicators through expert judgement or questionnaire surveys. Through the subjective judgement of experts and by quantifying the relative importance between pairs of indicators, the weights are determined to obtain a comprehensive evaluation result(Li et al., 2018).(2)Principal component analysis (PCA) is a dimensionality reduction technique that can transform multiple related indicators into a few unrelated principal components. In the evaluation of urban international image, principal component analysis can be used to reduce the dimensions of indicators, calculate the contribution of each principal component, and determine the weight of indicators based on their contribution. This method can reduce redundant information between indicators, extract the most representative indicators, and better reflect the international image of a city (Shahabi et al., 2012).(3)The entropy weight method is a method of calculating weights based on the principle of information entropy. This method determines the weight by calculating the information entropy of each indicator and measuring its information content. The greater the information entropy is, the higher the uncertainty of the indicator and the smaller the weight. In contrast, the smaller the information entropy is, the lower the uncertainty of the indicator and the greater the weight. The entropy weight method can overcome the influence of subjective evaluation and provide an objective and effective weight calculation method (Zhang et al., 2011).(4)The weighted sum method is a simple and intuitive method of calculating weights. In this method, each indicator is assigned a weight, and then, the scores of each indicator are multiplied by the corresponding weights, and all weighted scores are summed to obtain the comprehensive image score of a city (Banai, 1999).This method is commonly used for relatively simple international image assessments of cities and is suitable for situations where there is no significant correlation between indicators. By determining the weight of indicators and selecting calculation methods, the importance and contribution of different indicators can be taken into account, resulting in a comprehensive evaluation of a city's international image. This study helps to provide an objective, comprehensive, and comparable evaluation system, helping cities better understand and enhance their international image.

Finally, some scholars have conducted case studies. In research, specific cities are often used as case studies for analysis. The case studies conducted by scholars provide important empirical support and empirical references for the study of urban international image. Through case analysis of specific cities, it is possible to gain a deeper understanding of their successful experiences and lessons learned in international image construction (Xie et al., 2022). In case analysis of international metropolises, researchers often choose international metropolises such as New York, London, and Paris. as case studies, as they have high international visibility and influence. Through the case study of these cities, we can analyse their international image construction process, strategies and success factors. For example, as a global financial centre and cultural exchange hub, New York's international image construction emphasizes innovation, diversity, and openness, and the city can draw on its experience in promoting urban internationalization. Through case analysis, researchers can delve deeper into the practical operations of building a city's international image and discover the advantages and challenges of different cities in different aspects. Case studies provide references and inspiration for other cities, helping them formulate international image development strategies that are suitable for their own characteristics and enhancing their competitiveness and attractiveness on the international stage. In summary, through case analysis, scholars can gain a deeper understanding of the international image construction experience of different cities and provide guidance and references for other cities. This empirical research method helps to deepen the understanding of the international image of cities and promote their sustainable development in the context of globalization.

In summary, the research results of the index system for acity's international image cover the classification and construction of indicators, indicator weights and calculation methods, analysis of influencing factors, case studies and other aspects. These achievements provide a necessary research foundation for the evaluation of the international image of cities.

3. CONSTRUCTION OF AN INDEX SYSTEM FOR MEASURING THE INTERNATIONAL IMAGE OF A CITY

Because a city is a special zone, its international image measurement index system can cover multiple aspects. Therefore, this study considers economic indicators, innovation indicators, urban governance indicators, cultural indicators, urban security system indicators, and urban living environment indicators. See Table 1.

Table1. *International Image Indicator System for the Urban Civilization Model*

Primary indicators	Secondary indexes	Tertiary (inspection) indexes	Tertiary index codes
Quantitative distribution of high-quality economic development	Economic strength	Total GDP	**Aa1**
		GDP increments	**Aa2**
		Per capita GDP	**Aa3**
		Number of Fortune 500 companies	**Aa4**
		New enterprise density	**Aa5**
	Development quality	Labour productivity…………….	**Ab1**
		Proportion of the value added of the high-end technology manufacturing industry in industrial value added	**Ab2**
		Strategic emerging industries as a proportion of GDP	**Ab3**
		Proportion of the value added of productive services in the value added of the service industry	**Ab4**
		Distribution of high-end productive service industries worldwide (finance, law, consulting management, advertising, and accounting)	**Ab5**
	Political security	Coverage and satisfaction of government public service centers in industries such as industrial parks, commercial markets, and commercial buildings	**Ac1**
		Score on the performance of duties by government departments	**Ac2**
Science and technology innovation ability	Science and technology	Proportion of scientific research expenditure in GDP	**Ba1**
		Proportion of scientific research personnel in the total population	**Ba2**
		Number of invention patent applications in the total population	**Ba3**
		Per capita intellectual property exports	**Ba4**
		Per capita intellectual property import	**Ba5**
	Innovation ability	Proportion of research and development expenditure inthe GDP of the whole industries	**Bb1**
		Enterprise innovation ratio	**Bb2**
		Proportion of basic research and development funds in R&D funds	**Bb3**
		Number of innovation incubators	**Bb4**
		Number of R&D personnel per 10000 employees	**Bb5**
		Proportion of the population with a university education or above	**Bb6**
		QS Number of top 200 universities in the world	Bb7
City governance	Rule of law construction	International first-class legal business environment	**Ca1**
		Number of cases filed by procuratorial organs per 10000 public servants	**Ca2**
		Number of lawyers per 10000 people	**Ca3**
		Number of countries and regions covered by export international arbitration rules	**Ca4**
		Role of social supervision and public opinion supervision (number of hearings, satisfaction with letters and visits)	**Ca5**

	Democratic construction	Number of government-adopted proposals from the Chinese People's Political Consultative Conference	**Cb1**
		Democratization of major administrative decisions	**Cb2**
		Independent voter turnout of people's congresses at all levels	**Cb3**
Cultural soft power	Cultural quality	Civilized literacy evaluation score of citizens	**Da1**
		Proportion of cultural and entertainment service expenditure in household consumption expenditure	**Da2**
		Proportion of cultural talent	**Da3**
	Cultural facilities	Number of libraries	**Db1**
		Number of museums	**Db2**
		Number of international convention and exhibition centres	**Db3**
		Ranking of urban landmark buildings	**Db4**
	Cultural tourism industry	Proportion of the value added of the cultural industry in GDP	**Dc1**
		Proportion of the value added of the tourism industry in GDP	**Dc2**
		Number of inbound overnight tourists	**Dc3**
		Number of cultural brands	**Dc4**
	International culture exchange	Number of sister cities	**Dd1**
		Number of international exhibitions, conferences, and sports events	**Dd2**
		Number of international students	**Dd3**
		Number of cultural exports (number of books, films and television shows translated by foreign countries)	**Dd4**
		Ratio of cultural imports to cultural exports	**Dd5**
	Cultural cohesion	Sense of belonging in ethnic culture	**De1**
		Self-confidence in national culture	**De2**
		From citizen to government recognized urban spirit	**De3**
City guarantee system	Employment issues	Per capita disposable income of residents as a percentage of GDP	**Ea1**
		Engel's coefficient	**Ea2**
		Surveyed employment rate in urban areas	**Ea3**
	Educational issues	Proportion of public education expenditure in fiscal expenditure	**Eb1**
		Average years of education received by the working age population	**Eb2**
	Medical and health aspects	Number of hospitals with 10000 people	**Ec1**
		Number of beds per thousand people	**Ec2**
		Number of professional (assistant) physicians per thousand people	**Ec3**
		Average life expectancy of residents	**Ec4**
	Social security	Gini coefficient	**Ed1**
		Absolute poverty incidence rate	**Ed2**
		Number of nursing beds per thousand elderly people	**Ed3**
	Comprehensive transportation	Public transportation share in motorized travel	**Ee1**
		Length of urban rail transit lines	**Ee2**
		Number of cities open to international passenger routes at airports	**Ee3**
Citizens' living environment	Ecological environment	Per capita energy consumption	**Fa1**
		Renewable energy consumption ratio	**Fa2**
		Green coverage rate	**Fa3**
		Annual average concentration of PM2.5	**Fa4**
		Urban waste treatment rate	**Fa5**
		International migration as a percentage of the total population	**Fb1**

	International environment	Proportion of total international trade in GDP	**Fb2**
		Net inflow ratio of foreign direct investment	**Fb3**
		Number of foreign enterprises	**Fb4**
		City search volume on Baidu and Google	**Fb5**
		Emergency response, media dissemination and evaluation of international incidents, disasters and accidents by the government and relevant departments	**Fb6**
	Residents' life	Per capita disposable income of households	**Fc1**
		Per capita housing area	**Fc2**
		Automobile penetration rate	**Fc3**
		Per capita number of trips	**Fc4**
		Proportion of the online shopping population	**Fc5**
		Popularization rate of artificial intelligence in households	**Fc6**

The measurement of a city's international image is the process of evaluating its image and reputation on the international stage. In this process, it is necessary to consider multiple indicators, as shaping a city's image is a comprehensive task. The following explores the significance of economic indicators, innovation indicators, urban governance indicators, cultural indicators, urban security system indicators, and citizen living environment indicators in measuring the international image of cities.

First, economic indicators are one of the important factors in evaluating a city's international image. An economically prosperous city often attracts international investment, commercial activities, and talent mobility. Therefore, economic indicators such as the gross domestic product (GDP), per capita income, and employment rate of a city are important criteria for evaluating the city's economic strength and attractiveness. A city with a strong economic foundation is often considered a place with business opportunities and development potential, which play a crucial role in shaping its international image.

Second, innovation indicators also hold important significance for measuring the international image of cities. Innovation is a key factor in the sustained development and enhanced competitiveness of a city. Innovation indicators can include the number of patent applications, research investment, the high-tech output value, etc. A city full of innovative vitality can attract entrepreneurs, technology companies, and research institutions, thereby promoting the development of the city and enhancing its international image.

Third, urban governance indicators are important measures for evaluating the efficiency of urban management and administration. Urban governance indicators can include government transparency, policy stability, anti-corruption measures, etc. A good urban governance environment can provide a stable regulatory framework and predictable business environment for enterprises, attract more international enterprises to settle in a city, and enhance the international image of a city.

Fourth, cultural indicators also play an important role in the international image of cities. Culture is a unique resource of a city that can attract tourists, artists, and cultural enthusiasts. Cultural indicators can include the number of museums, artistic performance activities, cultural industry contributions, etc. A city full of cultural vitality and diversity can showcase its unique charm and enhance its international image.

Fifth, urban security system indicators are important indicators for evaluating the level of social security and public services in a city. The indicators of the urban security system can include health care coverage, the educational level, social welfare support, etc. A sound urban security system can provide good social services and welfare guarantees and improve the quality of life of residents. The urban security system is crucial for attracting international talent and enhancing a city's international image.

Finally, citizen living environment indicators are also important indicators for evaluating the international image of a city. These indicators can include environmental quality, urban planning, infrastructure construction, etc. A liveable, clean, and safe city can attract people to live, work, and invest in the city, enhancing the city's international image.

In summary, economic indicators, innovation indicators, urban governance indicators, cultural indicators, urban security system indicators, and citizen living environment indicators all hold important significance for measuring the international image of cities. These indicators can comprehensively evaluate a city's economic strength, innovation ability, governance level, cultural charm, social security, and living environment, thereby shaping the city's image and reputation on the international stage. An excellent city should achieve balance and breakthroughs in these aspects to enhance its international image and competitiveness.

4. EPILOGUE

This study comprehensively considers the impact of economic indicators, innovation indicators, urban governance indicators, cultural indicators, urban security system indicators, and citizen living environment indicators on the international image of cities. By analysing these indicators, the following conclusions can be drawn:

The shaping of a city's international image cannot be separated from the support of economic indicators. Economic prosperity and development potential are important factors in enhancing the image of a city. A city that has an economy that shows stable growth, has a high per capita income level, and attracts foreign investment is more likely to gain international recognition. Innovation indicators are crucial for enhancing the international image of cities. The innovation ability and technological development level of cities are important factors that attract international attention. Cities that invest in research and development, cultivate high-tech industries, and possess a rich number of patents are more likely to shape a positive international image. Urban governance indicators are one of the key factors determining a city's image (Kearns & Paddison, 2000). Good urban governance reflects the efficiency, transparency, and fairness of urban management. Cities with high government efficiency, transparent administration, and appropriate anti-corruption measures are more likely to establish a good image internationally. Cultural indicators have a significant impact on shaping the international image of cities. The cultural activities and heritage of a city can attract international tourists and investors. Cities with rich cultural resource management, artistic performance activities and cultural industry development are more likely to be recognized and praised internationally (Montalto et al., 2019). The indicators of the urban security system play an important role in enhancing a city's image. A sound urban infrastructure, public safety, and social welfare will provide a good living environment and high-quality services, enhancing the international image of a city. The citizen living environment indicators hold great significance for shaping the international image of cities. Providing a comfortable, convenient, and liveable living environment for citizens, including good housing conditions, educational levels, medical facilities, and cultural and entertainment facilities, will help establish a positive international image.

In summary, economic indicators, innovation indicators, urban governance indicators, cultural indicators, urban security system indicators, and citizen living environment indicators all have a significant impact on the international image of cities. A city that excels in these areas will be more likely to establish a positive and attractive image internationally. Therefore, urban development strategies should focus on fostering economic development, enhancing innovation capabilities, strengthening the construction of urban governance systems, protecting and promoting local culture, and improving urban infrastructure and the living environment of citizens. These measures will help enhance the international competitiveness of s city, attract international investment, tourists, and talent, and thus promote the sustainable development of the city. The government and relevant stakeholders should work closely together to develop and implement targeted policies and plans to achieve a comprehensive enhancement of a city's international image.

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