Journal of Sustainable Built Environment

press

https://doi.org/10.70731/s91hg603

Contract Risk Management for Cultural and Tourism Projects in EPC+O Mode

Renxian Yi [a], **Yanfeng Du** [b], **Shasha Xie** [a,*], **Yazhou Fang** [a]

[a] *School of Civil Engineering and Architecture, Wuhan Institute of Technology, Wuhan 430074, China*
[b] *China Investment Consulting Company*

KEYWORDS

EPC+O Model;
Comprehensive Empowerment Method;
Contract Risk Evaluation Model;
Risk Control

ABSTRACT

Driven by the policy of deepening the implementation of the rural revitalisation strategy and the deep integration of culture and tourism, the EPC+O model is becoming the preferred paradigm for large-scale culture and tourism projects due to its full-cycle integration capability. However, its contract risk management still faces the multi-dimensional challenges of cultural adaptation, operational benefits, and policy compliance. In this paper, 35 risk factors are identified through an empirical study of relevant literature, and the indicators are optimised using the questionnaire survey method to form a contract risk evaluation index system that includes 4 guideline levels, 10 level 1 indicators, and 32 level 2 indicators. The weights of the evaluation indexes are calculated by the comprehensive assignment method, combining the entropy weighting method and hierarchical analysis method. The contract risk evaluation model of the general contractor for the EPC+O mode cultural tourism project is constructed by the grey fuzzy comprehensive evaluation method. Taking the Hunan Shaoyang Wujiang Night Tour cultural tourism project as an example, the established contract risk evaluation index system and evaluation model are used to evaluate the contract risk of the project, and the risk control measures are proposed for the risk indicators with the most significant risk value of the project. The scientificity and applicability of the evaluation model are verified, providing tools for contract risk management of the EPC+O cultural tourism project, which has specific positive significance for the development of contract risk management.

INTRODUCTION

Under the policy background of comprehensively promoting the rural revitalisation strategy and the deep integration of culture and tourism, the culture and tourism industry has become essential for activating the rural economy and inheriting regional culture. The "14th Five-Year" Culture and Tourism Development Plan puts forward "promoting the quality and efficiency of culture and tourism projects, and innovating investment and financing modes", and the EPC+O (design-procurement-construction-operation) mode is gradually becoming the mainstream construction management mode for large-scale culture and tourism projects due to its full-cycle integration advantages. Due to its full-cycle integration advantages, the EPC+O (design-procurement-

* Corresponding author. E-mail address: xss@wit.edu.cn

Received 16 July 2025; Received in revised form 25 July 2025; Accepted 28 July 2025; Published online 31 July 2025.

construction-operation) mode is slowly becoming the mainstream construction management mode for large cultural tourism projects. This mode can effectively solve the problems of design and construction disconnection and insufficient operational adaptability under the traditional mode by integrating the planning, construction, and operation links through the general contractor, which is especially suitable for rural cultural tourism projects that must be deeply integrated into the local culture. However, with the "Rural Construction Action Implementation Plan" emphasising the rigid constraint of "protecting local customs and features and eliminating large-scale demolition and construction", as well as the significant shift of tourists' consumption behavior to immersive experience and digital interaction in the post-pandemic era, the contractual risk of the EPC+O project presents the triple superposition of policy relevance, technological complexity and operational dependence. Characteristics. Current academic research on traditional EPC project risk is more mature. However, there is still a lack of systematic identification tools for the three-dimensional risk chain of "culture-technology-operation" unique to EPC+O cultural tourism projects. According to the statistics of the Ministry of Culture and Tourism, the investment overrun rate of the rural cultural tourism project due to contractual risk reached 34% in 2023, of which disputes over the imbalance of income in the operation period accounted for 61%, while disputes over the imbalance of income in the operation period accounted for 61%. In 2023, according to the statistics of the Ministry of Culture and Tourism, the investment overrun rate of rural cultural tourism projects due to contractual risks will reach 34%, of which 61% will be disputes over imbalance of returns in the operation period, highlighting the urgency of building a scientific evaluation system. Based on the dual strategic needs of rural revitalisation and consumption upgrading, this paper focuses on the risk management of the general contractor contract under the EPC+O mode. It aims to construct a scientific risk evaluation system and provide experience and reference for the contractual risk control of rural culture and tourism projects by combining the entropy weighting and hierarchical analysis methods, and combining the grey and fuzzy comprehensive evaluation with the construction of risk quantification tools.

EPC+O MODE CULTURAL TOURISM PROJECT CONTRACT RISK EVALUATION INDEX SYSTEM CONSTRUCTION

Contract Risk Factor Identification

Commonly used risk identification methods include an expert scoring method, the causal analysis method, the simulation analysis method, and the empirical method. Among them, the most common expert scoring method is the Delphi method, the Delphi method refers to the questionnaire form to ask the opinions of experts in the relevant fields, and then summarise, will once again return to the experts that, for the second time to ask, and finally the use of mathematical and statistical methods to analyse and summarise. The causal analysis method, also known as the accident tree method, can be calculated using Boolean algebra. The Accident Tree method can be calculated using the Boolean algebra method to find out the inducing factors of accidents. Empirical method by reading a large number of literature, network data, analysing and summarising the data that have already occurred, and using the experience of the predecessor to predict the possibility of future risks.

As there are relatively few studies on "EPC+O cultural tourism project contract risk" at this stage, there is still a lack of a scientific and systematic analysis of the contract risk of the general contractor of the following tourism project under the EPC+O mode, which requires continuous summarisation and exploration of the EPC+O cultural tourism project. Therefore, this paper adopts the empirical method to summarise and generalise the contractual risk factors of the following tourism projects under the EPC+O mode by reading the literature and collecting data, and determines the initial risk factor list, as shown in **Table 1**.

Analysing and Evaluating Indicator Screening

The empirical method may be subject to subjective influence since there is little research on the contract risk of cultural tourism projects. To ensure the accuracy and completeness of the identified contract risk factors, the questionnaire survey method should be used to optimise the processing of risk indicators with the help of the engineering staff's relevant work experience.

This questionnaire's survey object is mainly the project-related personnel who have participated in EPC+O cultural tourism projects or contract management work, and the relevant university scholars who have researched the contract management of EPC+O cultural tourism projects. A total of 185 questionnaires were distributed through WeChat, e-mail and other channels, and 151 questionnaires were retrieved, with a recovery rate of 81.62%.

Before analysing the collected data, SPSSAU online data processing software was used to analyse the reliability of the questionnaire, including the reliability analysis of 35 secondary indicators and the reliability analysis of each parameter of primary indicators. According to the reliability coefficient value obtained from the reliability analysis, the reliability of the collected data is judged. If the value of the reliability coefficient is greater than 0.8, the reliability of the collected data is high. If the value of the reliability coefficient is between 0.7 and 0.8, the reliability of the collected data is relatively good. If the value of the reliability coefficient is between 0.6 and 0.7, the reliability of the collected data is acceptable. If the value of the reliability coefficient obtained from the analysis is less than 0.6, the reliability of the collected data is poor. The reliability coefficient of the questionnaire obtained from the analysis is 0.972 > 0.8, which indicates that the collected data are reliable. The analysis of the reliability of the second-level indicators contained within each first-level indicator can be obtained by determining whether the second-level indicators can reflect the content of the first-level indicators. Most of the reliability coefficients are greater than 0.8,

Table1 | Contractual risk factors of EPC+O mode cultural tourism project-1

Classification			Meaning
Pre-planning risk	Cultural theme adaptation risk	Disputes on the commercialisation of cultural elements	Risk of public scepticism or legal disputes arising from the commercial development of traditional cultural elements.
		Conflict between historical protection and renovation	There is a risk of direct contradiction between the renovation scope and heritage protection requirements.
		Insufficient fit with local culture	Risk of significant differences between the cultural tourism theme design and local cultural traditions
		Defective IP authorisation compliance	Risk that the use of digital cultural IP is not legally authorised or exceeds the scope of authorisation.
	Risk of design technology	Defects in the visitor flow line	The risk is that scenic tour route design cannot withstand visitors' peak flow.
		Insufficient compatibility of the intelligent system	Risk that the intelligent equipment cannot be docked with the government supervision platform or internal system
		Lack of safety guarantee for special equipment	Risk of insufficient redundant safety design of roller coasters, ropeways and other special amusement facilities
Procurement and construction risk	Risk of uncontrolled procurement costs	Cross-border procurement fluctuation risk	Risk of imported materials being hit by multiple factors such as tariffs, exchange rates and international logistics
		Risk of supplier monopoly premium	Risk of abnormally high procurement costs due to control of key equipment or materials by a single supplier
		Procurement experience and management level	Risk of cost loss or delivery delay due to a lack of specialised procurement process design (e.g., lack of supplier evaluation system) by the general contractor
		Supplier performance	Risk of suppliers of key equipment/materials failing to fulfil their supply obligations as agreed in the contract due to insufficient production capacity, quality defects or integrity issues
	Construction Risk	Reasonableness of schedule design	Risk that the total project schedule does not fully consider the special characteristics of the cultural tourism project (e.g., debugging cycle of performing arts equipment, preparation period for festivals), resulting in a compression rate of the construction period >20%.
		Reasonableness of the construction program	Decision-making risks that the construction organisation design is not adapted to the needs of cultural theme scenarios (e.g., underestimating the time-consuming restoration process of ancient buildings) or that there are technical feasibility defects.
		Reasonableness of on-site safety measures	The construction site safety protection program may not cover the cultural tourism project's high-risk scenarios (e.g., installation of high-altitude weaving equipment, insufficient lighting for night construction).
		Construction management level of subcontractors	Risk of quality and progress of specialised subcontractors due to insufficient technical ability (e.g., lack of AR equipment installation qualification) or ineffective resource deployment (e.g., shortage of ethnic craftsmen).
		Inadequate protection for construction in special weather	Risk of equipment damage due to failure to take adequate protective measures in extreme weather.
	Risk of acceptance disputes	Vague acceptance criteria for experiential projects	Disputes arise from the lack of quantitative acceptance indicators for interactive projects like VR/AR.
		Disputes over equipment safety testing	Risk of third-party testing results of special equipment not meeting contractual standards
		Disputes over the standardisation of antique construction techniques	There is a risk of quality disputes arising from antique construction techniques' failure to meet traditional techniques' requirements.
Operation and Management Risks	Facility Operation and Maintenance Risk	High wear and tear, facilities maintenance costs are out of control	Risk of over-budgeted maintenance costs for water parks, amusement rides and other high-intensity use facilities
		Intelligent system iteration pressure	Risk of mandatory upgrade costs for digital equipment due to rapid technological updates
		Abnormal fluctuation of energy consumption cost	Risk of large-scale energy consumption projects, such as light shows and temperature control systems, spending more than expected
	Market revenue risk	Rapid decline of the Netflix effect	Risk of loss of customers due to the fading of the hotness of projects relying on short-term internet hotspots
		Diversion of customers from neighbouring competitors	Risk of dividing the target customer base due to the opening of similar competitor projects
		Insufficient innovation in derivative consumption	Risk of serious homogenisation of cultural and creative products, catering services, etc., which may reduce consumer willingness
		Revenue imbalance between low and peak seasons	Risk of drastic fluctuations in cash flow due to seasonal differences in customer flow
	Service experience risk	Imbalance of the cost-performance ratio of secondary consumption	Risk of a serious mismatch between the pricing of additional consumption items and the consumption ability of tourists
		Insufficient user stickiness of the membership system	Risk of failure to cultivate a long-term customer base due to the low repurchase rate of members
		Disconnection between low and peak season operations	Risk of ineffective balance between service capacity in peak season and idle resources in off-season.
External Environment Risks	Risk of policy change	Dynamic adjustment of land use	Risk of limiting the function of the original tourism land due to changes in government planning
		Policy constraints on the nighttime economy	Risk of time constraints on nighttime business activities, such as light shows and night markets
		Data Collection Compliance Disputes	Legal risk that the collection of tourists' personal information violates the Personal Information Protection Law
	Natural and Social Risks	Inadequate protection of facilities against extreme weather	Risk of insufficient protection against damage to facilities caused by natural disasters such as rainstorms and typhoons
		Local cultural conflicts	Risk of conflict between the project construction or operation behaviour and local folklore and traditions.
		Ecological restoration responsibility	Risk of ecological damage caused by construction and the need to bear the obligation to repair or compensate.

Table 2 | Mean value of risk factor reasonableness

Risk factor	Mean Score	Standard deviation	Discrete value
Controversy over the commercialisation of cultural elements	4.09	1.68	0.41
Historic Preservation and Renovation Conflict	4.15	1.60	0.38
Inadequate regional cultural fit	3.99	1.64	0.41
IP license compliance deficiencies	4.03	1.64	0.40
Visitor movement congestion design	4.09	1.60	0.39
Inadequate safety design for special equipment	3.93	1.59	0.40
Inadequate Intelligent System Compatibility	4.05	1.65	0.40
Cross-border procurement volatility risk	4.01	1.62	0.40
Supplier monopoly premium risk	4.19	1.62	0.38
Purchasing experience and management level	3.47	1.68	0.48
Supplier performance	4.26	1.57	0.36
Schedule Design Reasonableness	3.91	1.64	0.41
Reasonability of the construction program	4.26	1.62	0.38
Reasonability of on-site safety measures	4.25	1.63	0.38
Subcontractor construction management level	3.99	1.69	0.42
Inadequate special weather construction protection	3.69	1.62	0.44
Vague acceptance criteria for experiential programs	4.07	1.68	0.41
Equipment safety testing controversy	4.01	1.53	0.38
Antique workmanship compliance dispute	4.05	1.61	0.39
Uncontrolled maintenance costs for high-wear and tear facilities	4.05	1.54	0.38
Intelligent system iteration pressure	4.26	1.64	0.38
Abnormal fluctuations in energy costs	3.97	1.58	0.39
Rapid decline of the Netflix effect	4.02	1.67	0.41
Diversion of customers from neighbouring competition	3.73	1.66	0.43
Insufficient innovation in derivative consumption	4.17	1.62	0.39
Revenue imbalance between low and high seasons	3.95	1.71	0.43
Secondary consumption price/performance imbalance	4.03	1.66	0.41
Insufficient user stickiness of the membership system	4.07	1.64	0.40
Disconnection of operation in the low and peak seasons	4.04	1.65	0.40
Dynamic Adjustment of Site Characteristics	4	1.61	0.40
Restrictions on night-time operating hours	3.99	1.59	0.39
Data collection compliance disputes	4.13	1.54	0.37
Inadequate protection of extreme weather facilities	4.03	1.55	0.38
Incidents of territorial culture clashes	4.17	1.61	0.38
Risk of liability for ecological restoration	4.19	1.59	0.38

indicating that the reliability is relatively good, which means that the second-level indicators can reflect the content of the first-level indicators.

Next, we analyse the questionnaire data and calculate the average reasonableness score of each risk factor and the standard deviation and dispersion values that reflect the degree of change in each indicator's score, as shown in **Table 2**.

In the table, the dispersion value is the ratio between the standard deviation of the indicator and the mean value. The smaller the dispersion value is, the lower the degree of dispersion of the indicator score is, and the closer the interviewees' views on the indicator are. The results of the questionnaire survey show that the average value of the three risk factors of procurement experience and management level in the procurement cost loss of control, construction risk of special climate construction protection is insufficient, and **the market revenue risk** of neighboring competition source diversion is less than 3.8, which indicates that the rationality is low. The dispersion value of these three indicators is relatively high, so it is considered that these three risk indicators can be excluded.

Construction of Risk Evaluation Index System

Through the identification, categorisation, adjustment and screening of EPC+O general contractor contract risk factors, the final EPC+O general contractor contract risk evaluation index system is established, which includes four target layers, 10 first-level indicators and 32 second-level indicators, and the detailed EPC+O general contractor contract risk evaluation index system is shown in **Table 3**.

Table 3 | EPC+O cultural tourism project contract risk evaluation index system

Guideline layer	First-level indicators	Second-level indicators
Pre-planning risk A1	Cultural theme adaptation risk B1	Dispute over the commercialization of cultural elements C1 Conflict between historical preservation and remodelling C2 Insufficient regional cultural fit C3 IP authorisation compliance defects C4
	Design technology risk B2	Visitor Movement Line Carrying Defects C5 Insufficient Intelligent System Compatibility C6 Lack of safety guarantee for special equipment C7
Procurement and Construction Risk A2	Risk of uncontrolled procurement cost B3	Cross-border procurement fluctuation risk C8 Supplier monopoly premium risk C9 Supplier performance C10
	Construction Risk B4	Reasonableness of construction period design C11 Reasonableness of construction program C12 Reasonableness of on-site safety measures C13 Subcontractor construction management level C14
	Acceptance Dispute Risk B5	Vague acceptance standard of experiential projects C15 Dispute over equipment safety testing C16 Dispute over the standardisation of antique project workmanship C17
Operation Management Risk A3	Facility Operation and Maintenance Risk B6	High wear and tear facilities maintenance cost out of control, C18 Intelligent system iteration pressure C19 Abnormal fluctuation of energy consumption cost C20
	Market Revenue Risk B7	Rapid decline of Netflix effect C21 Insufficient innovation in derivative consumption C22 Off-peak season revenue imbalance C23
	Service experience risk B8	Cost-performance imbalance of secondary consumption C24 Insufficient user stickiness of the membership system C25 Disconnection of operation in low and peak seasons C26
External Environment Risk A4	Policy change risk B9	Dynamic adjustment of the nature of land C27 Nighttime economic policy constraints C28 Data Collection Compliance Disputes C29
	Natural and Social Risks B10	Inadequate Protection of Extreme Weather Facilities C30 Incidents of territorial culture conflict C31 Ecological environment restoration responsibility C32

EPC+O MODE CULTURAL TOURISM PROJECT PORTFOLIO ASSIGNMENT METHOD INDICATOR ASSIGNMENT

The contract risk of the EPC+O cultural tourism project has more risk factors, which are more difficult to identify. The impact on the overall risk is vague and difficult to quantify. Therefore, the comprehensive empowerment method combines subjective and objective factors. This method combines the entropy weight and hierarchical analysis to assign importance to each risk indicator.

Entropy Weight Method Indicator Assignment

Entropy, proposed by German mathematician and physicist Rudolf Clausius in 1865, is a measure of the state of matter in thermodynamics and the degree of chaos in the system. In 1948, Shennong introduced the concept of entropy into information theory and proposed the concept of information entropy. The larger the information entropy is, the smaller the degree of variability of the information is, the smaller the amount of information provided, and the smaller the utility value is in the comprehensive evaluation, the smaller its weight is. This paper selects the evaluation indexes as the contract risk evaluation indexes of the EPC+O cultural tourism project. See Table 3 for details. All of them are qualitative indices.

Establish the Evaluation Matrix

Six experts or scholars in the industry who understand EPC+O projects and contract management are invited to fill out the questionnaire, including two university researchers and four construction unit experts. The importance of the secondary indicators was scored to obtain quantitative data, and the experts scored using a percentage standard, with the following specific criteria: 90-100 is very important. 80-89 is important. 70-79 is generally important. 60-69 is unimportant. And below 60 is very unimportant. Due to the consistent scoring criteria of experts and the consistent scale between each evaluation index, there is no need to normalise the data, and the scoring data of experts can be directly used as the evaluation matrix R:

$$R = (r_{ij})_{m\times n} = \begin{bmatrix} r_{11} & r_{12} & \cdots & r_{1n} \\ r_{21} & r_{22} & \cdots & r_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ r_{m1} & r_{m2} & \cdots & r_{mn} \end{bmatrix}$$

Calculate the Information Entropy of Evaluation Indexes

Based on the normalized matrix, calculate the weight P_{ij} and the information entropy value E_{ij} of the evaluation value of each evaluation index, and the specific calculation formula is shown below:

$$P_{ij} = \frac{r_{ij}}{\sum_{j=1}^{n} r_{ij}} \quad (i = 1,2,\cdots,m) \tag{1}$$

$$e_{ij} = -\ln n \sum_{j=1}^{n} P_{ij} \ln P_{ij} \quad (i = 1,2,\cdots,m) \tag{2}$$

Calculate the Objective Weights of Evaluation Indicators

According to the calculated information entropy value, e_i, and the weight calculation formula (4) for each second-level evaluation index, it is possible to the comprehensive weight corresponding to each second-level evaluation index. According to the weights of the second-level evaluation indicators, the first-level evaluation indicators and the intra-level weights and the second-level evaluation indicators are calculated. The weight of the first-level evaluation indicator is equal to the sum of the composite weights of the second-level evaluation indicators it contains. The intra-hierarchical weight of the second-level evaluation indicator is the ratio of the composite weight of the indicator to the composite weight of the first-level evaluation indicator to which it belongs. The calculated weight results of the contract risk evaluation indicators of the EPC+O cultural tourism project are shown in **Table 4**.

$$\nu_i = \frac{1 - e_i}{\sum_{i=1}^{m} (1 - e_i)} \tag{3}$$

Hierarchical Analysis Method Indicator Assignment

Hierarchical analysis is a relatively simple and practical hierarchical weighting decision analysis method proposed by American operations researcher Satie in the early 1970s. The method can be used for more complex and ambiguous problems, especially for problems that are difficult to fully analyse quantitatively .

Constructing a Pairwise Comparison Matrix

Constructing a pairwise comparison matrix involves comparing the importance of criteria (or factors) belonging to the same layer and affecting the same superordinate objective (or criterion), and obtaining a pairwise comparison matrix by scoring by experts according to the specified scoring criteria. This paper invites six experts or scholars in the industry who understand EPC+O cultural tourism projects and contract management (including two university researchers and four construction unit experts) to fill in the AHP pairwise comparison matrix questionnaire to get the pairwise comparison matrix of the first-level indicators and the second-level indicators under the first-level indicators. The pairwise comparison matrix given by one of the experts for the first-level indicators is shown in **Table 5**.

Hierarchical Single Sorting and Consistency Test

Hierarchical single sorting is a more critical part of the hierarchical analysis method, the core lies in the calculation of the eigenvectors of the judgment matrix and the maximum eigenvalue λmax, this paper uses the SPSSAU analysis software, the data in Table 5 is imported into the software, and the sum-product method is selected for calculation. The λmax of the pairwise comparison matrix of the first-level indicators is calculated to be 10.978, and the weights of each first-level indicator for the total target Omega are 0.0167, 0.0383, 0.0257, 0.0217, 0.0406, 0.2668, 0.0619, 0.1813, 0.1027, and 0.2442.

Since the pairwise comparison matrix data comes from expert scoring, and there is more data, inconsistency will inevitably occur. Therefore, the consistency of the pairwise comparison matrix needs to be tested. The matrix was calculated to have a stochastic consistency ratio (CR) of 0.073 using SPSSAU analysis software. This indicates that the matrix satisfies the consistency requirement, as CR is less than 0.1. In the same way, the scoring results of all the experts about the first-level and second-level indicators are analysed, and the weighting results corresponding to each indicator, the CR value, and its average weight are calculated. Partial results are shown in **Table 6**.

Hierarchical Total Ranking

Through the above process, to get all the first-level evaluation indicators and second-level evaluation indicators corresponding to the intra-level weight, with the second-level indicators relative to the first-level evaluation indicators of the intra-level weight and their belonging to the first-level indicators of the intra-level weight, calculate the comprehensive weight of the second-level evaluation indicators, resulting in the contractual risk indicators of the EPC+O culture and tourism project subjective weight summary table, as shown in **Table 7**.

Determination of Combination Weights

Due to the differences in the importance of subjective and objective weights, the matrix is used to calculate the combination weights, making the weights of the indicators in the contract risk evaluation index system of the EPC+O cultural tourism project consider objectivity and subjectivity.

The variables α and β denote the relative importance of subjective and objective weights, respectively. The weights obtained by the analytic hierarchy process are equivalent to those obtained by the entropy method. The calculation of the importance coefficients of subjective weights and objective weights is performed through the utilisation of matrix theory. The specific formula is as follows:

In the context of this study, "α" and "β" are used to denote the relative importance of subjective and objective weights, respectively. "ω_i" is the weight obtained by the analytic hierarchy process, and "ν_i" is the weight obtained by the entropy method. The subjective weight importance coefficient and the objective weight importance coefficient β_i are calculated using matrix theory. The specific formulas are as follows:

$$\begin{cases} \alpha_i = \dfrac{\nu_i}{\nu_i + \omega_i} \\ \beta_i = \dfrac{\omega_i}{\nu_i + \omega_i} \end{cases} \quad (i = 1,2,\cdots,n) \tag{4}$$

Through the obtained important coefficients of subjective weights and objective weights and formula (6) is

Table 4 | Summary of objective weights of risk evaluation indicators

Guideline level	Level 1 indicators	Weights within the layer	Level 2 indicators	Intra-level weights	Combined weights
Pre-planning Risk A1	Cultural Theme Adaptation Risk B1	0.0871	Cultural element commercialisation controversy C1	0.2502	0.0218
			Historic Preservation and Remodelling Conflict C2	0.1446	0.0126
			Insufficient regional cultural fit C3	0.2985	0.0260
			IP License Compliance Deficiency C4	0.3053	0.0266
	Design Technology Risk B2	0.0534	Visitor Movement Line Carrying Deficiency C5	0.4251	0.0227
			Inadequate Intelligent System Compatibility C6	0.2883	0.0154
			Lack of safety and security of special equipment C7	0.2865	0.0153
Procurement construction risk A2	Procurement cost loss control **risk** B3	0.0835	Cross-border procurement volatility risk C8	0.3425	0.0286
			Supplier monopoly premium risk C9	0.2778	0.0232
			Supplier compliance C10	0.3784	0.0316
	Construction risk B4	0.1153	Construction period design reasonableness C11	0.2202	0.0254
			Construction Program Reasonableness C12	0.2888	0.0333
			Reasonableness of on-site safety measures C13	0.1925	0.0222
			Construction management level of subcontractors C14	0.2957	0.0341
	Risk of acceptance dispute B5	0.1665	Ambiguous acceptance criteria for experiential projects C15	0.4211	0.0701
			Equipment Safety Testing Dispute C16	0.2228	0.0371
			Antique Engineering Workmanship Compliance Dispute C17	0.3567	0.0594
Operation and Management Risk A3	Facilities Operation and Maintenance Risk B6	0.1091	High wear and tear, facility maintenance costs are out of control, C18	0.3959	0.0432
			Intelligent system iteration pressure C19	0.2969	0.0324
			Abnormal fluctuations in energy costs C20	0.3052	0.0333
	Market return risk B7	0.0847	Rapid decline of Netflix effect C21	0.2798	0.0237
			Insufficient innovation in derivative consumption C22	0.3553	0.0301
			Off-peak season revenue imbalance C23	0.3636	0.0308
	Service experience risk B8	0.0984	Secondary consumption value-for-money imbalance C24	0.2764	0.0272
			Insufficient user stickiness of membership system C25	0.3668	0.0361
			Off-peak season operation disconnection C26	0.3567	0.0351
External Environment Risk A4	Policy Change Risk B9	0.0871	Dynamic adjustment of land use nature C27	0.2996	0.0261
			Night time economic policy constraints C28	0.3363	0.0293
			Data Collection Compliance Controversy C29	0.3628	0.0316
	Natural and Social Risks B10	0.1147	Inadequate protection of extreme weather facilities C30	0.2319	0.0266
			Incidents of territorial cultural conflict C31	0.2493	0.0286
			Ecological restoration responsibility C32	0.5178	0.0594

Table 5 | Pairwise comparison matrix of first-level indicators

Evaluation indicator system	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
B1	1	1/3	1/2	1/2	1/4	1/9	1/4	1/7	1/6	1/9
B2	3	1	2	4	1/2	1/8	1/3	1/4	1/4	1/5
B3	2	1/2	1	2	1/2	1/9	1/4	1/6	1/5	1/8
B4	2	1/4	1/2	1	1/3	1/8	1/4	1/5	1/4	1/6
B5	4	2	2	3	1	1/9	1/2	1/6	1/5	1/8
B6	9	8	9	8	9	1	3	2	3	2
B7	4	3	4	4	2	1/3	1	1/7	1/3	1/8
B8	7	4	6	5	6	1/2	7	1	4	1/2
B9	6	4	5	4	5	1/3	3	1/4	1	1/5
B10	9	5	8	6	8	1/2	8	2	5	1

Table 6 | Weights and CR values of first-level indicators

	1	2	3	4	5	6	weighting
B1	0.0167	0.0178	0.2789	0.2785	0.268	0.3143	0.1643
B2	0.0383	0.0396	0.0942	0.105	0.0947	0.1191	0.1093
B3	0.0257	0.0235	0.1591	0.1792	0.1554	0.1417	0.1251
B4	0.0217	0.0149	0.2345	0.2222	0.2513	0.2114	0.1443
B5	0.0406	0.0638	0.0142	0.0153	0.0145	0.0142	0.0325
B6	0.2668	0.1171	0.0385	0.0339	0.0372	0.036	0.0905
B7	0.0619	0.0444	0.0863	0.0725	0.0789	0.068	0.0988
B8	0.1813	0.2157	0.0291	0.0254	0.0273	0.027	0.0774
B9	0.1027	0.0977	0.0502	0.0509	0.0568	0.0533	0.096
B10	0.2442	0.3654	0.0151	0.0172	0.0158	0.015	0.0617
CR	0.073	0.0946	0.0974	0.0718	0.0912	0.095	-

Table 7 | Summary table of subjective weights of risk evaluation indicators

Level 1 indicators	Intra-level weights	Second-level indicators	Intra-tier weights	Aggregate weights
B1 Cultural Thematic Fit Risk	0.1643	C1 Cultural Element Commercialisation Controversy	0.3045	0.0501
		C2 Historical preservation and remodelling conflict	0.3123	0.0513
		C3 Insufficient synthesis of regional culture	0.1842	0.0303
		C4 Deficiency in Authorisation Compliance for IP	0.1989	0.0327
B2 Design Technical Risks	0.1093	C5 Visitor Movement Line Carrying Deficiencies	0.3919	0.0428
		C6 Intelligent system compatibility deficiency	0.3038	0.0332
		C7 Lack of safety and security of special equipment	0.3044	0.0333
B3 Risk of uncontrolled procurement costs	0.1251	C8 Cross-store purchasing volatility risk	0.2983	0.0373
		C9 Supplier monopoly premium risk	0.4115	0.0515
		C10 Supplier compliance	0.2902	0.0363
B4 Construction risk	0.1443	C11 Duration design reasonableness	0.2654	0.0383
		C12 Construction Program Reasonableness	0.2409	0.0348
		C13 Reasonability of site safety measures	0.2866	0.0413
		C14 Construction management level of subcontractors	0.2071	0.0299
B5 Risk of acceptance dispute	0.0325	C15 Vague acceptance criteria for experiential projects	0.4196	0.0136
		C16 Equipment Safety Testing Disputes	0.2992	0.0097
		C17 Dispute of antique workmanship compliance	0.2812	0.0091
B6 Facility Operation and Maintenance Risks	0.0905	C18 High Wear and Tear Facility Maintenance Costs Out of Control	0.3938	0.0356
		C19 Intelligent System Iteration Pressure	0.2878	0.0261
		C20 Abnormal fluctuations in energy costs	0.3183	0.0288
B7 Market return risk	0.0988	C21 Rapid decline of the net effect	0.3847	0.0380
		C22 Insufficient innovation in derivative consumption	0.3072	0.0304
		C23 Off-peak season revenue imbalance	0.3082	0.0305
B8 Service experience risk	0.0774	C24 Secondary consumption value for money imbalance	0.3955	0.0306
		C25 Insufficient user stickiness of the membership system	0.3042	0.0235
		C26 Off-peak season operation disconnection	0.3003	0.0232
B9 Policy change risk	0.096	C27 Dynamic Adjustment of Site Nature	0.4101	0.0394
		C28 Night-time economic policy constraints	0.2834	0.0272
		C29 Data collection compliance disputes	0.3066	0.0294
B10 Natural and Social Risks	0.0617	C30 Inadequate protection of extreme weather facilities	0.3522	0.0217
		C31 Incidents of territorial cultural conflict	0.3409	0.0210
		C32 Responsibility for ecological restoration	0.3069	0.0189

Table 8 | Summary of evaluation indicator combination weights

Guideline level	Tier 1 indicators	Intra-level weights	Level 2 indicators	Intra-level weights	Combined weights
Pre-planning Risk A1	Cultural Theme Adaptation Risk B1	0.1303	Cultural element commercialisation dispute C1	0.2894	0.0377
			Historic Preservation and Remodelling Conflict C2	0.3043	0.0396
			Insufficient regional cultural fit C3	0.1973	0.0257
			IP license compliance deficiency C4	0.2088	0.0272
	Design Technology Risk B2	0.0827	Visitor Movement Line Carrying Deficiency C5	0.3936	0.0325
			Inadequate Intelligent System Compatibility C6	0.3027	0.0250
			Lack of safety and security of special equipment C7	0.3035	0.0251
Procurement construction risk A2	Procurement cost loss of control **risk** B3	0.1002	Cross-border procurement volatility risk C8	0.3038	0.0304
			Supplier monopoly premium risk C9	0.3871	0.0388
			Supplier compliance C10	0.3091	0.0309
	Construction risk B4	0.1217	Construction period design reasonableness C11	0.2474	0.0301
			Construction program reasonableness C12	0.2542	0.0309
			Reasonableness of on-site safety measures C13	0.2584	0.0314
			Construction management level of subcontractors C14	0.2398	0.0291
	Risk of acceptance dispute B5	0.1317	Ambiguous acceptance criteria for experiential projects C15	0.4199	0.0553
			Equipment safety testing controversy C16	0.2166	0.0285
			Antique Engineering Workmanship Compliance Dispute C17	0.3634	0.0478
Operation and Management Risk A3	Facilities Operation and Maintenance Risk B6	0.0913	High wear and tear, facility maintenance costs are out of control, C18	0.3954	0.0361
			Intelligent system iteration pressure C19	0.2942	0.0268
			Abnormal fluctuations in energy costs C20	0.3103	0.0283
	Market return risk B7	0.0848	Rapid decline of Netflix effect C21	0.3480	0.0295
			Insufficient innovation in derivative consumption C22	0.3238	0.0274
			Off-peak season revenue imbalance C23	0.3281	0.0278
	Service experience risk B8	0.0822	Secondary consumption value-for-money imbalance C24	0.3204	0.0263
			Insufficient user stickiness of membership system C25	0.3440	0.0282
			Off-peak season operation disconnection C26	0.3355	0.0275
External Environment Risk A4	Policy Change Risk B9	0.0844	Dynamic adjustment of land use nature C27	0.3669	0.0309
			Night time economic policy constraints C28	0.3044	0.0257
			Data Collection Compliance Controversy C29	0.3286	0.0277
	Natural and Social Risks B10	0.0903	Inadequate protection of extreme weather facilities C30	0.2454	0.0221
			Incidents of territorial cultural conflict C31	0.2553	0.0231
			Ecological restoration responsibility C32	0.4992	0.0451

used to calculate the composite weight of each secondary indicator Q_i.

$$Q_i = \frac{\nu_i \alpha_i + \omega_i \beta_i}{\sum_{i=1}^{n} (\nu_i \alpha_i + \omega_i \beta_i)} \tag{5}$$

Using the comprehensive weights of the second-level indicators calculated above, to continue to calculate the weights of the first-level evaluation indicators and the intra-level weights of the second-level evaluation indicators, the weight of the first-level evaluation indicators is equal to the sum of the weights of all the second-level evaluation indicators it contains, and the intra-level weight of the second-level evaluation indicators is equal to the ratio of the comprehensive weights of the second-level evaluation indicators to the weights of the first-level evaluation indicators to which they belong. The summarised weights of the indicators are shown in **Table 8**.

CONSTRUCTION OF A GREY FUZZY COMPREHENSIVE EVALUATION MODEL FOR THE EPC+O MODE CULTURAL TOURISM PROJECT

When choosing risk evaluation methods, it is necessary to conduct in-depth research and analysis of various methods, combine the characteristics of the research object, and choose the most appropriate risk evaluation method. This paper uses the grey fuzzy comprehensive analysis method to evaluate the project risk. Grey fuzzy comprehensive evaluation combines the grey system theory proposed by Prof. Deng Julong, a cybernetic expert in China, in 1981, and the fuzzy mathematical theory proposed by Prof. Zadeh, a cybernetic expert in the United States, in 1965. The research object of grey system theory is "unclear connotation and clear extension", while the research object of fuzzy mathematics theory is "clear connotation and unclear extension".

Establishment of a Comprehensive Evaluation Matrix

Taking the overall risk of contract management of EPC+O cultural and tourism projects as the object of evaluation, the set composed of each evaluation index of the evaluation index system derived from the above research is called the evaluation index set, which is divided into the first-level index set B_i $(i = 1,2,...,10)$ and the second-level index set C_i $(i = 1,2,...,32)$. The set consisting of all the evaluation results of the experts on the evaluation indicators is called the comment set, which is denoted by the letter V. The contract management risk level of the EPC+O cultural tourism project is categorised into low risk, lower risk, medium risk, higher risk, and high risk, which are denoted by V_1, V_2, V_3, V_4, and V_5, respectively. They are assigned values of 1, 2, 3, 4, and 5, with 1.5, 2.5, 3.5, and 4.5 indicating that they are between two of these levels. The higher the value, the higher the risk of the indicator.

Invite m experts to score the risk level of the second-level indicator set of the contract risk evaluation of the EPC+O cultural tourism project according to the above rubric set assignment, and establish a comprehensive evaluation matrix.

Calculate the Grey Evaluation Coefficient and Evaluation Matrix

This process of scoring by experts is equivalent to providing a whitened value of the grey number. Due to the experts' experience and cognitive limitations, the whitening value provided will have a certain degree of subjectivity. Introducing a whitening weight function is necessary to reduce the error due to subjectivity, react to the grey class of the evaluation index scored by the experts, and determine which risk level the evaluation index belongs to. According to the different measurements of grey categories, the commonly used whitening weight function can be divided into three categories: upper limit measurement, moderate measurement, and lower limit measurement, of which the moderate measurement whitening weight function is also called the triangular whitening weight function. The upper limit measure of the whitening weight function applies to the elements within the gray category, reflecting the bigger, better, and clearer. The lower limit measure whitening weight function applies to the elements within the gray category, the smaller, the better and clearer. If it is around a point, then it becomes the moderate measure whitening weight function, i.e., the triangular whitening weight function. Based on this criterion, the moderate-measure whitening weight function should be chosen as the basis for constructing the whitening weight function.

To make the risk evaluation grey class correspond to the risk level classification, the risk evaluation grey class e is also divided into five levels, which are represented by the values 1, 2, 3, 4, and 5. The whitening weight function is as follows:

1) e=1, gray level $\oplus \in [0,1,2]$, and its whitening weight function is as follows:

$$f_1(d) = \begin{cases} d & d \in [0,1] \\ 2-d & d \in [1,2] \\ 0 & d \notin [0,2] \end{cases} \tag{6}$$

2) e=2, grayscale $\oplus \in [0,2,4]$, and its whitening weight function is as follows:

$$f_2(d) = \begin{cases} d/2 & d \in [0,2] \\ 2-d/2 & d \in [2,4] \\ 0 & d \notin [0,4] \end{cases} \tag{7}$$

3) e=3, grayscale $\oplus \in [0,3,6]$, and its whitening weight function is as follows:

$$f_3(d) = \begin{cases} d/3 & d \in [0,3] \\ 2-d/3 & d \in [3,6] \\ 0 & d \notin [0,6] \end{cases} \tag{8}$$

4) e=4, grayscale $\oplus \in [0,4,8]$, and its whitening weight function is as follows:

$$f_4(d) = \begin{cases} d/4 & d \in [0,4] \\ 2-d/4 & d \in [4,8] \\ 0 & d \notin [0,8] \end{cases} \tag{9}$$

5) e=5, grayscale $\oplus \in [0,5,10]$, and its whitening weight function is as follows:

$$f_5(d) = \begin{cases} d/5 & d \in [0,5] \\ 2-d/5 & d \in [5,10] \\ 0 & d \notin [0,10] \end{cases} \tag{10}$$

Let the gray coefficient of the indicator for an evaluation gray class if $e = s$ $(s = 1,2,\ldots,5)$ is y_j^s, the gray coefficient of all gray categories of the indicator is summed up to get the total gray coefficient of the indicator y_i , and the gray evaluation weight of the indicator C_j for each gray category is r_j^s. The following formula is used to calculate the gray evaluation weight.

$$y_j^s = \sum_{k=1}^{m} f_s(d_{jk}) \quad (11)$$

$$y_j = \sum_{s=1}^{s} y_j^s \quad (12)$$

$$r_j^s = \frac{y_j^s}{y_j}, \quad (s = 1,2,\ldots,5) \quad (13)$$

Combining all the gray evaluation weights for this indicator gives the gray evaluation weight vector $r_j = (r_j^1, r_j^2, r_j^3, r_j^4, r_j^5)$ for this indicator, which represents the affiliation of the risk evaluation indicator with respect to the set of rubrics V. Combining all the gray evaluation weight vectors of all the second-level evaluation indicators C_j, the gray evaluation matrix R of the second-level evaluation indicator C can be obtained.

Multi-Level Fuzzy Comprehensive Evaluation

Multiply the weight vectors of the second-level evaluation indicators with the corresponding grey evaluation matrix R to carry out the first-level fuzzy comprehensive evaluation, and combine the calculated results to get the grey evaluation weight matrix X of the first-level indicators included in the evaluation object. Multiply the weight vectors of the first-level evaluation indicators with the corresponding grey evaluation matrix X to carry out the second-level fuzzy comprehensive evaluation, and the matrix of the calculated results is denoted by S. The weight vector of the first-level evaluation indicators is the grey evaluation weight vector of the second-level evaluation indicators.

S calculated by the above steps, is a matrix describing the grey level of the evaluation results. To obtain a comprehensive evaluation value, F, that describes the degree of risk, it is necessary to continue calculating the final threshold of the matrix. Now, assigning the values in vector $V = (1,2,3,4,5)$ to the different risk levels, the comprehensive evaluation result F can be calculated using the following formula. The risk level in which the project is placed is determined based on the calculated comprehensive evaluation value and the risk level classification criteria.

$$F = S \times V^T \quad (14)$$

CASE ANALYSIS OF CONTRACT RISK MANAGEMENT OF CULTURAL AND TOURISM PROJECT IN EPC+O MODE

Project Overview

Hunan Shaoyang Wushu River Night Tour Project is located in the section of Wushu River from Rubber Dam of Rulin Town to Waking Lion House of Lion Mountain, totalling 2.6 kilometres of water. The project adopts the EPC+O mode, led by Hunan Jinjiu Investment Group, with a total investment of 66.11 million yuan funded by enterprise financing and self-financing. The construction period is from the fourth quarter of 2024 to the fourth quarter of 2025, in which the main construction was completed at the end of August 2024 and put into trial operation in September of the same year. The project is planned to be fully completed by the end of 2025.

The project volume covers more than 8 Miao cultural theme scenes, supporting the purchase of 5 new energy excursion boats and several performance boats, integrated sound and light systems, and completing the construction of digital light and shadow devices along the river, 3D projection on the cliff wall, and dock facilities. The project is designed to be a 50-minute night tour, with a capacity of over 200 people, aiming to create the first "Water Miao Township Digital Illusion Tour" experience in China.

Risk Evaluation of Project Contract

Send the scoring criteria and risk evaluation index system to the expert group, which scores the second-level evaluation indexes of the contract risk, and gets the comprehensive evaluation matrix of the contract risk $D_i(i = 1,2,\ldots,10)$. Part of the contract risk evaluation matrix is shown below:

$$\mathrm{D1} = \begin{bmatrix} 3.5 & 2.5 & 4 & 3 & 4.5 & 3.5 \\ 4 & 3.5 & 3 & 4.5 & 3.5 & 2.5 \\ 3 & 4 & 3.5 & 2.5 & 4 & 4.5 \\ 4.5 & 3 & 4.5 & 3.5 & 2.5 & 3 \end{bmatrix}$$

Taking D1 as an example, based on the whitening weight function formulas (6)-(10) and the introduced indicator C_j for a certain evaluation gray category $e = s(s = 1,2,\ldots,5)$ of the gray coefficient formulas (11)-(13), calculate the gray evaluation coefficients and gray evaluation weights for each secondary indicator.

Calculate the grey rating coefficient of the 1st grey category of the secondary indicator $C1y_1^1$:

Multiply the intra-level weight vector of each second-level evaluation index with the corresponding grey evaluation matrix R_i to get the grey evaluation weight matrix X. Then multiply the weight vector of the first-level evaluation index with the corresponding grey evaluation matrix X to get the matrix S The grey coefficient of the second-level indicator $C1$ is 15.61. Calculate the grey rating right of the indicator $C1$ for each grey category according to the total grey coefficient, t r_j^s, and get the weight vector of the second-level indicator $C1r1$ = (0,0.1121,0.2988,0.3201,0.2689).

According to the same calculation steps to calculate the weight vector r2, r3, r4, to get the project contract risk level evaluation index B1, the grey evaluation matrix $R1$:

$$\mathrm{R1} = \begin{bmatrix} 0 & 0.1121 & 0.2988 & 0.3201 & 0.2689 \\ 0 & 0.1121 & 0.2988 & 0.3201 & 0.2689 \\ 0 & 0.0972 & 0.2917 & 0.3322 & 0.2787 \\ 0 & 0.1805 & 0.2808 & 0.2858 & 0.2527 \end{bmatrix}$$

Table 9 | Risk evaluation value of first-level indicators

F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
3.7262	3.7262	3.7571	3.7571	3.7116	3.6314	3.7502	3.5658	3.6585	3.7645

Similarly, the grey evaluation matrix of other contract risk level 1 evaluation indicators can be obtained. Based on the ideas in section 3.3, multiply the intra-level weight vector of each second-level evaluation index with the corresponding grey evaluation matrix Ri to get the grey evaluation weight matrix X. Then multiply the weight vector of the first-level evaluation index with the corresponding grey evaluation matrix X to get the matrix S (0,0.1416,0.2883,0.3111,0.2584).

According to formula (14), the values in vector V (1,2,3,4,5) are assigned to different risk levels, and the comprehensive evaluation value of contract risk of the project is calculated to be F = 3.68. Similarly, the vector V is used to multiply with the grey evaluation matrices of the first-level and the second-level indexes X and R to get the risk evaluation value of each first-level and the second-level indexes F_i, and the results of the calculation of first-level indexes are shown in **Table 9**.

Based on the comprehensive evaluation of the value of contract risk, it can be seen that the project's contract risk is at a moderately high level. Among them, the risk of primary indicators is the risk of uncontrolled procurement cost, market revenue risk, natural and social risk. The risk of secondary indicators is the lack of regional cultural fit, supplier monopoly premium risk, equipment safety testing disputes, lack of innovation in derivative consumption, local cultural conflict events, and ecological environment restoration responsibility. To avoid the occurrence of risks and bring losses to the general contractor, corresponding risk prevention and control measures should be taken for contract risks with large risk values.

Project Contract Risk Control Measures

Combined with the results of the analysis above, select the risk of EPC+O project at each stage of the risk value of the largest indicators of risk: insufficient regional cultural fit, supplier monopoly premium risk, insufficient innovation of derivative consumption, territorial cultural conflict events, and put forward the corresponding contractual risk control measures.

Insufficient Geographic Cultural Fit

In the contract negotiation stage to add a cultural compliance disclaimer, the owner is required to provide the design elements certified by the Miao cultural authority library, and agrees that disputes arising from the use of cultural elements by the owner will be borne by the owner. Simultaneous establishment of a cultural risk transfer mechanism, subcontracting design contract mandatory requirements for the design institute to hire non-hereditary inheritors as a consultant, the cost of incorporating into the scope of the owner's payment, if the cultural distortion led to the rectification of the project If the project is rectified due to cultural distortion, the design institute has to bear 30% joint and several liability. The implementation of modular cultural scenario design, set aside 10% of the budget for dynamic adjustment, according to the quarterly "Hmong cultural elements fitness scorecard" (by the owner, the cultural centre, and the general contractor of the three-party assessment), iterative content, to avoid the risk of unilateral liability.

Supplier Monopoly Premium Risk

Construct a hierarchical supply chain contract system: core equipment (e.g., laser projector) adopts a "cost + honorarium" contract, and copper and aluminum futures price fluctuation clauses are written into

the subcontracting agreement, so that the procurement cost is linked to the commodity market. General-purpose equipment implements the "framework agreement + order" model, with three pre-signed contracts and three pre-contracted contracts. In the general equipment implementation of the "framework agreement + order" model, three local suppliers are pre-signed and automatically switch to the backup source when the monopoly offer exceeds the market price by 15%. Strengthen the subcontractor performance binding: in the equipment supply subcontract embedded in the "annual evaluation elimination system", from the technical responsiveness (40%), price stability (30%), after-sales timeliness (30%) of the three-dimensional evaluation, the last person to deduct 5% of the contract balance and suspension of the subsequent cooperation, forcing subcontractors to make profits.

Insufficient Derivative Consumption Innovation

Activate consumption innovation by sharing mechanism: agree on the stepped sharing ratio of derivative consumption income in the operation contract (e.g., 15% of the total contractor's commission for annual income below 5 million, 25% for the part of more than 5 million), to incentivize the total contractor to invest in the development of AR technology. Synchronize with the binding of local resources to reduce the cost of trial and error, and sign a guaranteed purchasing agreement with the cooperative of Chenggbu County, and obtain agricultural products such as bamboo rice wine at the cost price for the cruise ship. The cooperative will buy back the sales of slow-selling inventory at 90% of the price. Establishment of innovation risk-control reserve: 3% of the operating income is used to fund the pool for rapid iteration of consumption scenarios (e.g., the construction of batik workshops), to avoid the risk of sinking the innovation investment.

Incidents of Territorial Culture Conflict

Incorporate the cost of community relations into the contract price: set aside 5% of the total EPC+O price as a "Cultural Coordination Fund", which is used to pay for the supervision allowance of the Miao village elders, the salary of the villagers' actors, and the compensation for conflicts, to avoid additional cost overruns. Design of two-track dispute resolution clauses: routine complaints are handled on-site by a localized service team (≥60% of local villagers) set up by the main contractor. Major group conflicts are subject to a "48-hour hearing procedure", with the costs charged to the cultural coordination fund, and the conclusions used as a basis for determining responsibility. The contract stipulates that the compensation for a single cultural conflict shall not exceed 200% of the average daily revenue of the project.

CONCLUSION

This paper takes the EPC+O cultural tourism project as the research object, and follows the steps of contract risk identification, evaluation, and response from the general contractor's perspective. The risk factors existing in the contract management of the EPC+O cultural tourism project are analysed and identified, the initial list of risk factors is established, and the analysis and evaluation index system of the EPC+O cultural tourism project is formed through further screening. The entropy weight and hierarchical analysis methods are used to carry out subjective and objective assignments, and the combination weights are determined by combining the idea of the matrix. Based on the gray systematics to construct the whitening weight function, the use of fuzzy theory to establish a gray fuzzy comprehensive evaluation model and apply it to the actual case, put forward the corresponding countermeasures for the risk factors with large risk values, verify the applicability of the constructed contract risk evaluation index system and risk evaluation model, and provide a basis for the risk management of the general contractor's contract of the EPC+O cultural and tourism project.

Authors' Contributions Renxian Yi: Investigation, Formal Analysis, Data Curation, Writing – Original Draft. **Yanfeng Du**: Investigation, Resources (Data Acquisition), Writing - Review and Editing. **Shasha Xie**: Supervision,Conceptualization,Methodology,Funding Acquisition, Writing - Review and Editing. **Yazhou Fang**: Investigation, Data Curation.All authors have read and agreed to the published version of the manuscript.

Acknowledgments This research was funded by the Philosophy and social science research project of colleges and Universities in Hubei Province (Grant no. 24Y053), and the Graduate Innovative Fund of Wuhan Institute of Technology (Grant no.CX2024516)

Declaration of interests The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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