NIMBY Risk Assessment for Overseas Investment Countries of China with Entropy Weighted and Fuzzy Integral

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Abstract: Addressing the frequent occurrence of NIMBY incidents during Chinese enterprises' investment activities in overseas investment countries, this study examines 51 such nations. An assessment framework for NIMBY risks is constructed across six dimensions: national stability, balanced economic development, environmental vulnerability, cultural divergence, public sentiment, and governmental governance. Entropy weights and fuzzy integration methods are employed to evaluate NIMBY risks across these 51 countries. Findings reveal: Nigeria, Pakistan, Ethiopia, Mozambique, Egypt, Kenya, Bangladesh, Angola, Russia, and Ukraine are classified as high NIMBY risk nations. These high-risk countries predominantly cluster in Africa, South Asia, and conflict-affected regions of Europe. New Zealand, Qatar, Austria, Uruguay, the United Arab Emirates, the Czech Republic, Malta, Hungary, Cyprus, and Slovakia are classified as low NIMBY risk countries, distributed across Europe, the Middle East, South America, and Oceania.

Keywords: Overseas Investment; NIMBY Risk; Fuzzy Integral; Entropy Weighting

1. Introduction

In 2013, the "Silk Road Economic Belt" and the "21st Century Maritime Silk Road" were proposed, collectively known as the Belt and Road Initiative. By March 2025, 152 countries and 32 international organisations had joined the initiative. Against this backdrop, Chinese investment in Belt and Road countries has maintained rapid growth. However, cross-cultural differences in values, perceptions, communication, beliefs, and institutions have led to anxiety and even alarm among citizens in some participating nations regarding cooperation with Chinese enterprises. Concerns include undervaluation of sold resources and fears that China might gain exclusive control over vital national resources. Some citizens worry about the substantial environmental impact of infrastructure projects and the potential for Chinese companies to exploit local resources. Concurrently, certain improper conduct by Chinese enterprises can provoke psychological aversion among host nations and broader populations, leading to intense, resolute, and sometimes highly emotional collective opposition or even resistance. This ultimately results in the termination of investment projects. As Belt and Road cooperation enters a new phase of comprehensive pragmatism, such cross-cultural NIMBY risks have emerged as the foremost obstacle to Chinese enterprises' international collaboration.

In 1977, the foreign scholar O'Hare first proposed the academic concept of "Not on My Back", referring to economic projects or public facilities that impose negative externalities on local residents while providing social benefits [1]. Subsequently, scholar Michael Dear further elaborated on the concept of NIMBY, defining it as the protectionist sentiments and resistance arising when public facilities with significant negative impacts are constructed near residents' homes without their consent [2]. NIMBY facilities, such as municipal solid waste disposal and nuclear power facilities, are crucial for a country's economy and society globally [3]. Such facilities provoke strong opposition from nearby residents, a phenomenon termed the "NIMBY effect" [4]. In 2006, Chinese scholar He Yanling first introduced the NIMBY issue into academic discourse, analysing its causes, characteristics, and governance approaches [5]. Subsequent scholars described NIMBYism as an "aversion complex" triggered among certain members of the public by fears that constructing specific facilities would threaten their living environment, physical and mental wellbeing, or property values [6]. The NIMBY risk, which is the probability of the negative effects of NIMBY

effect, is determined by the fear of NIMBY facilities and the openness of NIMBY site selection process [7]. With accelerating globalisation, NIMBY risks have progressively transcended geographical boundaries, giving rise to the new paradigm of "cross-cultural NIMBY risks". Some scholars contend that cross-cultural NIMBY risks represent a composite threat within transnational energy cooperation, stemming from cultural cognitive disparities, institutional environmental conflicts, and power imbalances that provoke systematic resistance among host country residents towards NIMBY facilities [8]. As the Belt and Road Initiative advances, the NIMBY risks faced by Chinese enterprises in overseas investment projects have increasingly become a focal point. Compared to domestic NIMBY conflicts, those in Belt and Road countries are often more intense, frequently escalating into violent incidents [9]. Multiple studies have examined NIMBY risks in overseas projects and their causes from various perspectives. Irregular practices during project construction and operation, coupled with limited public relations capabilities, exacerbated by domestic political manoeuvring and media stigmatisation in host countries, collectively intensify conflict occurrence [10]. In the study of infrastructure projects in Southeast Asia, it is found that the unreasonable cost-benefit distribution is one of the important factors leading to the failure of the project [11], and geopolitical risks will also significantly affect the investment decisions of China enterprises in some countries along the Belt and Road [12].

Based on this, this paper takes 51 Belt and Road countries as research objects, and constructs the indicator system of NIMBY risk assessment in Belt and Road countries by analyzing the influencing factors of NIMBY risk. Entropy weighting and fuzzy integral methods are employed to evaluate NIMBY risks across these 51 nations, aiming to provide fresh insights for Chinese enterprises and host governments in managing such risks.

2. Analysis of Factors Influencing NIMBY Risks in Belt and Road Countries

NIMBY risk incidents represent a typical form of collective social action. As a social phenomenon, collective action not only involves interactions and psychological states between individuals and groups but also reflects deeper underlying social structures, economic factors, and cultural influences. Through an in-depth analysis of NIMBY risk incidents in Belt and Road countries, the following key factors influencing such risks have been identified:

(1) National Stability. Certain Belt and Road countries experience frequent regime changes, social unrest, and recurrent terrorist activities, categorising them as high-risk investment zones. Pre-existing societal contradictions and conflicts fuel resentment and discontent, making national instability a significant catalyst for NIMBY risks.

(2) Level of Economic Development. Certain Belt and Road nations have problems such as unstable and unbalanced economic development and severe inflation, leading to high unemployment and poverty among local residents. Concurrently, Belt and Road investment projects may suffer from unequal distribution of benefits and inadequate compensation. Consequently, during project construction and operation, local residents may resort to mass protests to pressure Chinese enterprises, seeking increased compensation.

(3) Environmental Vulnerability. Belt and Road investment projects predominantly focus on energy, mining, and transportation sectors, potentially causing environmental pollution during construction. Compounding this, certain participating nations possess inherent environmental fragility. Foreign media continue to stigmatize China investment projects through negative reporting on potential pollution risks. Influenced by such media narratives, some local residents perceive Chinese investment projects as "resource plundering" or "environmental destruction," leading to public opposition against project establishment.

(4) Cultural Diversity. Countries along the Belt and Road possess distinct religious, ethnic, linguistic and cultural environments, traversing or encompassing several regions with the greatest cultural divergence from China. Some nations harbour social tensions such as religious extremism and ethnic separatism. Under such complex cultural differences, Chinese enterprises undertaking investment projects may provoke cultural clashes with local residents during construction and operation. This could trigger a sharp surge in local residents' NIMBY sentiment, leading to collective action or even violent acts targeting the projects.

(5) Public sentiment. The psychological fear, irrational stigmatization, egoism, lack of trust and sense of justice among local residents in

Belt and Road countries are the triggers for the outbreak of NIMBY risk events. Public sentiment is influenced by factors including values, happiness levels, and collective dissatisfaction with society.

(6) Government Governance Capacity. In some Belt and Road countries, poor public service quality, opaque investment project decision-making, inadequate information disclosure, and lack of local community participation erode governmental credibility, fostering public suspicion and distrust. Inadequate regulatory oversight and enforcement by certain governments, coupled with corruption in investment projects, fuel intense public resistance, laying the groundwork for NIMBY conflicts.

3. Development of an Indicator System for Assessing NIMBY Risks in Belt and Road Countries

Based on NIMBY risk influencing factors and drawing upon the National Risk Analysis Report, the World Bank's Global Governance Index (GCI), the U.S. Peace Foundation's Fragile States Index (FSI), the World Happiness Report, the Environmental Performance Index (EPI) from the Yale Center for Environmental Law and Policy and Columbia University's International Geoscience Information Network Centre, the Global Soft Power Index from Brand Finance, and the Global Terrorism Index and Global Peace Index from the Australian Institute for Economics and Peace, this paper constructs an indicator system for NIMBY risk assessment as shown in Table 1.

Table 1. Indicator System for NIMBY Risk Assessment in Belt and Road Countries

Objective Layer	Criteria Level	Indicator Level	Indicator Description	Indicator Source
"Belt and Road" Countries NIMBY Risk	National Stability	Political stability	Measures perceptions of political instability or the likelihood of political instability	World Bank
		Terrorist Activities	Measures the impact of terrorism on countries	Global Terrorism Index
		Internal conflict	Measured by the number and duration of internal conflicts	Global Peace Index
	Level of Economic Development	GDP per capita	The average value of the total final goods and services produced by a country over a given period, calculated per capita	World Bank
		Economic Inequality	This indicator considers inequality within the economy, rather than the economy's actual performance	FSI Fragile States Index
		Unemployment rate	Percentage of unemployed persons in the labour force	World Bank
	Environmental Vulnerability	Environmental Health	Measures the extent to which countries protect their populations from environmental health risks	EPI Environmental Performance Index
		Ecosystem Vitality	Measures countries' performance in protecting ecosystems	EPI Environmental Performance Index
		Climate Change	This indicator measures the extent to which countries mitigate climate change	EPI Environmental Performance Index
	Cultural Diversity	Cultural Distance	This indicator is calculated using the static cultural distance between China and other countries plus the reciprocal of the year of diplomatic relations. The static cultural distance is the weighted average of the differences between China and other countries across Hofstede's six cultural dimensions.	Hofstede Cultural Dimensions
		Cultural Influence	This indicator measures the influence of arts and entertainment, rich cultural heritage, lifestyle, cuisine, and attractions.	Global Soft Power Index
		Values	This indicator measures the trustworthiness, generosity, friendliness, enjoyment, and inclusiveness of a nation's people	Global Soft Power Index
	Public Sentiment	Public Well-being Index	This indicator assesses the impact of material conditions and social equity on well-being	Global Happiness Index Report
		Public Voice	Reflects the extent to which a nation's citizens can participate in electing their government, as well as freedom of speech, freedom of association, and media freedom.	World Bank
		Group Grievance	Indicator focuses on divisions and disagreements between different groups within society	FSI Fragile States Index
	Government Governance Capacity	Government Effectiveness	Reflects public perceptions of the quality of public services, the calibre of the civil service and its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government	World Bank
		Regulatory Quality	Reflects perceptions of the government's ability to formulate and implement sound policies and regulations that permit and promote private sector development	World Bank
		Control of Corruption	reflects perceptions of the extent to which public power is exercised for private gain	World Bank
		Rule of Law	Reflects agents' confidence in and adherence to societal rules, particularly the quality of contract enforcement, property rights, police and courts, and the likelihood of crime and violence	World Bank

4. Research Methodology

4.1 Methodological Choice

In conventional multi-attribute decision-making research, traditional evaluation methods typically presuppose independence among indicators and employ additive approaches as their foundation. However, in reality, the indicators are not completely independent, which does not conform to the additive hypothesis. Fuzzy integration is a non-linear function defined upon fuzzy measures, which does not require the assumption of independence between evaluation indicators. Therefore, considering the characteristics of NIMBY risk evaluation indicators, this paper adopts fuzzy integration as the evaluation method.

4.2 Fuzzy Measures and Fuzzy Integrals

In 1974, Japanese scholar Sugeno extended classical probability measures by replacing the additivity condition with a weaker monotonicity constraint, thereby introducing the concept of fuzzy measures. Correspondingly, he defined the integral of measurable functions with respect to fuzzy measures.

Definition 1: Let g denote a mapping from $P(X)$ (the power set of X) to [0,1]. If g satisfies the following conditions:

(1) Boundedness $g(\Phi)=0, g(\mathrm{X})=1$

(2) Monotonicity: $\forall A, B \in P(X)$, if $A \subseteq B$, then $g(A) \leq g(B)$

(3) Continuity If $\forall A_i \in P(X)$ and $\{A_i\}_{i=1}^{\infty}$ is monotonic, i.e. $A_1 \subseteq A_2 \subseteq \ldots \subseteq A_n \ldots$ or $A_1 \supseteq A_2 \supseteq \ldots A_n \supseteq \ldots$, then $\lim_{i\to\infty} g(A_i)=g(\lim_{i\to\infty} A_i)$. In this case, g is termed a fuzzy measure (general fuzzy measure) on $P(X)$.

M. Sugeno defined fuzzy measures as follows: Given an element $x \in X$, we conjecture that x may belong to some element A of $P(X)$ (i.e., $A \in P(X)$ and $x \in A$). This conjecture is uncertain and fuzzy, and g serves as a measure of this fuzziness.

Definition 2: If the fuzzy measure g satisfies the following additional property:

If $A \cap B = \phi$,

then $g(A \cup B)=g(A)+g(B)+\lambda g(A)g(B)$,

where $\lambda \in [-1,\infty)$.

Then g is termed the λ fuzzy measure, or the g_λ measure.

When $\lambda = 0$, g_λ clearly satisfies additivity. By continuity, it is readily proven that countable additivity holds, and the λ fuzzy measure is a probability measure.

In the formula for the λ fuzzy measure, the magnitude relationship between $g_\lambda(A \cup B)$ and $g_\lambda(A)+g_\lambda(B)$ presents three scenarios:

(1) When $\lambda > 0$, $g_\lambda(A \cup B) \geq g_\lambda(A)+g_\lambda(B)$, indicating a multiplicative relationship exists between A and B .

(2) When $\lambda < 0$, $g_\lambda(A \cup B) \leq g_\lambda(A)+g_\lambda(B)$, this indicates that A and B are substitutes for one another, with their functions overlapping.

(3) When $\lambda = 0$, $g_\lambda(A \cup B)=g_\lambda(A)+g_\lambda(B)$, it indicates that no interaction exists between A and B , presenting an independent state.

If $X=\{x_1,\ldots,x_n\}$ is a finite set and the fuzzy density function of each variable x_{i} is $g(x_i)$, then g_λ can be expressed as follows:

$$\begin{aligned} g_\lambda(\{x_1,\ldots,x_n\}) &= \sum_{i=1}^{n} g(x_i)+\lambda \sum_{i1=1}^{n-1}\sum_{i2=i1+1}^{n} g(x_{i1})g(x_{i2})+\ldots+\lambda^{n-1} g(x_1),\ldots g(x_n) \\ &= \frac{1}{\lambda}\left|\prod_{i=1}^{n}(1+\lambda g(x_i))-1\right| \quad \lambda \in [-1,\infty) \quad \lambda \neq 0 \end{aligned} \tag{1}$$

Fuzzy integration is a nonlinear function defined upon fuzzy measures. Numerous methods exist for fuzzy integration, with the most commonly employed including Suggeon fuzzy integral, Weber fuzzy integral, and Choquet fuzzy integral.

Definition 3: Let g denote a fuzzy measure on $P(X)$, and $f: X \to [0,1]$ denote a measurable function on X . If $X = \{x_1,\ldots, x_n\}$ is a finite set, then without loss of generality, $f(x_1) \geq f(x_2) \geq \ldots \geq f(x_n)$ (If this condition not hold, it may be satisfied by rearranging the elements), Then the Suggeon fuzzy integral of the fuzzy measure g of f over X is defined as:

$$\int f dg = \bigvee_{i=1}^{n} \left(f(x_i) \wedge g(X_i)\right) \tag{2}$$

Where $X_{\mathrm{i}} = \{x_1,\ldots, x_{\mathrm{i}}\}$, $(i=1,2,\ldots n)$ $\vee$ denotes taking the maximum value, and $\wedge$ denotes taking the minimum value. $g(X_1)=g(\{x_1\})$, $g(X_2)=g(\{x_1,x_2\})$,…, $g(X_n)=g(\{x_1,x_2,\cdots,x_n\})$

Moreover, fuzzy integration need not necessarily employ the aforementioned max-min operators; addition/multiplication operations may also be adopted, which constitutes the currently widely used Choquet integral.

Definition 4: Assuming without loss of generality that $f(x_1) \geq \cdots \geq f(x_i) \geq \ldots \geq f(x_n)$, then the Choquet fuzzy integral of the fuzzy measure g over X for f is defined as:

$$\int f dg = f(x_n)g(X_n) + [f(x_{n-1}) - f(x_n)]g(X_{n-1}) + \cdots + [f(x_1) - f(x_2)]g(X_1) \quad (3)$$

In the evaluation process using fuzzy integration, f represents the performance value of the subject under evaluation on a specific attribute, where $f(x_i)$ denotes the standardised evaluation value of the i th indicator for the subject; g signifies the subjective importance of the attribute, with $g(X_i)$ indicating the subjective importance of the indicator set $x_1 \ldots x_i$, i.e., $g(X_i) = g(\{x_1, x_2, \cdots, x_i\})$; the fuzzy integration of f and g then constitutes the overall evaluation value of the subject under evaluation.

5. Analysis of NIMBY Risk Evaluation Results

5.1 Data Preprocessing

This study employs the extremum method in Formula (4) to normalise positive indicators and Formula (5) to normalise negative indicators. The normalised results for 51 countries are presented in Table 2.

$$x'_j = \frac{x_j - x_{j\min}}{x_{j\max} - x_{j\min}} \qquad x_{j\min} \leq x_j \leq x_{j\max} \quad (4)$$

Table 2. Data Normalisation Results

Country Name	National Stability			Level of Economic Development			Environmental Vulnerability			Cultural Diversity			Public Sentiment			Government Governance Capacity			
	Political Stability	Terrorist Activities	Internal Conflict	GDP per capita	Economic Inequality	Unemployment rate	Environmental Health	Ecosystem Vitality	Climate Change	Cultural Distance	Cultural Influence	Values	Public Well-being Index	Public Voice	Group Grievance	Government Effectiveness	Regulatory Quality	Control of Corruption	Rule of Law
United ArabEmirates	0.711	0.971	0.947	0.609	0.836	0.933	0.465	0.184	0.353	0.328	0.343	0.269	0.151	0.846	0.076	1.000	0.819	0.809	0.786
Pakistan	0.005	0.019	0.474	0.009	0.589	1.000	1.000	0.827	0.160	0.234	0.886	0.923	0.665	0.800	0.937	0.199	0.135	0.051	0.115
Georgia	0.300	1.000	0.987	0.096	0.658	1.000	0.608	0.641	0.523	0.385	0.514	0.385	0.534	0.539	0.696	0.784	0.793	0.674	0.511
Kazakhstan	0.337	1.000	1.000	0.154	0.904	1.000	0.551	0.528	0.417	0.205	0.743	0.577	0.286	0.815	0.734	0.526	0.503	0.388	0.297
Sri Lanka	0.216	0.622	0.947	0.040	0.438	1.000	0.681	0.704	0.361	0.485	0.714	0.692	0.853	0.626	0.861	0.328	0.280	0.303	0.451
Qatar	0.868	1.000	1.000	1.000	0.534	1.000	0.449	0.595	0.182	0.695	0.486	0.308	0.240	0.805	0.152	0.883	0.808	0.719	0.802
Malaysia	0.495	0.976	1.000	0.135	0.781	1.000	0.514	0.753	0.332	0.167	0.514	0.385	0.338	0.508	0.405	0.807	0.720	0.562	0.654
Bangladesh	0.105	0.580	0.921	0.024	0.452	1.000	0.938	0.886	0.202	0.071	0.857	0.808	0.856	0.754	0.911	0.152	0.124	0.000	0.258
Saudi Arabia	0.374	0.832	0.829	0.447	0.603	0.875	0.590	0.529	0.255	0.363	0.543	0.462	0.185	0.949	1.000	0.795	0.674	0.618	0.599
Turkey	0.084	0.487	0.855	0.157	0.356	0.708	0.543	0.948	0.259	0.400	0.086	0.385	0.586	0.780	1.000	0.333	0.399	0.242	0.247
Philippines	0.195	0.327	0.632	0.040	0.616	1.000	0.752	0.776	0.179	0.184	0.600	0.462	0.320	0.554	0.658	0.538	0.549	0.214	0.302
Israel	0.042	0.000	0.697	0.646	0.767	0.895	0.187	0.658	0.467	0.864	0.657	0.808	0.000	0.318	0.696	0.854	0.845	0.764	0.769
India	0.168	0.218	0.553	0.024	0.466	0.870	0.990	1.000	0.243	0.044	0.000	0.692	0.814	0.503	0.823	0.661	0.435	0.320	0.522
Indonesia	0.253	0.472	0.947	0.054	0.658	0.897	0.813	0.771	0.232	0.000	0.514	0.385	0.439	0.492	0.671	0.684	0.586	0.258	0.412
Vietnam	0.432	1.000	1.000	0.047	0.781	0.949	0.736	0.998	0.000	0.025	0.629	0.654	0.322	0.882	0.405	0.515	0.337	0.287	0.456
Nepal	0.368	0.734	1.000	0.010	0.534	1.000	0.949	0.649	0.186	0.554	0.629	0.462	0.541	0.559	0.911	0.088	0.218	0.230	0.275
Thailand	0.332	0.476	0.921	0.083	0.671	0.977	0.618	0.618	0.458	0.363	0.371	0.346	0.338	0.667	0.696	0.544	0.544	0.253	0.539
Algeria	0.190	0.729	0.987	0.060	0.548	1.000	0.539	0.767	0.247	0.411	0.714	0.615	0.490	0.810	0.684	0.158	0.093	0.185	0.176
Ethiopia	0.000	0.843	0.000	0.008	0.233	1.000	0.818	0.579	0.176	0.495	0.829	0.731	0.862	0.831	0.924	0.117	0.073	0.270	0.181
Angola	0.290	0.722	0.961	0.021	0.055	1.000	0.875	0.774	0.501	0.823	0.829	0.692	0.875	0.749	0.899	0.000	0.166	0.174	0.039
Namibia	0.637	1.000	1.000	0.045	0.315	1.000	0.814	0.368	0.567	0.227	0.857	0.654	0.622	0.349	0.329	0.474	0.482	0.528	0.621
Ghana	0.437	1.000	1.000	0.022	0.356	1.000	0.803	0.678	0.174	0.717	0.657	0.654	0.756	0.405	0.177	0.404	0.415	0.438	0.445
Zambia	0.511	1.000	1.000	0.009	0.014	0.817	0.889	0.258	0.314	0.288	0.771	0.577	0.951	0.569	0.544	0.164	0.285	0.264	0.236
Kenya	0.095	0.302	0.763	0.017	0.247	1.000	0.798	0.665	0.233	0.485	0.771	0.654	0.711	0.605	0.810	0.298	0.332	0.112	0.346
Egypt	0.116	0.357	0.645	0.036	0.644	0.790	0.716	0.553	0.347	0.679	0.314	0.615	0.833	0.928	0.772	0.339	0.212	0.118	0.385
Rwanda	0.484	0.986	0.961	0.005	0.192	0.615	0.912	0.668	0.313	0.908	0.800	0.692	1.000	0.785	0.937	0.626	0.534	0.697	0.528
Morocco	0.263	1.000	1.000	0.040	0.603	1.000	0.662	0.828	0.309	0.455	0.400	0.500	0.631	0.682	0.848	0.439	0.477	0.219	0.434
Mozambique	0.063	0.221	0.592	0.000	0.000	1.000	0.797	0.572	0.229	0.615	0.857	0.692	0.526	0.708	0.734	0.140	0.187	0.090	0.071
South Africa	0.163	1.000	0.974	0.068	0.315	0.000	0.804	0.570	0.459	0.443	0.543	0.692	0.475	0.303	0.557	0.322	0.404	0.371	0.500
Nigeria	0.016	0.066	0.000	0.012	0.151	0.904	0.923	0.727	0.386	0.579	0.686	0.846	0.609	0.703	0.886	0.070	0.104	0.028	0.104
Senegal	0.390	0.733	1.000	0.014	0.397	1.000	0.720	0.583	0.319	0.294	0.714	0.577	0.588	0.497	0.430	0.491	0.347	0.500	0.368
Tanzania	0.421	0.721	0.882	0.008	0.260	1.000	0.798	0.448	0.253	0.205	0.743	0.615	0.882	0.697	0.456	0.252	0.249	0.348	0.319
Tunisia	0.179	0.641	1.000	0.042	0.699	0.529	0.542	0.702	0.523	0.744	0.571	0.539	0.723	0.615	0.671	0.304	0.233	0.337	0.423
Austria	0.726	0.883	0.947	0.696	0.918	0.836	0.100	0.000	0.648	0.728	0.200	0.115	0.108	0.062	0.215	0.930	0.907	0.820	1.000
Belarus	0.137	0.948	1.000	0.091	0.808	0.892	0.415	0.274	0.476	0.536	0.800	0.808	0.416	1.000	0.468	0.006	0.000	0.146	0.000
Russia	0.079	0.622	0.803	0.170	0.548	0.904	0.428	0.630	0.322	0.403	0.429	0.808	0.385	0.903	0.785	0.146	0.057	0.011	0.011
Czech Republic	0.847	0.559	1.000	0.389	1.000	0.920	0.313	0.088	0.653	0.243	0.486	0.423	0.129	0.180	0.304	0.842	0.881	0.742	0.852
Malta	0.790	1.000	1.000	0.497	0.945	0.903	0.123	0.174	1.000	0.726	0.571	0.423	0.247	0.236	0.063	0.632	0.731	0.523	0.747
Cyprus	0.590	0.924	1.000	0.452	0.644	0.818	0.213	0.401	0.580	0.787	0.543	0.385	0.315	0.226	0.367	0.766	0.751	0.573	0.703
Slovakia	0.647	0.866	1.000	0.302	0.959	0.818	0.332	0.068	0.631	0.177	0.657	0.500	0.269	0.241	0.494	0.550	0.700	0.556	0.670
Ukraine	0.053	0.792	0.776	0.057	0.589	1.000	0.530	0.438	0.684	0.454	0.829	0.808	0.611	0.595	0.658	0.287	0.394	0.135	0.099
Greece	0.532	0.621	1.000	0.286	0.822	0.657	0.227	0.301	0.798	0.542	0.000	0.269	0.349	0.210	0.304	0.532	0.694	0.517	0.533
Hungary	0.732	1.000	1.000	0.273	0.904	0.872	0.499	0.131	0.588	0.651	0.571	0.539	0.328	0.421	0.215	0.597	0.606	0.478	0.604
Panama	0.516	1.000	1.000	0.227	0.438	0.792	0.441	0.343	0.487	0.839	0.714	0.577	0.244	0.369	0.582	0.351	0.529	0.163	0.335
El Salvador	0.447	1.000	0.987	0.060	0.562	0.907	0.685	0.724	0.582	1.000	0.829	0.654	0.216	0.677	0.468	0.485	0.352	0.208	0.324
Jamaica	0.568	1.000	1.000	0.078	0.534	0.906	0.600	0.611	0.682	0.604	0.400	0.423	0.371	0.359	0.000	0.637	0.508	0.433	0.390
Peru	0.200	0.662	0.987	0.091	0.411	0.847	0.616	0.494	0.381	0.556	0.571	0.500	0.372	0.523	0.810	0.228	0.580	0.129	0.220
Ecuador	0.295	0.979	0.921	0.077	0.411	0.891	0.529	0.446	0.540	0.573	0.743	0.615	0.400	0.580	0.544	0.222	0.176	0.157	0.093
Suriname	0.595	1.000	1.000	0.061	0.616	1.000	0.505	0.396	0.559	0.953	1.000	1.000	0.266	0.426	0.684	0.018	0.171	0.292	0.473
Uruguay	0.842	0.986	1.000	0.282	0.808	0.740	0.328	0.852	0.421	0.758	0.629	0.500	0.181	0.077	0.089	0.801	0.725	0.927	0.753
New Zealand	1.000	0.760	1.000	0.604	0.904	0.884	0.000	0.428	0.509	0.910	0.343	0.000	0.077	0.000	0.051	0.965	1.000	1.000	0.984

5.2 Weight Calculation

The entropy weighting method constitutes an objective weighting approach. It calculates the entropy value of each indicator based on the impact of its numerical variation on the overall outcome, thereby determining its weight. When addressing multi-indicator weighting, this method eliminates result biases arising from subjective human valuation, mitigates the influence of subjective factors, and enhances the objectivity and accuracy of evaluation outcomes. The indicator weights for NIMBY risk calculated using the entropy weighting method are presented in Table 3.

Table 3. Indicator Weights

Objective Layer	Criteria Layer	Criterion Layer Weight	Indicator Layer	Indicator Layer Weighting
Belt and Road Countries Along the Belt and Road NIMBY Risk	National Stability	0.3458	Political Stability	0.0837
			Terrorist Activities	0.0336
			Internal Conflict	0.0166
	Level of Economic Development	0.1189	GDP per capita	0.2170
			Economic Inequality	0.0401
			Unemployment rate	0.0088
	Environmental Vulnerability	0.0384	Environmental health	0.0319
			Ecosystem vitality	0.0360
			Climate Change	0.0367
	Cultural Diversity	0.1000	Cultural Distance	0.0509
			Cultural Influence	0.0296
			Values	0.0230
	Public Sentiment	0.1784	Public Well-being Index	0.0492
			Public Voice	0.0369
			Group Grievance	0.0475
	Government Governance Capacity	0.2186	Government Efficiency	0.0669
			Regulatory Quality	0.0574
			Corruption Control	0.0737
			Rule of Law	0.0604

5.3 Analysis of NIMBY Risk Assessment Results

The NIMBY risk for 51 countries was assessed using the Choquet fuzzy integral in formula (3). To emphasise the balanced influence of each indicator on NIMBY risk [13], the fuzzy measure was defined as. The NIMBY risk assessment comprised two steps: first, calculating the criterion layer from the indicator layer; second, deriving the objective layer from the criterion layer. The assessment results are presented in Table 4.

(1) Analysis of the top ten countries with highest NIMBY risk. As illustrated in Figure 1, the ten nations ranking highest in NIMBY risk among the 51 countries are Nigeria, Pakistan, Ethiopia, Mozambique, Egypt, Kenya, Bangladesh, Angola, Russia, and Ukraine. Countries exhibiting high NIMBY risk are predominantly concentrated in Africa, South Asia, and regions of Europe experiencing localised armed conflicts.Countries with high NIMBY risk share common characteristics: political instability, high levels of economic disparity, significant public sentiment volatility, and low levels of national governance.

(2) Analysis of the ten countries with the lowest NIMBY risk. As shown in Figure 2, among the 51 countries, the ten nations with the lowest NIMBY risk are New Zealand, Qatar, Austria, Uruguay, the United Arab Emirates, the Czech Republic, Malta, Hungary, Cyprus and Slovakia. Low NIMBY risk countries are primarily concentrated in Europe, the Middle East, South America and Oceania. These countries share common characteristics: political stability, balanced economic development, healthy national ecosystems, stable public sentiment, and high levels of national governance.

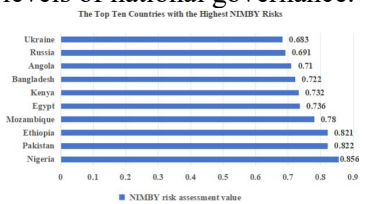

Figure 1. Top 10 Countries with Highest NIMBY Risk

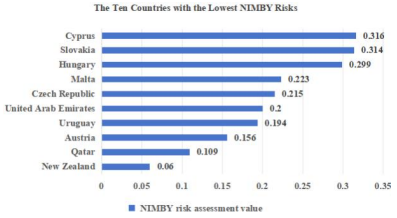

Figure 2. Top 10 Countries with Lowest NIMBY Risk

Table 4. NIMBY Risk Assessment Results

Country Name	Criterion Level						Objective Level	Rank
	National Stability	Level of Economic Development	Environmental Vulnerability	Cultural Diversity	Public Sentiment	Government Governance Capacity	NIMBY risk	
United Arab Emirates	0.145	0.294	0.326	0.318	0.307	0.143	0.200	47
Pakistan	0.948	0.881	0.636	0.567	0.795	0.914	0.822	2
Georgia	0.415	0.790	0.588	0.421	0.591	0.319	0.447	35
Kazakhstan	0.387	0.697	0.495	0.436	0.584	0.594	0.489	30
Sri Lanka	0.579	0.877	0.573	0.594	0.790	0.686	0.654	12
Qatar	0.022	0.000	0.401	0.544	0.357	0.199	0.109	50
Malaysia	0.285	0.734	0.528	0.311	0.407	0.327	0.357	41
Bangladesh	0.670	0.889	0.654	0.452	0.845	0.907	0.722	7
Saudi Arabia	0.430	0.483	0.448	0.435	0.674	0.336	0.437	37
Turkey	0.718	0.793	0.575	0.303	0.781	0.725	0.663	11
Philippines	0.714	0.848	0.552	0.361	0.500	0.635	0.596	19
Israel	0.934	0.273	0.442	0.790	0.325	0.192	0.468	33
India	0.773	0.892	0.723	0.140	0.727	0.542	0.612	17
Indonesia	0.594	0.832	0.588	0.228	0.533	0.548	0.532	25
Vietnam	0.322	0.817	0.584	0.331	0.499	0.628	0.454	34
Nepal	0.437	0.889	0.570	0.553	0.672	0.831	0.597	18
Thailand	0.542	0.801	0.560	0.361	0.551	0.562	0.541	24
Algeria	0.564	0.841	0.509	0.540	0.643	0.878	0.644	14
Ethiopia	0.875	0.940	0.503	0.640	0.874	0.870	0.821	3
Angola	0.500	0.957	0.705	0.794	0.847	0.943	0.710	8
Namibia	0.181	0.892	0.569	0.496	0.438	0.489	0.382	38
Ghana	0.319	0.907	0.532	0.685	0.444	0.591	0.476	32
Zambia	0.268	0.981	0.464	0.486	0.694	0.794	0.517	27
Kenya	0.773	0.929	0.548	0.602	0.714	0.767	0.732	6
Egypt	0.758	0.854	0.526	0.556	0.836	0.775	0.736	5
Rwanda	0.295	0.962	0.611	0.826	0.915	0.409	0.518	26
Morocco	0.439	0.850	0.589	0.448	0.719	0.642	0.557	22
Mozambique	0.839	1.000	0.514	0.699	0.647	0.916	0.780	4
South Africa	0.511	0.962	0.599	0.525	0.453	0.626	0.556	23
Nigeria	1.000	0.952	0.661	0.667	0.729	0.963	0.856	1
Senegal	0.422	0.908	0.528	0.473	0.504	0.588	0.513	28
Tanzania	0.420	0.936	0.481	0.445	0.673	0.732	0.561	21
Tunisia	0.593	0.850	0.588	0.646	0.673	0.701	0.651	13
Austria	0.158	0.205	0.261	0.432	0.131	0.084	0.156	49
Belarus	0.540	0.774	0.386	0.669	0.589	1.000	0.643	15
Russia	0.693	0.743	0.457	0.498	0.663	0.983	0.691	9
Czech Republic	0.160	0.469	0.348	0.350	0.203	0.174	0.215	46
Malta	0.075	0.380	0.438	0.610	0.176	0.360	0.223	45
Cyprus	0.234	0.473	0.402	0.622	0.307	0.314	0.316	42
Slovakia	0.210	0.560	0.339	0.382	0.337	0.397	0.314	43
Ukraine	0.669	0.837	0.550	0.636	0.622	0.811	0.683	10
Greece	0.355	0.602	0.446	0.263	0.293	0.449	0.366	40
Hungary	0.115	0.593	0.398	0.602	0.311	0.445	0.299	44
Panama	0.264	0.713	0.422	0.742	0.394	0.697	0.447	36
El Salvador	0.313	0.842	0.661	0.870	0.427	0.689	0.502	29
Jamaica	0.229	0.830	0.632	0.502	0.227	0.527	0.367	39
Peru	0.575	0.840	0.489	0.547	0.563	0.759	0.615	16
Ecuador	0.433	0.851	0.503	0.629	0.498	0.870	0.572	20
Suriname	0.210	0.829	0.485	0.976	0.453	0.802	0.482	31
Uruguay	0.044	0.605	0.535	0.660	0.118	0.193	0.194	48
New Zealand	0.000	0.289	0.320	0.416	0.041	0.000	0.060	51

6. Conclusion

This paper addresses the frequent occurrence of NIMBY risk incidents in Belt and Road countries by constructing an indicator system for assessing such risks. Using entropy weighting and fuzzy integration methods, the NIMBY risks of 51 Belt and Road countries were evaluated. Rankings were established for the NIMBY risks across these 51 countries, identifying nations with both high and low risk profiles. Common characteristics were analysed to provide

decision-making guidance for Chinese enterprises seeking to mitigate NIMBY risks when investing in Belt and Road countries.

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