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事由 Subject： 科研成果評鑑結果通知 Assessment outcome of academic research result

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Revealing the pattern of causality between tourist experience and the perception of sacredness at shamanic heritage destinations in Northeast China

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For religious heritage tourism, the key to a destination's reputation lies in enabling visitors to fully experience the sacredness or a unique spiritual experience offered by the site. The authenticity of the tourism experience and perception is the most significant factor influencing visitors' perception of the sacredness of religious or holy sites. However, there is currently a lack of sufficient references and evidence to explore the relationship between tourists' authentic experiences and their perception of sacredness in religious heritage tourism. The aim of this study is to elucidate the causal relationship between the characteristics or attributes of tourists' authentic experiences and their perception of the sacredness of the destination. Furthermore, it seeks to explore resource development and site creation strategies for religious tourism destinations to continuously enhance the sense of sacredness of these places. The Shamanic cultural traditions in the traditional settlements of Northeast China provide a subtly different context for this study. However, the topics discussed have broad applicability in constructing the network of relationships between the characteristics of tourists' experiences and their perception of sacredness in religious heritage tourism. This study applied the causal decision analysis model based on data mining (RSA-DEMATEL) and established a causal network diagram between core attributes based on clarifying the behavioral rule knowledge (i.e., If…Then… rules) between tourists' travel experience (conditional attributes) and the perception of place sacredness (decision-making attributes). The study finds that enhancing tourists' perception of the sacredness of a destination is related to authentic tourism experiences, the ability to observe believers and participate in the religious activities of local residents, landscapes that reflect local traditions and historical culture, as well as the number of tourists and the extent of commercial activities. This research offers further insights into the sustainable development of religious tourism, providing a critical conceptual framework and data analysis model for subsequent related studies, contributing significantly to both theory and practice.

Keywords Shamanic heritage destinations, Sacredness, Authentic experience, Cultural tourism, RSA-DEMATEL model

Cultural heritage resources can be described as living traditions passed down through generations and as sources of identity that distinguish one nation or ethnic group from another[1]. These resources manifest themselves in tangible and intangible natural and cultural products, whose uniqueness attracts tourists who want to experience the unique landscape, traditions and history of cultural sites[2]. Therefore, cultural heritage is widely regarded as an important driver with the potential to develop and promote tourism, significantly impacting the environmental, social, and economic life of communities. As cultural tourism grows, understanding the culture of the destination, observing, and experiencing the local way of life have become among the most important expectations and motivations for tourists[3]. Cultural heritage tourism helps visitors understand and experience

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the indigenous culture of their destination, offering not only economic benefits but also the potential to foster societal cultural identity[4,5]. The novelty of heritage tourism products is not the core factor constituting their destination appeal. Apart from service and leisure experiences, the authenticity and uniqueness of products also play a crucial role in shaping tourists' behavioral intentions, attracting repeat visits and fostering positive word-of-mouth[6]. Wang et al.[7] summarized the factors that influence tourists' pre-trip choices and in-trip consumption behavior as the reputation of heritage tourism destinations. Destination reputation not only directly and positively affects tourists' consumption behavior, but also indirectly affects tourists' consumption behavior through tourists' memorability and the chain relationship between tourists' enjoyment and memory. In recent years, an increasing number of scholars have emphasized that maintaining the reputation of heritage tourism destinations hinges on enabling visiting tourists to fully experience the sacredness of the destination or a unique spiritual experience, particularly for cultural heritage tourism sites centred around religious or sacred places[8–10]. It can be regarded as a unique and widely distributed type of cultural heritage tourism. Nearly half of the world's cultural heritage tourist attractions are religious or sacred sites[11]. In the real world, these attractions are generally traditional religious sites that receive a large number of tourists, and have turned into a hybrid place where sacred and secular activities are mixed. Therefore, relevant research has emphasized that sustainable tourism to religious or holy sites depends on whether the site can retain the sanctity of the place while balancing the development of community use traditions and tourism activities[12] .

In China's remote border regions, the religious cultures nurtured and inherited by minority communities are often labelled as "ancient and mysterious", "surreal" and "fantastical", and with the spread of these concepts and imagery, many of these residential communities have become religious destinations that can attract cultural heritage tourists[13]. As the original belief of the Togus-speaking peoples, Shamanism has a long history of evolution and development in Northeastern China, and has played an important catalytic role in the origins of the primitive culture of the northern Chinese ancestors[14]. On the other hand, in order to promote the implementation of the revitalisation plan of the Northeast region, it is of multiple significance and value to protect and make use of the local Shaman cultural resources to promote the sustainable development of the religious tourism industry. Therefore, whether from the perspective of protecting local cultural heritage or promoting the development of religious tourism, the sacredness of shamanistic cultural tourism destinations and their unique ambience need to be preserved and continuously enhanced in Northeast China. In prior research, sanctity can be understood as an experience of awe at religious interpretations, where awe-inspiring environmental features overwhelm the observer and create a sense of being a small part of a larger spiritual system[15]. In recent years, scholars in related studies have generally viewed the sacredness of place as an emotional experience that stems from people's interactions with that place and exists in relationships[8,16,17].

Scholars in previous studies have generally believed that there is a close correlation between tourists' perceptions of the sacredness of a religious destination and the series of successive experiences they have while travelling[8]. Andriotis[18] has investigated the religious heritage tourist sites in northern Greece and summarised five experiences of authenticity associated with the perception of the sacredness of the sites. Lu et al.[19] believed that the perception of sacredness in religious or sacred site tourism is more often triggered by tourists' perception of the vastness of the natural environment and their perception of the shock of the religious atmosphere. Iftikhar et al.[20] has pointed out that the sacredness of religious tourism activities is influenced by factors such as local architectural aesthetics, religious rituals and folk traditions, personal emotions, and interaction with the local community's way of life. Therefore, Aulet & Duda[21] believe that destination managers should take effective measures to maintain the sanctity of the place, and management measures should provide tourists with opportunities to get close to local belief subjects and the experience of contacting folk beliefs. Furthermore, local management decisions should take corresponding measures to help tourists achieve satisfying experiences, which are foundational for maintaining the sacredness of the place[22]. Not only from a religious perspective, but also as places of broader sanctity, refuge, hospitality, cultural sites, and ecological locations. However, in contrast, more studies have been conducted on how to enhance the attractiveness of religious or sacred destinations, or to improve services to enhance the experience of tourists[23,24]. On the other hand, in previous studies on the sacredness of religious sites, scholars have paid more attention to the changing sacredness of religions or holy places in line with social and cultural development, as well as to the interpretation of the characteristics of religious environments[25,26]. From the perspective of managers overseeing religious destinations, there is a significant lack of literature exploring what kind of tourist experience these destinations should provide to uphold and preserve visitors' perception of the sacredness of the place.

To sum up, this study argues that there is an urgent need for a wide range of empirical studies to clarify the causal relevance of tourism experiences to perceptions of local sacredness. The limited amount of research available does not provide destination policymakers, project managers, and developers with a more concrete and systematic basis for exploring resource development and place-making strategies in religious heritage destinations to preserve or shape the sacredness of the place. The purpose of this study is to clarify the causal relationship between tourist experience characteristics/attributes and the perceived sacredness of the destination, and then to explore the resource development and venue creation strategies of religious tourism destinations to enhance the sacredness of the place continuously.

This study takes the shamanistic religious tourism destinations in Northeast China as an empirical case study. Firstly, based on a review of relevant literature, the conditional attributes of religious tourism destinations in terms of the perception of authenticity in the tourism experience were summarised. Then, we investigated the categorical data of tourists' perception of authenticity and collected the evaluation data of each tourist's perception of the sacredness of the destination. Again, a causal decision analysis model (RSA-DEMATEL) based on data mining was applied to clarify the knowledge of the behavioral rules between tourist experience (conditional attributes) and the perceived sacredness of the place (decision attributes), and then a network diagram of the causal relationships between the core attributes was established. Finally, we discuss the resource development

and venue creation strategies of religious tourism destinations with the goal of increasing the sacredness of the place based on empirical cases.

Literature review

In general, most religious tourism research can be understood as case studies based on religious tourism in different destinations[27]. Themes commonly discussed in the literature can all be categorised as: the conceptualisation of religious tourism, the evolution of religious tourism, and the economic and cultural impacts of religious tourism. In this chapter, this study explores scholars' understanding of the tourism experience in religious heritage destinations through a review of the relevant literature and the cultural characteristics of shamanic religions in Northeast China in previous studies.

Tourist experience at heritage religious destinations

Religious tourism is based on religious landscapes, with religious activities and non-religious cultural sightseeing activities as its contents. There is a mutually reinforcing relationship between religion and tourism. Tourism contributes to the revival and healthy development of religion, while religion gives tourism new cultural connotations. The motivation of tourists to visit cultural heritage destinations is understood to be to gain emotional, recreational and educational/cultural experiences[28]. In principle, in addition to religious motives (e.g. seeking to feel the divine power, to be healed and to be blessed), tourism activities in tourist destinations such as sightseeing and entertainment may inspire religious tourists[29]. Religious tourism destinations are spatial carriers of a mixture of pilgrimage and incense activities for religious believers (believers and visitors) and sightseeing, healing, and knowledge-seeking activities for mass tourists. The meaning of religious tourism experience is associated with multiple interpretations from the overall experience of the society, environment and activities[27]. Levi & Kocher[8] has pointed out that the tourist experience of a religious heritage destination is related to the perceived authenticity of the visitor, the aesthetics of the place and its natural features. Authenticity of experience is a focal point in the study of religious heritage tourism, contingent upon how tourist destinations are interpreted and presented to visitors[30].

Perceptions of authenticity in religious heritage tourism are mainly made up of three interrelated factors: the theological ideologies behind the pilgrimage; the places visited; and the activities undertaken by the pilgrims[8,31]. Authenticity in tourism is not only a tangible asset, but also a judgement or value formed by tourists seeking authentic experiences in a particular environment. In other words, the meaning of place and self-in-place, combined with the external circumstances that are the product of the tourism encounter, gives rise to pilgrims' experiences of existential authenticity. Previous empirical studies have shown that tourists perceive authenticity in their travelling experience as essential for interpreting the meaning of place and shaping a sense of sacredness in religious heritage[31–33]. Levi & Kocher[8] has examined religious heritage tourism and examined the relationship between multiple tourism experiences and tourists' perceptions of the sacredness of a destination. He found that visitors' experiences of authenticity at religious heritage destinations had a particularly significant impact on perceptions of sacredness. Several scholars have assessed authentic experience using object-based and existential authentic experience, following Cohen and Cohen's and N. Wang's works[34–36].

However, despite the increasing number of tourists seeking authentic experiences in recent years, tourism industries worldwide seem unable to resist domesticating their respective religious heritage tourism sites, promoting their commodification to maximize short-term economic gains. There are too many real-life examples that show when religious heritage sites and customs are commercialized for the convenience of tourist consumption, the true cultural value of these resources may be lost. The loss of authenticity in religious heritage sites affects both the daily lives of local communities and the tourist experience. Moreover, modifying religious customs to meet tourist expectations may lead to the loss of their traditional significance. Both academia and practical management decisions have increasingly recognised that the excitement of profiting from religious tourism should not overshadow its role in promoting spiritual healing and devout traditions. Scholars have also attempted to elucidate and summarise through case studies the balancing act between authentic religious heritage experiences and tourist service experiences[37]. Even with the development of information and communication technology (ICT), scholars have begun to explore opportunities to use mobile Internet, social media, and virtual/augmented reality technology to promote an ideal balance between the authentic experience of religious heritage destinations and the tourism and leisure experience. with positive impact[38–40]. However, as found in the empirical research by De Ascaniis et al.[41], visitors' motivations for visiting religious heritage sites can influence their perceptions of information and communication technologies. Only a small number of tourists rely on information and communication technologies to learn about and share information about religious heritage sites. Furthermore, religious/spiritual experiences are typically individualistic, especially when it comes to perceiving the sacredness of religious/holy sites, which is intricately linked to the overall tourist experience. Authentic experiences during tourism can shape the depth and breadth of individual tourists' perception of the destination's sacredness. This type of experience not only enriches personal travel experiences but also promotes cross-cultural understanding and respect, thereby making religious heritage sites significant venues for cultural exchange and spiritual enlightenment. However, compared to exploring how authentic experiences at religious heritage sites influence tourists' travel behavior and attitudes, there remains a significant lack of depth in understanding how tourists form perceptions of the sacredness of religious heritage through their personal visits and authentic experiences.

Shamanism in Northeast China

In China, Shamanism is mainly distributed among the Tungusic, Mongolian and Turkic-speaking peoples in the Northeast and Northwest regions. Therefore, Shamanism is considered to be a primitive form of religion unique to the peoples of Northern China. In the history of Northeast China, Shamanism is one of the oldest and most

influential primitive and indigenous folk religions, and it is the mother source of folk culture and folklore of all the peoples in Northeast China. Shamanism is an ancient religion in which people associated all kinds of natural objects and unpredictable natural phenomena with human beings and gave them a subjective consciousness, so that they believed in and prayed to them, forming the first religious concepts[42]. The shamanistic view of nature is primarily manifested through anthropomorphism, deification, and moralization processes. Shamans, as intermediaries between humans and spirits, utilise attire to embody the image of being part-human and part-divine. Liu & Kwon[43] argued that shamans often use costumes to embody a half-human, half-divine image, attributing supernatural powers to their attire. For instance, animals depicted on the clothing can aid shamans in traversing into the spirit world. Typically, benevolent animals assist shamans in entering the divine realm, while those aiding entry into the underworld are considered malevolent. Additionally, the number of hanging ornaments represents the shaman's level of ability. Many scholars describe shamanism as a religious concept developed by northeastern ethnic groups through long-term hunting and struggles with the natural environment[44]. However, this interpretation may oversimplify the complex religious and cultural historical development processes. Shamanism is typically associated with various practices such as soul work, healing, and prophecy, and its development extends beyond interactions between the natural environment and humanity.

McClenon[45] found that shamanic healing relies on beliefs and customs specific to cultural backgrounds, where patient trust and expectations play crucial roles in the healing process. The power of psychological suggestion and collective rituals are significant factors in achieving healing. It is evident through observation that symbolic language and symbols used in shamanic rituals often evoke collective memories and individual subconscious, thereby influencing participants' psychological and physiological states. Shamanism does not only refer to a religious belief activity but also represents a rich and strong cultural spirit, which has become a distinctive regional culture and has widely influenced the folk customs, philosophies, and values of Northeastern people[46]. Shamanism's pursuit of the consciousness of transcending the boundaries of nature and the character and blood quality of fighting have objectively fuelled the "beard" spirit of the northeastern people. However, despite its antiquity, Shamanism in Northeastern China has long been regarded as a declining, rare and mysterious minority religious and cultural heritage[47]. Scholars generally believe that the three major internal factors that make it difficult to be widely promoted and developed are: the absence of strict rules and doctrines of shamanism and the lack of a unified church organisation; the serious limitations of the religious rituals; and the simplicity of the religious buildings and the diversity of the forms, which make it difficult to play an effective role in spreading the ideas of the religion. While the processes of modernisation may attenuate the direct impact of shamanic culture on the character of Northeastern people, the historical depth and widespread influence of this culture should not be overlooked. Shamanic culture maintains a presence in both traditional and modern life in the Northeast region, with its effects likely being complex and multi-layered, requiring comprehensive understanding through detailed empirical research.

Materials and methods

In previous studies, Rough Set Rationale Theory (RSA) has been widely applied to deal with fuzzy and imprecise information datasets, and it is regarded as a quantitative analysis method to mine rough decision rules from known data. RSA is a mathematical tool proposed by Pawlak in the 1980s[48]. It applies data mining technology to screen out core evaluation indicators and clarify the behavioral rules knowledge behind the data (i.e., if-then rules). RST can be used to resolve the imprecise knowledge relationship between conditional attributes and decision attributes in classification functions[49]. It uses an exact set with equivalence relations to construct a set of lower and upper approximations of functions to find the boundaries of the classification function. Based on this, the basic information is extended to obtain the reduced attribute set, core attribute set and knowledge rules. The simplification of the conditional attribute set is accomplished by calculating the importance of the conditional attributes through the degree of dependence of the attributes. The core attribute set is then retrieved from multiple reduced conditional attribute sets. Ultimately, multiple behavioral laws are derived for each performance level within the decision attributes[50]. Golmohammadi et al.[51] has developed a data mining tool that is an effective means of predicting overall tourist satisfaction, demonstrating that rough set theory can be effectively applied to feature selection for large datasets in a tourism environment. In order to clarify the causal relationship between foreign immigrants' perceived environmental preferences in religious places and sense of place formation, Mei et al.[52] conducted a questionnaire survey in Shamian District, Guangzhou City, China, to collect categorical data from the people's end of the population for data mining analysis based on the rough set rationale. Fan et al.[53] also used rough ensemble analysis to clarify the pattern of causality between creative practitioners' perceptions of the physical environment of cultural districts and the formation of a sense of place identity. In recent studies, scholars have tried to combine the rough sets method with the decision lab analysis method in Multi-Criteria Decision Making (MCDM), aiming at integrating expert domain knowledge on the basis of data exploration, and developing a "dual-knowledge" driven decision pathway diagram[54]. One of the main objectives of this study is to clarify the rules of causality between tourist experience characteristics/attributes and destination sanctity perceptions. Secondly, this study will further analyse the dominant influence network relationship between the core tourism experience characteristics. Therefore, this study will use DEMATEL technique to construct a complex influence network relationship diagram between core features based on the RSA analysis results. DEMATEL (Decision Making Trial and Evaluation Laboratory) is a technique used to deal with complex problems, especially in causal analysis. INRM (Influential Network Relationship Map) is a key output of DEMATEL, which shows the mutual impact relationship between various factors[55]. This technique uses matrices and related mathematical theories to calculate the cause-and-effect relationships between all indicators and the strength of their effects[56].

Data collection

In the first phase of the sub-study, the design of the survey questionnaire was based on a review of the relevant literature to extract characteristics/attributes of tourists' traveling experience in relation to the perceived sacredness of religious heritage destinations. In previous studies, multiple subjective opinion questions have been used to quantitatively analyze tourists' travel experiences (typically on a Litke 5 scale) to model motivation, satisfaction, loyalty or revisit intentions in heritage tourism. Su et al.[28] argued that tourists are motivated to visit a heritage destination because they seek emotional, recreational, and educational/cultural experiences. Therefore, Su et al.[28] used the three dimensions of emotional, recreational, and educational/cultural, and four subjective opinion questions to measure tourists' travel experiences in heritage destinations under each dimension. For emotional experience, Patwardhan et al.[57] measured the emotional experience of tourists in religious destinations by investigating their sense of belonging to the destination, their pride in the destination, and whether its religious ambience helps tourists to discover themselves and develop their personal values. He further confirmed that affective experiences play a partial mediating role in the influence of place attachment on destination loyalty. Chang et al.[58] developed the holy land tourism experience scale, which is an exploratory factor analysis of five dimensions - spirituality, learning, physicality, help, and unpleasantness - and identified 38 questions to measure the tourism experience.

Based on a review of relevant literature involving the measurement of tourists' authentic tourism experience it is inevitable to find that destination authenticity includes not only phenomena related to objects, but also phenomena related to tourism experience[36]. Destination authenticity is not only regarded as the inherent quality of the destination, but also the perception and judgment generated by the true knowledge and true feelings of the destination, as well as the process by which tourists actively construct their own meaning. Previous work has demonstrated that the perceived sacredness experienced by visitors at religious heritage destinations is related to ongoing religious activities, the presence of religious symbols, and the preservation of the area's historical heritage[8]. Therefore, the experience of authenticity that can influence tourists' perception of the sacredness of a destination can be understood as a personal feeling, that is, a person's understanding and interpretation of local festivals, rituals, traditional culture and art, and the residential built environment. Hung Lee et al.[12] developed seven questions for measuring authenticity experiences in religious tourism destinations, which involved investigating tourists' perceptions of the ambiance of their surroundings, the characteristics of ritual activities, spiritual experiences, and the dissemination of information about the venue's history, legends, and folk culture.

Zhao & Li[36] have categorized tourists' authenticity experience into two dimensions to be measured: object-based authenticity and interpersonal interaction authenticity. Regarding the authenticity of interpersonal interactions, scholars have mainly assessed it by investigating tourists' self-assessed encounters with locals, peers and other tourists. Regarding object-based authenticity, scholars propose to quantitatively analyze object-based authenticity experiences by surveying tourists' perceptions of the destination's natural landscapes, food & cultural commodities, local traditional lifestyles, folk cultures and traditional buildings. However, more authors in previous research have used the concepts of cold and hot to differentiate between the two types of authenticity experiences, with the former referring to visitors' beliefs, expectations, and preferences about specific objects and their images, while hot authenticity (i.e., authenticity related to the activity) is viewed as a reflection of the emotional experience of the visitors' participation in the activity[59]. As discussed earlier, in recent years, an increasing number of scholars have used the two dimensions of object-based authenticity and existential authenticity in empirical studies to investigate and assess tourists' experience of authenticity in cultural tourism destinations[34–36]. In a research study applying structural equation modeling to test theoretical hypotheses, Lin & Hsu[34] examined that the elements used to measure the authenticity experience of cultural tourism destinations indeed fall into two main dimensions, namely object-based authenticity and existential authenticity. Object-based authenticity measures were mainly concerned with the investigation of tourists' experiences and perceptions of local buildings, natural landscapes, places of living, and customs & cultures. Existential authenticity experiences are quantitatively assessed by investigating tourists' spiritual experience, participation in activities & rituals, understanding of history & legends, and perception of the local ambience in religious heritage destinations. In summary, based on the summarization of key literature, this study draws Fig. 1 to illustrate the theoretical framework of the conditional attributes (F) of the perception of sacredness (D) in religious heritage destinations.

On the one hand, this study takes destination authenticity experience characteristics as conditional attributes; on the other hand, this study takes tourists' perceptions of sacredness in religious heritage tourism destinations as decision attributes. The main questions in the questionnaire are shown in Table 1, with a total of eight conditional attributes under the two dimensions, and each conditional attribute was registered with categorical data. Decision-making attributes were collected by surveying each respondent on the degree of perceived sanctity of the destination. In this study, each respondent was a tourist from several cultural tourism destinations with a shamanic religious theme. The survey was conducted in the form of semi-structured questionnaires. 429 questionnaires were distributed, of which 374 were valid. Respondents accepted the survey anonymously, with the assurance that they would complete the survey voluntarily without involving their privacy. Each question in the questionnaire used in this study was derived from attributes of the authentic tourism experience that have been validated in previous studies to influence tourists' perceptions of the sacredness of the destination[12,37]. Based on this, Cohen's Kappa coefficient was employed to quantitatively assess the consistency of the category variables as judged by the respondents across the different survey attractions. The statistical results indicated that the average consistency of the respondents' responses to the category variables collected from the eight shamanic religious and cultural tourism sites in this study reached 80.62%, with a standard deviation of 0.049. This implies that respondents were able to provide more consistent category judgments for each conditional attribute (F) in each survey attraction. Furthermore, the validity of the questionnaire in this study was verified through validated factor analysis, which showed that the KMO coefficient for each topic dimension in the questionnaire

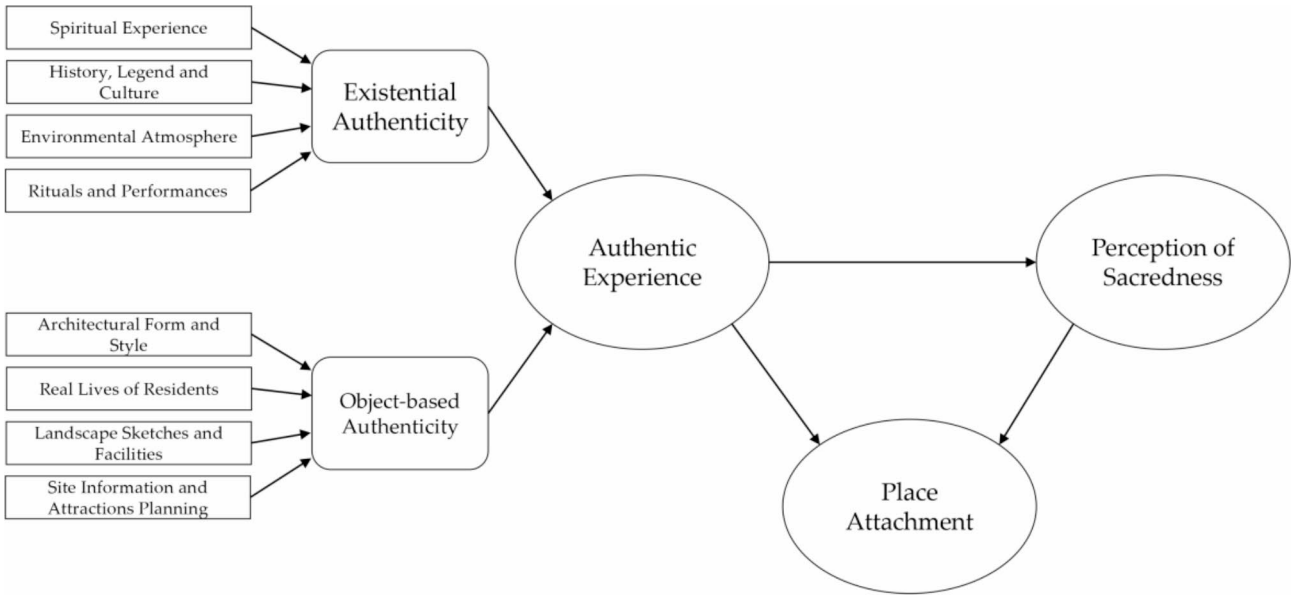

Fig. 1. Condition attributes that are summarized/extracted.

Dimensions	Condition attributes	Categories	Decision attributes (evaluation scale)
Existential Authenticity	Spiritual Experience (F_1)	1 = Enjoyed the unique religious and spiritual experience here. 2 = No special spiritual experience.	Perception of sacredness at heritage religious site (D) (5 point scales)
	History, Legend and Culture (F_2)	1 = This visit provided insight into the historical era, I felt connected with the related history, legends, and historical personalities. 2 = Unable to gain insight into local history and culture.	
	Environmental Atmosphere (F_3)	1 = Liked the calm and peaceful atmosphere during the visit. 2 = Felt crowded and noisy commercial environment during visit.	
	Rituals and Performances (F_4)	1 = There are unique characteristics of the rituals/performances that encourage visitors to participate. 2 = The rituals and activities arranged locally are not connected with traditional religious culture.	
Object-based Authenticity	Architectural Form and Style (F_5)	1 = The overall architecture and exhibits reflected actual buildings from the past. 2 = These newly built or remodeled buildings have been unable to allow tourists to experience the local traditional religious architectural style.	
	The Real Lives of Residents (F_6)	1 = Experienced or imagined the real lives of residents. 2 = Unable to experience the real life customs of residents.	
	Landscape Sketches and Facilities (F_7)	1 = Experienced the look and feel of the past and traditional local cultures. 2 = Commercialized landscape sketches and service facilities cannot establish a connection with local traditional culture.	
	Site Information and Attractions Planning (F_8)	1 = Thought the information about the site was interesting, and liked the way the site blends with the attractions. 2 = It is difficult to perceive the information of the site and clarify the relationship between the attractions.	

Table 1. Conditional and decision attributes in the questionnaire.

was greater than 0.6 and the total explained variance was minimized to 52.30%. Therefore, the quantitative statistics shows that the questionnaire data collected back in this study has good reliability and validity.

In this study, a questionnaire survey was conducted in well-known religious tourism destinations in Northeast China, and a similar number of tourists were randomly invited to complete the questionnaire in each destination. An average of 50 respondents from different destinations were enumerated, and it took them an average of about 15 min to complete the questionnaire. The basic information of the respondents and the locations of the survey sites in the Northeast region are shown in Fig. 2.

In the second investigation phase, this study designed an expert questionnaire based on the results of the previous phase, and used the DEMATEL technique to clarify the complex network of interactions between the core condition attributes. The invited participants consisted of two types of experts: academics in the field of tourism destination planning; and policy makers from the local cultural and tourism management departments in Heilongjiang Province. This study required that each participant had more than 5 years of work experience and that they all had a Master's degree or higher. A total of 31 expert responses were obtained, including 28 valid questionnaires, and in each questionnaire the study also collected additional expert ratings of the reliability of

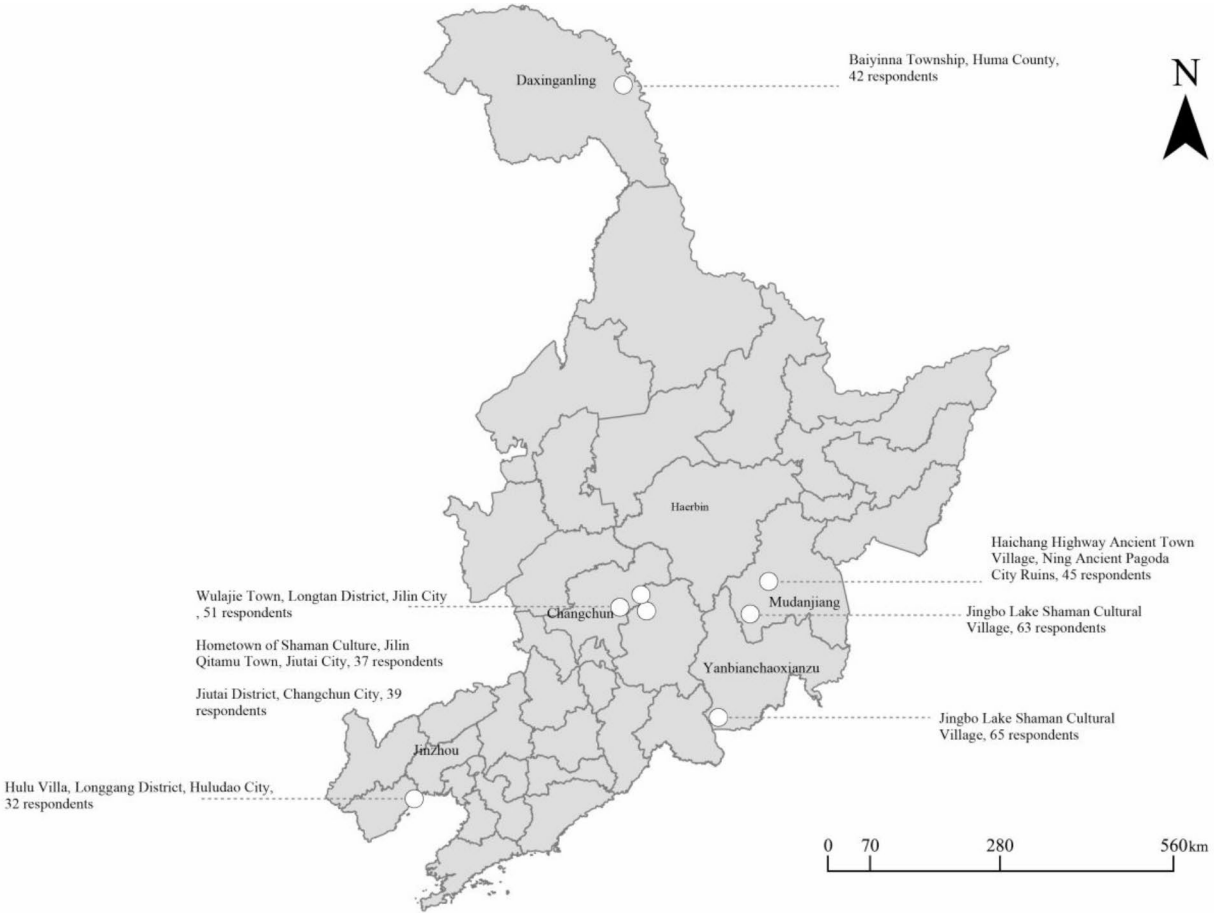

Fig. 2. Data collection at shamanic heritage destinations.

Quality of classification		Core attributes	
0.484		$F_1, F_2, F_3, F_4, F_5, F_6, F_7, F_8$	
Class	Lower approximation	Upper approximation	Accuracy
1	47	99	0.475
2	27	146	0.185
3	4	98	0.041
4	27	92	0.294
5	76	150	0.507

Table 2. Results of data prospecting analysis.

each conditional attribute. It helps to reconfirm the reliability of each conditional attribute (F) in Table 2 based on experts' domain knowledge through the fuzzy Delphi method. After statistically analyzing the data from the first round of expert questionnaires, this study confirms that the expert consensus value of each conditional attribute exceeds the set threshold (6.05), and based on the semantics of the Likert 7 scale, it can be seen that all of the conditional attributes in Table 2 also have sufficient survey reliability and validity under the experts' perspectives. In addition, on the basis of Eq. 7 in Appendix A1, this study quantitatively analyzed the consistency of the collected DEMATEL questionnaires, and the results showed that the experts' consistency was above 95%, which implies that there was a similarly sizable degree of consensus among experts on the discrimination of direct influence relationships between the extracted core attributes.

Result

In this study, the RSA technique was applied to clarify the rules of a causal association between tourists' experience of authenticity and perception of sacredness in religious heritage tourism destinations (i.e. If…Then…rules). Through the probe analysis of 374 data, we found that the categorical quality of these data was 0.484 (Table 2), which implies that the data we collected had sufficient roughness for rough pooling analysis. Table 2 also shows

Rules no.	Conditions	Decision	Number of objects
1	$F_1=2$ & $F_2=2$ & $F_3=2$ & $F_7=1$ & $F_8=2$	$D=1$	22 (29.33%)
2	$F_1=2$ & $F_4=2$ & $F_7=2$	$D=1$	18 (24.00%)
3	$F_4=1$ & $F_6=1$ & $F_7=1$	$D=5$	29 (23.39%)
4	$F_2=1$ & $F_4=2$ & $F_6=1$	$D=5$	22 (17.74%)
5	$F_2=1$ & $F_3=1$ & $F_7=1$	$D=5$	38 (30.65%)

Table 3. Minimal covering rules with strength exceeding 10% in decision = 1/5.

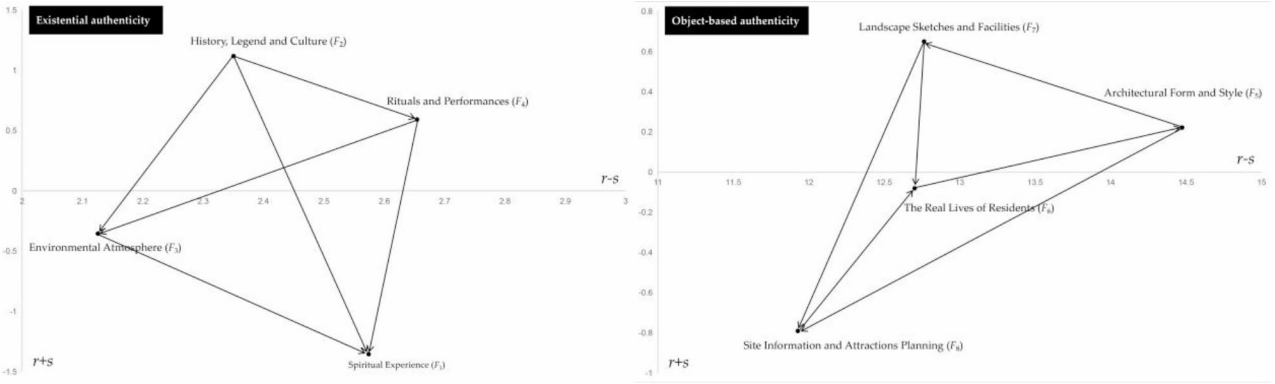

Fig. 3. Network diagram of the influence relationships between the core attributes.

the number of lower approximations and upper approximations corresponding to each classification level of the identified core and decision attributes. For the recovered data, a confusion matrix was constructed to check the validity of the data analysis, which yielded a result of 77.803%.

In addition to the above results, 21 rules were obtained through RSA analysis. Among them, 5 rules with more than 10% coverage when the decision attributes were 1 or 5 were extracted. These rules were used to understand the causal association rules between tourists' experience of originality and perception of sacredness in shamanic religious tourism destinations (as shown in Table 3). In Table 3, rules 1–2 explain the attributes of the destination's originality condition that are commonly experienced by tourists when their sanctity perception is lowest.

Based on the clarification of the five rules in Table 3, this study applies the DEMATEL technique to construct an Influence Network Relationship Map (INRM) between the core attributes. As the results are shown in Fig. 3, under the existential authenticity dimension, establishing a connection between tourists and local historical tales, history, legend and culture (F_2) is the most dominant conditional attribute. Under the object-based authenticity dimension, architectural form and style (F_5) and landscape sketches and facilities (F_7) that maintain religious and cultural authenticity have the strongest influence among the four conditional attributes.

Discussion

Rule 1 in Table 3 indicates that in certain tourist destinations, if visitors cannot perceive the spiritual experiences associated with shamanism, or lack the opportunity to deeply engage with the local history and culture, and if the environment of the destination is no longer serene and tranquil, it becomes challenging for tourists to sense the sanctity of the destination. Huang & Pearce[60] once suggested that managers of religious destinations should strive for the sustainable development of local religious culture. Tourists are eager to enjoy the tranquility and peace in local daily religious life. Combining Rules 1–2, this study believes that the authentic tourism experience that enhances tourists' perception of sanctity in Northeast Shamanism tourist destinations is related to the ability to observe devotees and local residents participating in religious activities, landscapes that express local traditions and historical culture, as well as a limited number of tourists and commercial activities. In the context of Northeast Shamanism tourist destinations, the sanctity perceived by tourists is intricately linked to the authenticity of their experiences. This authenticity is not merely derived from the physical surroundings but is deeply rooted in the active participation of local residents and devotees in religious activities, the representation of local traditions and historical culture through landscapes, and the preservation of the destination's sanctity by limiting commercial activities and tourist numbers.

In Northeast Shamanism tourist destinations, the essence of the place lies in its religious practices and the deep-rooted traditions of its people. When tourists witness local residents and devotees actively participating in religious activities, it provides an authentic experience that is hard to replicate. This active participation serves as a living testament to the region's rich history and traditions. Furthermore, landscapes that showcase local traditions and historical culture play a pivotal role in enhancing the tourist's experience. These landscapes act as silent storytellers, narrating tales of the past and providing context to the religious practices observed. However,

the sanctity and authenticity of such destinations can be easily overshadowed by excessive commercial activities and an influx of tourists. Commercialization, if not kept in check, can dilute the very essence of the place, turning it from a sacred site to just another tourist spot. Similarly, an overwhelming number of tourists can disrupt local practices and rituals, thereby diminishing the authentic experience for others.

In shamanistic religious culture, traditional religious music and dance are important components of ritual activities. During the ceremony, the shaman holds a shaman drum, and tourists and local residents can participate in singing the "Invitation Song" to summon the gods. In this process, music plays a central role[61]. The composition of shamanic music is mainly percussion, accompanied by human singing. Unlike many organized religions with structured rituals and ceremonies, Shamanism in this region leans towards a more informal and spontaneous expression of faith. This informality is not a sign of casualness but rather a reflection of the community's intrinsic connection with nature and the spiritual world. The rituals and festive activities in Northeast Shamanism are not bound by rigid protocols or scripts. Instead, they flow organically, often led by the shaman, who acts as a bridge between the physical and spiritual realms. This spontaneity allows for a more genuine and heartfelt connection during ceremonies, making each ritual unique and deeply personal. A significant aspect of these ceremonies is the emphasis on ethereal and pure auditory and visual experiences. The sounds used in rituals, whether from instruments, chants, or nature, are chosen for their ability to resonate with the soul, transporting participants to a spiritual plane. These sounds are not loud or jarring but are subtle, aiming to create an atmosphere of tranquility and introspection.

Visually, shamanic rituals in the Northeast lack grandeur or opulence. The focus is on simplicity, often using natural elements such as fire, water, and earth, which have profound significance in shamanic beliefs. This minimalist approach is intentional, ensuring participants are not distracted by external factors but instead are drawn inward, promoting a deeper spiritual connection. This study also believes that the experience of awe is related to the physical features and religious symbols presented in the place, including statues, buildings and landscapes with religious and cultural relics. Rules 3–5 in Table 3 indicate that the landscape features and facilities that tourists see, touch and use require high-quality visual translation of shamanic religious culture. This study suggests that landscape planners and designers should systematically summarize and trace the origins of a large number of shamanic religious cultural symbols, and extract and translate the real cultural symbols. In addition to the traditional totem patterns, sacrificial vessels and architectural forms of shamanic religion, the materials should also involve the analysis and induction of shamanistic images to transform landscape design elements.

In the Northeastern shamanistic religious culture, *Xian'er* or Xian-shaman is a spiritual medium that plays a key role in this folk belief. They are seen as having the ability to mediate between normal human and animal souls, and to harness the soul's power to cure illness or predict the future. Even more, this widespread and long-held tradition is an alternative medical option or solution to other problems of contemporary society. Behind this belief culture lies the sacred tradition of ancient human oral culture that communicates with heaven and man, and imparts knowledge from gods. This is the conceptual origin of this collective unconscious mythological narrative[62]. Xian'er has a rich knowledge of local historical stories, legends and rituals and plays a vital role in protecting and disseminating the rich cultural and religious heritage of the Northeast. Visitors seeking a deeper understanding of the region's spiritual practices should be given greater opportunities to seek insights, stories and guidance from these shamans.

On the other hand, this study draws the INRM for the dominant influence relationships between core attributes (as shown in Fig. 3). This study contends that understanding and appreciating the authentic history and belief systems of a place can enhance tourists' perceptions of the authenticity of that place. This perception of authenticity can enhance tourists' sense of satisfaction and the value of their travel experience[63]. Visitors' knowledge of a place's history, legends and allusions can enhance their awareness of the cultural and spiritual value of that place. In addition, if visitors are aware of the history and legends of the place, they can be encouraged to participate in activities related to these stories and legends. This kind of engagement can enhance tourists' travel experience, making them more engaged and satisfied. Kim & Jamal[64] found that tourists' understanding and appreciation of destination culture are positively related to their travel satisfaction and loyalty. This study believes that tourists' understanding and appreciation of local history and legends can enhance their respect and appreciation for the destination, thereby creating a more harmonious and respectful on-site atmosphere. On the other hand, this study also recommends that local decision-makers should maintain and enhance the religious character of the site's buildings and associated landscape features wherever possible. At the same time, organize and plan the information linkage relationship between various scenic spots in the destination. Under the influence of shamanistic religious culture, the buildings in rural settlements in Northeast China often use natural wood as the main building material, which is related to shamanism's worship and respect for nature. These wooden buildings often feature solid structures and unique decorations, such as carved patterns and symbols, which are associated with shamanic religious beliefs and rituals. The landscape layout of destination settlements is often related to shamanistic cosmology and space views. There was usually an altar or shrine dedicated to the deity in the center, surrounded by the residences of the residents. This layout reflects Shamanism's worship of the center of the universe and respect for the four directions. Shamanic religion worships nature. Therefore, the architecture and landscape design of rural settlements in Northeast China often exist in harmony with the surrounding natural environment. For example, a building's orientation and location may take into account the direction of the sun, wind, and water to ensure a harmonious relationship with nature. Therefore, the architectural and landscape features of rural settlements play a key role in presenting the authenticity of Northeastern shamanic cultural destinations. These features not only reflect the traditions and history of shamanic culture, but also provide visitors with an authentic and original cultural experience, thereby enhancing the destination's appeal and value.

Conclusion

This study identifies eight conditional attributes for the authenticity experience at tourism destinations, elucidating the causal rules between tourists' authenticity experience at religious heritage sites and their perception of sacredness. The index system constructed in Table 1, based on two dimensions and eight attributes, can provide essential reference points for future research related to authenticity experiences in cultural heritage tourism. More crucially, in the fields of human geography and religious cultural studies, this study introduces for the first time the RSA-DEMATEL decision-making model to uncover If.Then. rules between conditional attributes and decision attributes from individual tourist experience data. Furthermore, it extracts the classifying characteristics of authenticity experiences that play a crucial role in influencing tourists' perception of sacredness. Subsequently, through DEMATEL analysis, this study further clarifies the dominance and influence network relationships among the core conditional attributes (as shown in Fig. 3). Although previous studies have provided insights into the significant impact of tourists' authenticity experiences at cultural heritage tourism destinations on the formation of perceptions of sacredness[61]. Rohman[65] confirmed that spiritual allure, historical value, and religious activities can be considered as three reliable assessment criteria for quantitatively analyzing the perception of sacredness in religious/holy site tourism. However, this study mapped out the network of influence relationships among core attributes under the dimension of authenticity experiences based on a substantial collection of individual tourist experience survey data. Building upon the recognition of complex dominance relationships among various dimensions of authenticity experiences, this study provides new evidence to explain the mechanism of sacredness perception and to clarify the priority relationships among the required conditional attributes for sacredness perception. The results of this study also support the idea that the experience of awe is related to the physical features and religious symbols present in a place. The sense of awe and sacredness is also related to the sense of history that is explained to the visitor through the natural landscape features of the place and the buildings with traces of history. In addition to the above factors, interaction and participation between tourists and local communities is also very important. The rules embedded in the tourists' personal tourism experience data in this study reveal that tourists should be encouraged to participate in ritual activities, contact and interact with shamans, and observe the real religious life of community residents. This helps define the destination as a truly sacred place in the perception of tourists.

This study uses eight Shamanic cultural tourism destinations in Northeast China as empirical case studies. The five rules in Table 3 are only sufficient to fully explain the causal relationships between tourists' authenticity tourism experiences and perceptions of sacredness at Shamanic cultural tourism destinations. The influence network diagram depicted in Fig. 3 can only explain the dominant influence relationships among various authenticity tourism experiences leading to the formation of tourists' perceptions of sacredness in Shamanic cultural traditional settlements in Northeast China. However, both in China and around the world, there are many towns similar to the three provinces in Northeast China, hoping to promote the transformation of the economy of heavy industry or resource-based regions through the development of cultural tourism. In China, regions such as Xinjiang, Tibet, Sichuan, Yunnan, Inner Mongolia, among others, all consist of ethnic minority settlements, each possessing unique religious and cultural heritage resources. On the other hand, while Shamanic religious culture has its distinct characteristics, many indigenous beliefs and traditional religions worldwide also exhibit traces of nature worship. For instance, spirits revered by Native Americans, sacred rivers in Hindu worship, and Celtic reverence for trees and forests. Shamanism primarily alters states of consciousness through rituals such as dancing, singing, and drumming to communicate with spirits, symbolically representing natural forces and souls. This parallels other religious cultures worldwide, which also employ specific rituals and symbols to achieve religious experiences. In general, Shamanic religious culture shares many similarities with global religious cultures in aspects such as reverence for nature, concepts of the soul, rituals and symbols, worship and prayer, healing and protection, morality, and social norms. These similarities indicate that certain religious beliefs and worship practices are universal on a global scale, reflecting humanity's common pursuit and understanding of supernatural forces across diverse cultural contexts. Therefore, the data collection for this study was limited to visitors at Shamanic religious tourism destinations in Northeast China. However, this does not imply that the findings of this study lack sufficient contribution and universality. Numerous studies have already used religious and cultural traditional settlements from around the world as empirical research cases to explore tourists' perspectives on religious tourism destinations[58]. However, in contrast, there remains a significant scarcity of relevant studies using Shamanic cultural traditional settlements as examples, especially within mainland China. Future research could use other religious and cultural traditional settlements as cases, applying the decision analysis model developed in this study to mine data on tourist experiences at different tourist destinations. This would further engage with the findings and discussions of this study, exploring similarities and differences, and providing additional perspectives and evidence for investigating the formation and conservation of sacred perceptions in religious heritage tourism.

Data availability

Te data used in this study are available from the corresponding author (20191056@hifa.edu.cn) upon reasonable request.

Appendices

A1. RSA-DEMATEL Steps

This study applies the method to retrieve the core set of attributes from multiple refined and simplified sets of conditional attributes and derive multiple decision rules for the main categories in the decision attributes.
Step R1: Construct an information system $S = (U, A = C \cup D, V, f)$.

Step R2: Confirm the equivalence relationship between attributes, defined as shown in Eq. (1).

$$IND(B) = \{(x, y) \in U \,|\forall a \in B, f_a(x) = f_a(y)\} \tag{1}$$

Step R3: Apply Eqs. (2) and (3) to mediate the lower and upper approximations.

$$\underline{B}X = \{x \in U | I_B[x] \subseteq X\} \tag{2}$$

$$\overline{B}X = \{x \in U | I_B[x] \cap X \neq \emptyset\} \tag{3}$$

Step R4: Apply Eq. (4) to output the judgment rules (i.e., decision rules) for each decision level.

$$\text{A judgment rule in } S \text{ is expressed as } \beta \rightarrow \Psi \text{ and read as } if\ \beta\ then\ \Psi. \tag{4}$$

All decision rules $\beta \rightarrow \Psi$ have a coverage factor/coverage (CR). It is defined as the frequency/number of times it appears in that decision level $\mathrm{cov}_s(\Phi, \psi) = \sup_S(\Phi, \psi)/card(\|\psi\|_S)$. Thus, the strength of that decision rule can be simply expressed as a ratio that can be obtained by dividing the number of facts classified by the decision rule by the number of facts in the data table.

The Decision Making and Trial Evaluation Laboratory was developed by the Geneva Research Center in 1972 to understand the problems of real social structure. This method uses Markov chain process and matrix-related theory to calculate the degree of mutual influence between attributes. This method is based on collecting the domain knowledge of the expert group to show the systematic relationship structure between attributes.

Step D1: Establish the direct influence relation matrix $\boldsymbol{E}$. This matrix must be an $n \times n$ nonnegative matrix. According to the results from N experts, the direct influence relation matrix $\boldsymbol{E}$ is shown in Eq. 5, and the direct influence relation matrix from each expert is $\boldsymbol{E}^h = [e_{ij}^h]_{n\times n}, h = 1, 2, ?, H$.

$$\boldsymbol{E} = \begin{bmatrix} e_{11} & \cdots & e_{1j} & \cdots & e_{1n} \\ \vdots & & \vdots & & \vdots \\ e_{i1} & \cdots & e_{ij} & \cdots & e_{in} \\ \vdots & & \vdots & & \vdots \\ e_{n1} & \cdots & e_{nj} & \cdots & e_{nn} \end{bmatrix} \tag{5}$$

Step D2: Constitute the average direct influence relation matrix$\boldsymbol{A}$. The average scores of the N experts are $a_{ij}{=}\frac{1}{H}\sum_{h=1}^{H} e_{ij}^h$, as shown in Eq. 6.

$$\boldsymbol{A} = \begin{bmatrix} a_{11} & \cdots & a_{1j} & \cdots & a_{1n} \\ \vdots & & \vdots & & \vdots \\ a_{i1} & \cdots & a_{ij} & \cdots & a_{in} \\ \vdots & & \vdots & & \vdots \\ a_{n1} & \cdots & a_{nj} & \cdots & a_{nn} \end{bmatrix} \tag{6}$$

Step D3: Examine the consensus. The value of consensus can be estimated by Eq. 7, which represents the level of experts' consensus. The threshold of the average gap ratio is 5% in statistics, and a value less than 5% implies a confidence level above 95%, which also represents a stable system.

$$\text{Average gap-ratio inconsensus}(\%) = \frac{1}{n(n-1)} \sum_{i=1}^{n} \sum_{j=1}^{n} \left(\left|a_{ij}^H - a_{ij}^{H-1}\right| / a_{ij}^H\right) \times 100\% \tag{7}$$

Step D4: Formulate the normalized average direct influence relation matrix $\boldsymbol{D}$. The matrix $\boldsymbol{D}$, which is acquired by normalizing the matrix $\boldsymbol{A}$, can be derived from Eqs. 8 and 9, where all principal diagonal elements are equal to 0.

$$\boldsymbol{D} = b \cdot \boldsymbol{A} \tag{8}$$

$$b = \min\left\{\frac{1}{\max_{1\leq i\leq n}\sum_{j=1}^{n} a_{ij}}, \frac{1}{\max_{1\leq j\leq n}\sum_{i=1}^{n} a_{ij}}\right\} \tag{9}$$

Step D5: Construct the total influence relation matrix $\boldsymbol{T}$. A continuous decrease of the indirect effects of problems moves with the powers of the matrix $\boldsymbol{D}$, e.g., $\boldsymbol{D}^2, \ldots, \boldsymbol{D}^\infty$, and $\lim_{q\rightarrow\infty}\boldsymbol{D}^q = [0]_{n\times n}$, for Eq. 10, where $\boldsymbol{I}$ is a $n \times n$ unit matrix. The total influence relation matrix $\boldsymbol{T}$ is a $n \times n$ matrix defined by $\boldsymbol{T} = [t_{ij}]_{n\times n}$, as

shown in Eq. 11.

$$\lim_{q\to\infty}(\boldsymbol{I}+\boldsymbol{D}+\boldsymbol{D}^2+\ldots+\boldsymbol{D}^q)=(\boldsymbol{I}-\boldsymbol{D})^{-1} \tag{10}$$

$$\boldsymbol{T}=\boldsymbol{D}(\boldsymbol{I}-\boldsymbol{D})^{-1},\ \lim_{q\to\infty}\boldsymbol{D}^q=[0]_{n\times n} \tag{11}$$

Step D6: Generate the Illustration of INRM. The total influence relation matrix $\boldsymbol{T}$ of INRM can be acquired using Eqs. 12 and 13.

$$\boldsymbol{o}=(o_i)_{n\times 1}=\left[\sum\nolimits_{j=1}^{n}t_{ij}\right]_{n\times 1}=(o_1,\ldots,o_i,\ldots,o_n) \tag{12}$$

$$\boldsymbol{r}=(r_i)_{n\times 1}=(r_j)'_{1\times n}=\left[\sum\nolimits_{i=1}^{n}t_{ij}\right]'_{1\times n}=(r_1,\ldots,r_j,\ldots,r_n)' \tag{13}$$

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Author contributions

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Declarations

Competing interests
The authors declare no competing interests.

Informed consent
Not applicable.

Ethical statement
This study does not involve "human subject research". Data in this study were not obtained through intervention or interaction with individuals or groups or using personally identifiable information. The research ethics review is not applicable.

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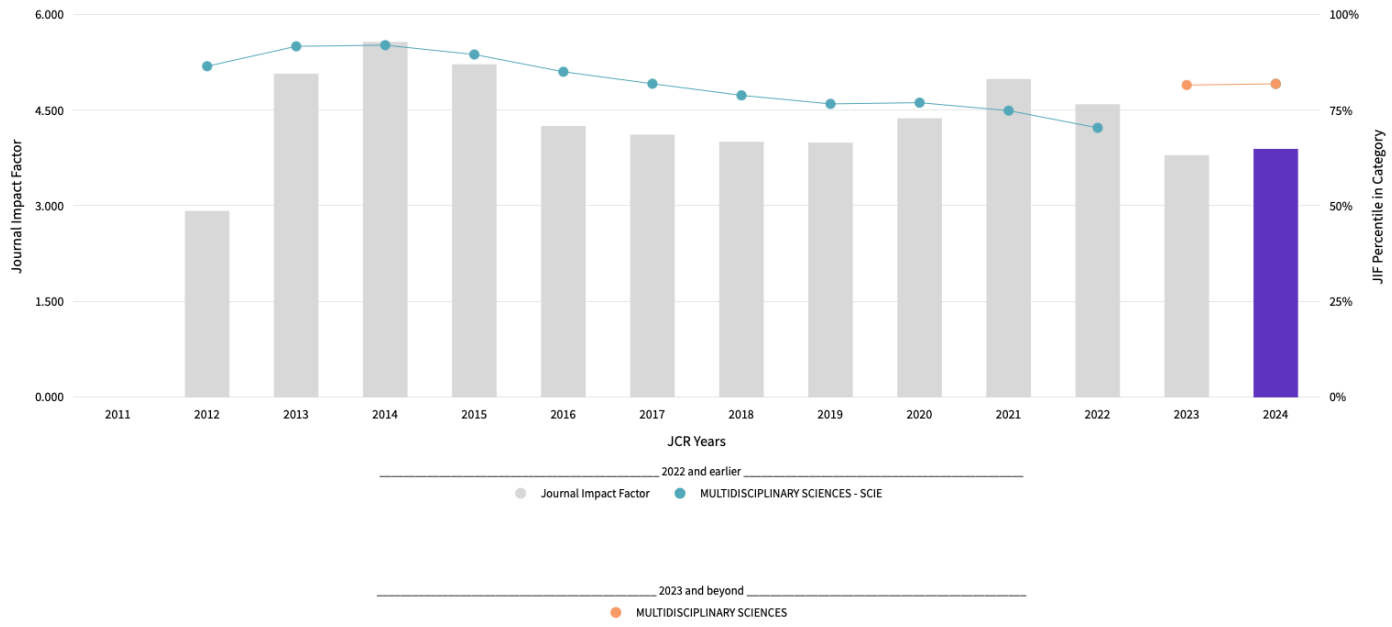

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CATEGORY

MULTIDISCIPLINARY SCIENCES

25/136

JCR YEAR	JIF RANK	QUARTILE	JIF PERCENTILE
2024	25/136	Q1	82.0
2023	25/134	Q1	81.7

Rank by JIF before 2023 for MULTIDISCIPLINARY SCIENCES

EDITION

Science Citation Index Expanded (SCIE)

JCR YEAR	JIF RANK	QUARTILE	JIF PERCENTILE
2022	22/73	Q2	70.5
2021	19/74	Q2	75.00
2020	17/72	Q1	77.08
2019	17/71	Q1	76.76
2018	15/69	Q1	78.99
2017	12/64	Q1	82.03
2016	10/64	Q1	85.16
2015	7/63	Q1	89.68
2014	5/57	Q1	92.11
2013	5/55	Q1	91.82
2012	8/56	Q1	86.61
2011	56/56	Q4	N/A

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CATEGORY

MULTIDISCIPLINARY SCIENCES

24/136

JCR YEAR	JCI RANK	QUARTILE	JCI PERCENTILE
2024	24/136	Q1	82.72
2023	23/135	Q1	83.33
2022	21/134	Q1	84.70
2021	19/135	Q1	86.30
2020	19/128	Q1	85.55
2019	17/126	Q1	86.90
2018	16/121	Q1	87.19
2017	12/115	Q1	90.00

