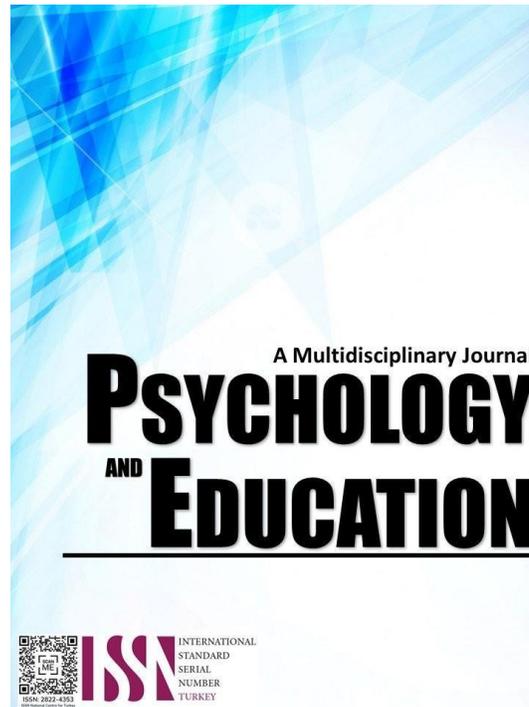


**MULTI-STAKEHOLDERS' ASSESSMENTS OF THE RESOURCES,
CAPABILITY, BENEFITS, AND SUSTAINABILITY OF CHINA-
MALAYSIA QINZHOU INDUSTRIAL PARK: INPUTS
TO POLICY ENHANCEMENT**



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Multi-stakeholders' Assessments of the Resources, Capability, Benefits, and Sustainability of China-Malaysia Qinzhou Industrial Park: Inputs to Policy Enhancement

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Abstract

This study assessed the resources, capabilities, benefits, and sustainability of the China-Malaysia Qinzhou Industrial Park (CMQIP) to provide data-driven inputs for policy enhancement. Employing an explanatory sequential mixed-methods design, the study gathered quantitative data from 168 managers and 400 residents, complemented by qualitative interviews with six key government officials. Findings revealed that while environmental benefits positively influenced the park's capability, both economic and social benefits showed strong negative correlations, indicating issues such as industrial over-reliance and social conflicts. Key resource-related drivers of capacity included policy support, land availability, and financial backing. Among the capabilities assessed, planning and implementation emerged as the strongest contributors to the park's benefits and sustainability, while monitoring and evaluation had weaker effects. Canonical correlation analysis demonstrated significant relationships between capabilities and sustainability, although economic, environmental, and social sustainability factors were negatively associated with the park's current capacity. These insights emphasize the need for CMQIP to diversify its industrial base, address social concerns, and enhance governance to ensure sustainable and inclusive development. The study proposes a sustainability model based on multi-stakeholder assessments, offering strategic directions for future policy and management reforms.

Keywords: *resources, capability, sustainability, China-Malaysia Qinzhou Industrial Park, policy enhancement*

Introduction

The Belt and Road Initiative (BRI), spearheaded by China, has emerged as one of the most ambitious global strategies for economic development and regional cooperation in the 21st century. It aims to foster transnational connectivity through infrastructure investments, trade partnerships, and industrial collaboration. Within this framework, the China-Malaysia Qinzhou Industrial Park (CMQIP) serves as a flagship project symbolizing cross-border cooperation between China and Malaysia. As a model for bilateral industrial development, CMQIP holds strategic significance not only for economic integration but also for demonstrating how international industrial parks can contribute to inclusive and sustainable growth (Xinhua, 2024; China-Malaysia Qinzhou Industrial Park, 2024).

Despite its promising role in regional economic transformation, the CMQIP faces multifaceted challenges. While previous assessments have highlighted infrastructure growth and investment inflows (Lu, 2024; Huang, 2023), there is limited empirical research on the park's resource management, institutional capability, and long-term sustainability from a multi-stakeholder perspective. Current policy evaluations often focus on economic outputs, overlooking environmental and social externalities that can constrain sustainable development (Qu et al., 2022). Furthermore, existing assessments rarely integrate the perceptions of diverse stakeholders, including local residents, managers, and government officials, which are essential for holistic policy formulation.

Addressing this gap, the present study aims to conduct a comprehensive assessment of the CMQIP's resources, capabilities, benefits, and sustainability dimensions. Through an explanatory sequential research design combining quantitative surveys and qualitative interviews, this study examines how factors such as governance, financial support, land access, planning, and environmental management influence the park's performance. By analyzing interrelationships among these variables, the study seeks to inform policy enhancements that align with sustainable development principles and stakeholder needs.

Research Objectives

The main objective is to develop an evidence-based model for sustainable industrial park development underpinned by multi-stakeholder assessments. Specifically, the study investigates:

1. The level of park and country-level resource support.
2. The capability in planning, implementation, monitoring, and evaluation.
3. Perceived economic, environmental, and social benefits.
4. Sustainability outcomes.

Methodology

Research Design

The explanatory sequential design involved two distinct but interconnected phases. The initial phase employed quantitative methods to assess stakeholder perceptions across various dimensions of the industrial park. The subsequent qualitative phase sought to contextualize and elaborate on the quantitative findings through structured interviews with key informants. This design facilitated triangulation and

strengthened the internal validity of the study.

Participants

A stratified sampling strategy was implemented during the quantitative phase. A total of 168 managers were randomly selected from 30 enterprises operating within CMQIP, representing approximately 56% of the manager population in the sampled firms. Additionally, 400 residents who had resided in the park for over three years were selected using quota sampling to ensure demographic representation across age, occupation, and location.

For the qualitative phase, purposive sampling was used to identify six senior government officials from the Qinzhou Industrial Park Administrative Committee and relevant departments. These individuals were selected based on their direct involvement in park governance and development planning.

Instrument

Two validated survey instruments were used to gather data from managers and residents, respectively. Content validity was ensured through expert review by a panel of five scholars from China and the Philippines. The instruments were pilot-tested on 30 managers and 30 residents outside the main sample. Reliability testing using Cronbach's alpha yielded values exceeding 0.80 for all scales, confirming internal consistency.

Structured interview guides were developed for the qualitative phase, anchored on themes emerging from the quantitative results. Interviews were conducted in-person and lasted approximately 45–60 minutes, allowing for in-depth exploration of challenges, perceptions, and policy recommendations.

Procedure

Quantitative data were collected via self-administered questionnaires distributed onsite. Enumerators provided assistance where needed to ensure full comprehension. The qualitative data were gathered through audio-recorded interviews, later transcribed verbatim and validated by respondents through member checking.

Data Analysis

Quantitative data were analyzed using SPSS Version 26. Descriptive statistics (frequency, mean, standard deviation) were used to summarize responses. Canonical Correlation Analysis (CCA) was employed to examine multivariate relationships between sets of variables: (1) resources and capability, (2) capability and benefits, and (3) capability and sustainability. CCA was chosen due to its efficacy in exploring complex interdependencies among variable sets.

Qualitative data were subjected to thematic analysis, with emergent themes used to support or contrast quantitative trends. Triangulation was employed to enhance interpretive reliability and ensure convergence of findings.

Ethical Considerations

Ethical clearance was obtained from the Research Ethics Review Board of Central Philippine University. Participants provided written informed consent and were assured of confidentiality and anonymity. Data were securely stored and used solely for academic purposes.

Results

This section analyzes the collected data to assess the resources, capacity, and sustainability of the China-Malaysia Qinzhou Industrial Park, providing a basis for formulating its improvement and development plans. The study aimed to evaluate the park's resources (assessed by park management and state support levels), capacity (in planning, monitoring, evaluation, and policy implementation), and benefits in economic, environmental, and social aspects.

To achieve this, a Canonical Correlation Analysis (CCA) model was employed to explore the relationships among resources, state support, capacity, benefits, and sustainability, and to propose a sustainable development model for the park. The CCA model reveals the relationship between two groups of variables, with the canonical correlation coefficient, ranging between -1 and 1, measuring the strength of the linear correlation between canonical variables. A coefficient closer to 1 or -1 indicates a stronger linear relationship.

Correlations between Resource and Country Support and Capability

Using Canonical Correlation Analysis, Resource and Country - related variables (Governance, Resource, Services, Policy, Land, Finance, Talent, International_Cooperation) were set as the dependent variable group, while Capability variables (Planning, Implementation, Monitoring, Evaluation) served as canonical variables. Results showed:

High - correlation factors: Policy (0.74223) had the strongest positive correlation with Capability, highlighting its key role in attracting investment and promoting development. Land (0.66110) and Finance (0.62695) also showed strong positive correlations, indicating that land planning, utilization, and financial environment significantly support the park's capacity enhancement.

Moderate - correlation factors: Structure (0.52724) and Services (0.52639) demonstrated significant positive impacts, meaning functional layout optimization and service quality improvement can boost Capability. International_Cooperation (0.39169) and Resource (0.37518) had medium - level positive correlations, suggesting that internationalization efforts and resource utilization contribute to but are not decisive for Capability.

Low - correlation factors: Governance (0.22564) and Talent (0.32990) showed weaker positive correlations. Governance factors have a limited positive effect, while talent - related impacts are restricted, possibly due to unexerted potential.

Correlations between Capability and Benefits

When analyzing Capability (Planning, Implementation, Monitoring, Evaluation) as the dependent variable group and Benefits (Economic_Benefit, Environmental_Benefit, Social_Benefit) as canonical variables, the Canonical Correlation Analysis results showed:

Strong positive correlations: Planning (0.76025) and Implementation (0.68298) had significant positive relationships with the Benefits of the China-Malaysia Qinzhou Industrial Park. Rational and forward-looking planning, along with effective implementation of strategies, greatly enhanced the park's overall benefits.

Weak positive correlations: Monitoring (0.31053) and Evaluation (0.34771) exhibited relatively weak correlations with Benefits. While they had some positive effects, they were not major determinants of the park's benefit performance.

Correlations between Benefits and Capability

Analyzing Benefits (Economic, Environmental, Social) as the dependent variable group and Capability (Planning, Implementation, Monitoring, Evaluation) as the canonical variable group via Canonical Correlation Analysis yielded the following results:

Economic Benefit: With a correlation coefficient of -0.90688, it showed a strong negative correlation with Capability. This suggests that factors like over - reliance on certain industries and an unbalanced economic structure may restrict the overall capacity of the China - Malaysia Qinzhou Industrial Park.

Environmental Benefit: A coefficient of 0.79579 indicated a positive correlation. Good environmental conditions, including a pleasant ecological environment and effective protection measures, can enhance the park's capacity, attract high - quality enterprises, and boost its image and competitiveness.

Social Benefit: The -0.85448 coefficient revealed a strong negative correlation. Social and cultural conflicts or disharmonious community relations may negatively impact the park's capacity, hindering its overall development.

Correlations between Capability and Sustainability

When analyzing Capability (Planning, Implementation, Monitoring, Evaluation) as the dependent variable group and Sustainability (Economic, Environmental, Social) as canonical variables, the results are as follows:

Planning: With a correlation coefficient of 0.81081, it had a very strong positive correlation with sustainability. Reasonable planning determines the park's development direction and layout, optimizes resource allocation, and is decisive for the sustainable development of the China-Malaysia Qinzhou Industrial Park.

Implementation: The correlation coefficient of 0.74023 indicated a strong positive correlation. Effective implementation of the plan in infrastructure and project introduction ensures the park's smooth operation and continuous development, like building environmental protection facilities as planned to reduce environmental impact.

Monitoring: A coefficient of 0.39484 showed a positive correlation. Monitoring the park's environmental, economic, and social indicators helps detect problems in time and take corrective measures to keep the park on the track of sustainable development.

Evaluation: The correlation coefficient of 0.37754 also showed a positive but relatively weak correlation. Evaluation of the park's development achievements provides a basis for adjusting planning, optimizing implementation, and setting monitoring priorities, such as adjusting industry development strategies based on evaluation results to promote sustainable development.

Correlations between Sustainability and Capability

Analyzing Sustainability (Economic, Environmental, Social) as the dependent variable group and Capability (Planning, Implementation, Monitoring, Evaluation) as canonical variables via Canonical Correlation Analysis showed:

Economic Sustainability: With a correlation coefficient of -0.94505, it exhibited a potent negative relationship with Capability. Stable economic growth, an optimal industrial structure, and efficient resource use underpin economic sustainability. Robust economic sustainability fuels investments in innovation and training, enhancing overall capabilities. Conversely, economic instability—such as industry over - dependence—hinders capital flow and project progress, constraining capacity development.

Environmental Sustainability: At -0.94954, the correlation was equally strong. Prioritizing ecological protection and resource recycling attracts eco - conscious enterprises, bolsters the park's brand, and spurs green innovation. However, environmental issues trigger regulatory

scrutiny and reputational damage, diverting resources and impeding comprehensive capability growth.

Social Sustainability: The coefficient of -0.98479 signified the strongest correlation. Fostering positive community relations, safeguarding employee rights, and creating jobs attract talent, boost loyalty, and strengthen social responsibility. In contrast, social sustainability failures lead to conflicts and low morale, undermining the park's operational stability and development capabilities.

Sustainability of the China-Malaysia Qinzhou Industrial Park based on Capacity and Benefit

This study utilized Canonical Correlation Analysis (CCA) to explore the linear relationships between "Capability" and both "Benefit" and "Sustainability," aiming to establish a sustainable development model for the Qinzhou Industrial Park. CCA was also conducted between "Resource Management and Capacity Support" variables and "Capability."

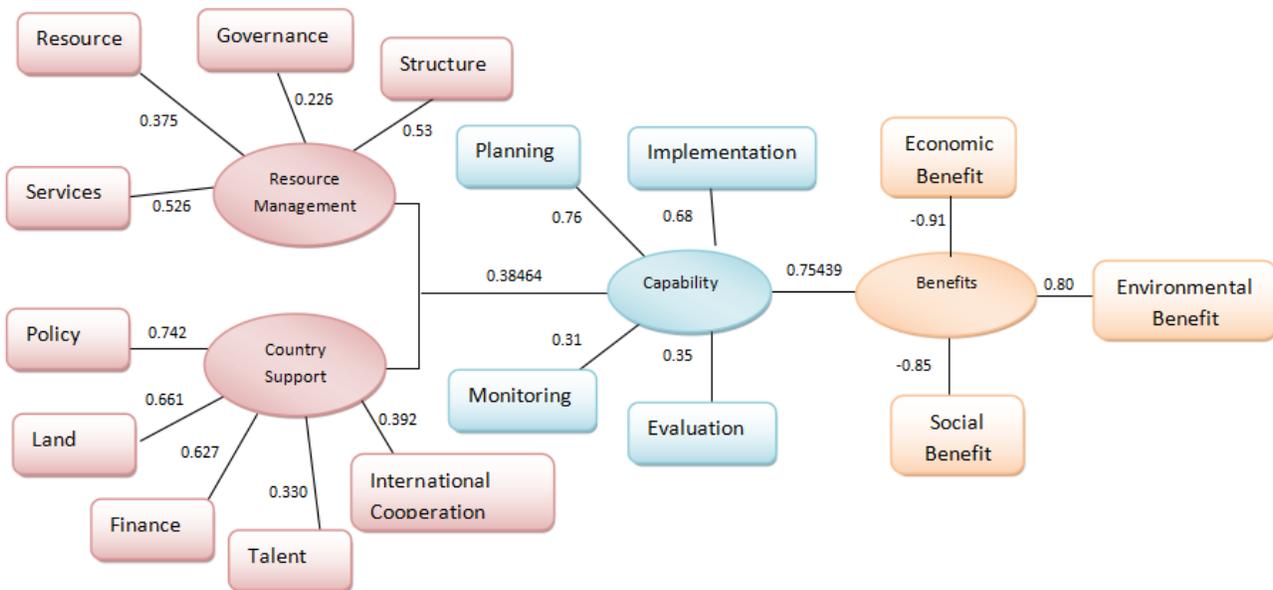


Figure 1. A model for sustainability of the China-Malaysia Qinzhou Industrial Park based on Capacity and Benefit

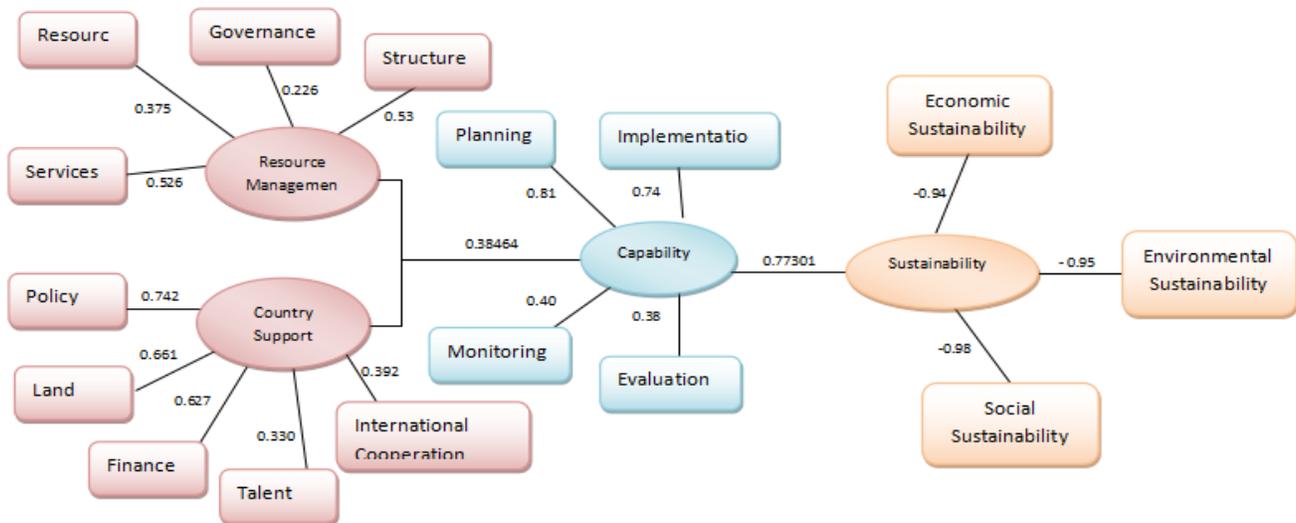


Figure 2. A model for sustainability of the China-Malaysia Qinzhou Industrial Park based on Capacity and Sustainability

The canonical correlation between "Resource Management and Capacity Support" and "Capability" was 0.38464, indicating a low overall correlation. However, "Structure" (0.53) and "Services" (0.536) in "Resource Management" had moderate influence, while "Policy" (0.742), "Land" (0.661), and "Finance" (0.627) under "Country Support" showed moderate to high impacts on "Capability," suggesting these factors are key to enhancing government implementation capacity.

For the relationships between "Capability and Benefits," the canonical correlation was 0.75439, demonstrating a high relationship (see Figure 2). "Planning" (0.76) and "Implementation" (0.68) were significant indicators of project success. As a covariate, Environmental Benefits had a positive value of 0.80, indicating that higher environmental benefits led to greater project success and resident appreciation.

Regarding "Capability and Sustainability," the canonical correlation value was 0.77301, also showing a high relationship (see Figure 3). Similar to "Benefit," "Planning" and "Implementation" strongly influenced project sustainability. However, negative loadings suggested that despite improved living conditions, residents remained skeptical about the park's long-term viability.

Discussion

This study examined the multi-stakeholder assessments of resources, capability, benefits, and sustainability in the China-Malaysia Qinzhou Industrial Park (CMQIP), revealing key interrelationships that inform sustainable industrial development and cross-border cooperation. The findings provide empirical support for the view that the long-term viability of international industrial parks hinges on the strategic alignment of planning, implementation, environmental governance, and stakeholder engagement core elements underscored in recent scholarship (Lu, 2024; Qu et al., 2022).

One of the central findings of this research is the critical role of national policy, land provision, and financial mechanisms in enhancing the park's operational capacity. The strong canonical correlations between these variables and capability indicators are consistent with prior studies asserting that institutional support and investment incentives are foundational to industrial park performance (Chen et al., 2023; Wang & Fang, 2020). This reinforces the notion that physical infrastructure alone is insufficient; policy-driven enablers are essential to transform infrastructure into sustained productivity and competitiveness (Maravilla & Pelmin, 2025).

However, the study also reveals a paradoxical dynamic: while environmental benefits positively influence capability, both economic and social benefits are negatively correlated with capacity. These results diverge from the optimistic conclusions drawn by Huang (2023), who highlighted CMQIP's economic progress as a proxy for its overall success. The present findings suggest that economic benefits may be masking structural vulnerabilities such as over-reliance on a limited number of industries and insufficient diversification. Similarly, the negative correlation with social benefits implies latent community tensions or weak integration between the industrial zone and surrounding population a concern also raised in Wang's (2021) discussion of governance gaps under BRI projects.

Furthermore, while planning and implementation strongly contribute to perceived benefits and sustainability, monitoring and evaluation exhibit weaker associations. This discrepancy raises concerns about accountability mechanisms within the park's governance system. The relative underperformance of these dimensions may reflect insufficient data feedback loops, weak benchmarking systems, or limited stakeholder participation in assessment processes commonly reported in large-scale cross-border projects (Qu et al., 2022; Wang Zilin & Fang, 2020). Strengthening these systems is vital to adaptively manage industrial expansion and avoid long-term inefficiencies.

The strongest negative correlation emerged between social sustainability and overall capacity, pointing to the profound impact of social integration challenges on organizational effectiveness. This finding validates assertions by Jeffreys (2015) and Wang Youyun (2021) that cultural dissonance, labor rights issues, and community exclusion can severely constrain development efforts. It also highlights the need for inclusive urban planning, community-based dialogue, and improved public services around industrial zones.

Contrary to several promotional reports from official CMQIP channels (China-Malaysia Qinzhou Industrial Park, 2024; Guangxi Daily, 2022), this study's stakeholder-based analysis paints a more cautious picture. While progress is evident in select domains, the long-term sustainability of CMQIP is undermined by imbalanced development, governance asymmetries, and public skepticism. These concerns underscore the importance of transitioning from growth-centric to sustainability-oriented industrial park models, as advocated in the broader literature on BRI infrastructure diplomacy (Xinhua, 2024; Lu, 2024).

Despite its strengths, this study acknowledges several limitations. The cross-sectional nature of the survey data may not capture temporal variations in perception or policy impacts. Moreover, qualitative interviews, while rich in insight, are limited in generalizability. Future research should consider longitudinal assessments, expanded stakeholder groups (e.g., environmental NGOs, migrant workers), and comparative case studies involving other BRI-linked industrial parks.

This research advances the understanding of sustainable industrial development within the BRI framework by demonstrating that policy support, environmental stewardship, and social cohesion are not only complementary goals but necessary conditions for industrial park success. The insights presented here provide a foundation for evidence-based policy enhancements and strategic interventions to reinforce the developmental trajectory of CMQIP and similar initiatives globally.

Conclusions

This study contributes to a multi-dimensional assessment of the China-Malaysia Qinzhou Industrial Park (CMQIP), integrating stakeholder perspectives to evaluate the park's resources, capability, benefits, and sustainability. By employing an explanatory sequential mixed-methods approach, it bridges the gap between policy intentions and operational realities, offering empirical insights that challenge overly optimistic narratives and emphasizing the nuanced interplay between institutional capacity, socio-environmental dynamics, and sustainable development outcomes.

A key advancement of this research lies in its application of Canonical Correlation Analysis (CCA) to uncover systemic relationships among resources, governance mechanisms, and stakeholder-perceived benefits. The findings underscore that while strong policy, land, and financial support positively enhance planning and implementation capacity, unresolved issues in social cohesion and economic diversification pose critical limitations to sustainability. These insights support a paradigm shift in industrial park development from infrastructure-centric planning to holistic governance frameworks that integrate economic, environmental, and social dimensions.

This work offers both theoretical and practical implications. It informs policymakers in China, Malaysia, and other BRI-participating countries that the long-term viability of joint industrial ventures depends not only on capital investment but also on stakeholder engagement, continuous monitoring, and adaptive policy design. Furthermore, the sustainability model proposed can serve as a decision-making tool for future industrial park developments globally.

Future research should expand on this foundation through longitudinal and comparative analyses across other BRI corridors. Additional focus on cultural integration, labor dynamics, and environmental performance metrics will further refine our understanding of what constitutes success in cross-border industrial cooperation. This study advances the discourse on international industrial park development by positioning stakeholder alignment, environmental responsibility, and governance transparency as central pillars for sustainability and policy innovation in the BRI era.

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