

Research on Tourism Development of Intangible Cultural Heritage Based on Game Theory and Three-Party Simulation

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Abstract—Intangible cultural heritage is not only a precious heritage of humans, but also an ancient and vivid historical and cultural tradition, which contains profound cultural values. In the process of development, the development of intangible cultural heritage tourism faces problems such as the inheritors' not actively inheriting, the government's failure to take corresponding incentives and interventions, and the over-development of intangible cultural heritage development enterprises. Starting from the stakeholders participated in the development of non-heritage tourism, this paper constructs three groups of evolutionary game models, studies the strategic evolution path of each subject, and uses simulation experiments to verify. The game results show that the size of the parameters determines the choice of the final strategy, and the strategic choices of the three players are interrelated. Only by taking precise measures from the perspective of different stakeholders, can be the efficiency and reasonable development of intangible cultural heritage tourism resources be achieved and the regional economic development be supported.

Keywords—intangible cultural heritage; stakeholders; evolutionary game; numerical simulation

I. INTRODUCTION

A. Research Objects

Intangible cultural heritage (ICH) refers to various practices, performances, forms of expression, knowledge systems and skills as well as related tools, objects, handicrafts and cultural sites that are regarded as their cultural heritage by various groups, organizations and sometimes individuals¹. Chinese traditional culture has a strong influence in the world. According to statistics, the total number of China's world-class ICH reached 39 items in 2016, ranking first in the world. However, with the acceleration of modernization and urbanization, many regions have begun to develop ICH for tourism. China's brilliant ICH is facing

unprecedented impact, and many ICH projects are on the verge of extinction. Therefore, it is very urgent to strengthen the protection of ICH resources while carrying out tourism development and promoting regional economic development.

B. Research Purpose

In this context, in order to realize the efficient and rational development of ICH tourism resources, the ultimate purpose of this paper is to find the best cooperation strategy among the inheritors, the government and the ICH tourism development enterprises by using the evolutionary game theory to establish a model and carry out simulation experiments, and then provide feasible suggestions for the scientific protection and tourism development of ICH.

C. Research Methods

Methods of literature analysis. Based on collecting relevant literature, summarizing the existing theoretical research results, this paper classifies the stakeholders in the protection and development of ICH, and summarizes their rights and interests.

Induction and deduction's method. On the basis of consulting a large number of literature materials and development examples and combining with certain theories, this paper uses inductive deduction method to elaborate the complicated relationship and benefit pattern, the evolution of benefit relationship and the benefit coordination mechanism among the benefit subjects of ICH development.

Game theory analysis method. By establishing a dynamic game model, this paper expounds the non-cooperative game relationship and its benefit pattern among various stakeholders, and analyzes the interactive process and results of the behavior of stakeholders in the development of ICH.

Interdisciplinary research approach. This paper comprehensively applies the relevant knowledge of western

economics, management, tourism and other disciplines to conduct research, and deeply analyzes the interest relationship among various stakeholders in the process of the protective development of ICH.

D. Literature review

In recent years, with the deepening of people's understanding of ICH tourism issues, the protection and development of ICH have gradually become a hot issue. Domestic scholars have long studied the issue of ICH tourism development. Only when we have a clear understanding of the concept and connotation of intangible cultural heritage can we better study the protective development of intangible cultural heritage. Bingan Wu defined and interpreted the concept of intangible cultural heritage proposed by the United Nations in "Theory and Method of Intangible Cultural Heritage Protection" [1]. In terms of the development methods of ICH, Jingyan Luo and Yixuan Wang took Tianjin as an example and proposed combining the innovation of tourism products and ICH on the premise of inheriting and protecting ICH from the perspective of consumers [2]. Xi Chen believes that ICH can be developed in the process of protection, and progress can be used to promote protection. In this way, it can not only expand its popularity, but also obtain economic income, which can realize a benign interaction between protection and development [3]. In the aspect of game analysis of ICH stakeholders, Xuelling Jiang selected the government, inheritors and tourism enterprises and other game players to study, and discussed the best strategies of the ICH stakeholders in the development and protection process [4]. Zhaolin Zhang believes that the correct treatment of the game between various forces will help to maximize the benefits of ICH protection [5]. Yijie Wang and Wanqing Lv selected three stakeholders, government agencies, ICH development enterprises and ICH inheritors, and studied the strategic influence mechanism between the game subjects of "government agencies - ICH development enterprises" and "ICH development enterprises - ICH inheritors" by constructing two groups of evolutionary game models [6]. Qian Luo and Hua Peng took Xiangxi as an example, based on the perspective of tourism, combined with game theory to discuss the optimal cooperation mode between game subjects in the process of ICH protection development [7]. In terms of tourism development of ICH, Dehui Wang believes that the living inheritance of ICH and tourism development can promote the common development of culture and economy [8]. Huqing Ling believes that ICH with obvious economic attributes can give birth to new industries, such as service industries and tourism. The protective development of ICH through tourism has become an imperative choice for inheriting and carrying forward the traditional Chinese culture of ICH and driving the development of local culture and economy [9]. The above research provides us with reference. Based on the above results, it can be seen that most of the research on the behavior of stakeholders in the process of ICH tourism development still stays in a static and single perspective. Besides, they lack dynamic and multi-party game analysis. However, static and single research perspective still has defects in applicability and science.

In terms of protection, Suxia Zhang discussed in detail the protection objectives, principles and measures from five angles: Local government, tourism enterprises, tourists, community residents and heritage inheritors [10]. Wei Mou and Qi Li believe that the immateriality of ICH makes it difficult for the government to take into account both the inheritance consciousness of inheritors and the living conditions of material representatives of cultural heritage when formulating protective strategies [11]. Shaojun Lv and others discussed it from the perspective of inheritors, pointing out that it is necessary to adjust the problems between the inheritors' own wishes and inheritance protection [12]. In the application of evolutionary game theory to study the development of ICH, Hongxing Dang and Xueguo Gong have studied the dynamic game of ICH protection and utilization, and the focus of the game is on the inheritors, cultural space and inheriting people and culture space [13]. Xinglin Fang constructed a tripartite evolutionary game model of inheritance and protection among government, enterprises and inheritors, and came to the conclusion that self-interest can be maximized by constantly adjusting strategies [14]. In the sense of protection, Fengjun Cui proposed that ICH has the function of tourism industry business card, and pointed out that ICH has the characteristics of tourism brand effect, and tourism is the main means and channel for rescuing and protecting ICH [15].

Foreign scholars have long studied the protection and development of ICH. In terms of protection, Susan O. Keitumetse considers the protection of ICH from the perspective of community people, and thinks that it is beneficial to the sustainable development of ICH to link community interaction with cultural resources at the social and resource management levels [16]. By investigating the interest groups in mountain scenic spots, Hudson pointed out that if we want to realize the respective interests of the groups, we must ensure barrier-free communication among the interest groups [17]. Rex Nettleford discussed a series of threats to the protection of ICH and suggested that the government should focus on the dynamic value of ICH [18]. In terms of protection means, Francesca Cominelli and Xavier Greffe put forward that ICH has the characteristics of both private heritage and social public resources. In order to enhance the status and influence of ICH in the whole society, innovative factors such as scenic spot tourism, national cultural performances and free art teaching can be integrated [19]. Alexis Celeste Bunten, through a case study of cultural tourism enterprises owned by Native Americans in Alaska, explored how to protect ICH from the threat of commercialization of tourism development enterprises and prevent ICH from being effectively protected due to over-exploitation [20]. In terms of protection significance, Tuttur Lusetyowati analyzed the adverse effects of tourism on ICH, and thought that tourism of ICH should be developed cautiously and moderately [21]. Some foreign scholars have realized that the development of ICH should be based on maintaining its authenticity, and it is necessary to prevent enterprises from over-commercializing ICH and losing its original historical and cultural value.

E. Evolutionary Game Theory

Evolutionary game theory originated from genetic biology. It is different from the static analysis of traditional game theory. Evolutionary game theory focuses on the dynamic process of the game. In the process of the dynamic game, it often reaches the ideal state after many times of trial and error, that is, evolutionary stability strategy (ESS) proposed by Maynard Smith and Price. The so-called ESS refers to that under the condition of natural selection, if most individuals in the group adopt stable strategies, the decisions of other small mutation individuals cannot affect the group that adopts stable strategies. However, these small mutant individuals tend to change the strategy to a stable strategy to prevent elimination. Evolutionary game theory is widely used in various academic fields. Although scholars in China have used the evolutionary game theory to study the development of ICH tourism, no one has conducted an in-depth and systematic analysis. In the past, there were few dynamic studies using evolutionary game analysis, most of which only select one or two stakeholders for game analysis, and there are few comprehensive studies on more stakeholders, let alone systematic numerical simulation analysis.

F. Innovation

Based on the theoretical basis of evolutionary game, this paper comprehensively examines the stakeholders of ICH tourism development and constructs three groups of evolutionary game models. This paper will also deeply explore the interest appeals among local government agencies, ICH inheritors and ICH tourism development enterprises, and guide all parties to balance the relationship between profit-seeking behavior and ICH protection. Considering that when the strategies of both parties in the game are beneficial to the research object, it may have the effect of " $1+1>2$ ", the parameter of "excess return" is introduced into the three groups of models, and the numerical simulation experiment is carried out with Matlab. In addition, the strategy change mechanism of stakeholders is deeply analyzed, so as to provide fresh ideas for the realization of ICH tourism development and protection. At the same time, put forward comprehensive suggestions and countermeasures for the ICH protection tourism development.

II. EVOLUTIONARY GAME ANALYSIS OF GOVERNMENT AGENCIES AND ICH INHERITORS

A. Analysis of Game Subject

Government agencies play a major role in the development of ICH tourism. If the inheritor does not inherit ICH or does not actively inherit it, government agencies need to take measures to intervene. Inheritor is the core role of inheriting ICH, and to a certain extent can often determine the survival of ICH. When there are difficulties in inheritance, the government needs to provide corresponding financial support. Based on the above game subjects, we have established an evolutionary game model of "government agencies and ICH inheritors". In the development of ICH tourism, the government must give full play to its leading position and play

a major role. When the ICH development enterprise conducts tourism development activities on ICH, in order to prevent the ICH activities of the enterprise from being unable to be held as scheduled due to difficulties in inheritance, government agencies can take to formulate policies and regulations, establish the corresponding management mechanism and management means such as increase subsidies for inheritors into, so as to fully coordinate the relationship between the enterprise and the inheritors. From the perspective of inheritors, there are several main reasons why they fail to actively inherit the ICH projects they have mastered: First, the social development has made the inheritors' life concept begin to change, and the inheritors' thoughts have gradually moved towards modernization. For example, they are no longer willing to wear the national costume with cultural flavor in daily life. Second, most of the ICH inheritors are old. Almost all young people with inheritance ability have stable jobs. They are not prepared to spend time on ICH and have limited energy to actively inherit ICH. Third, there is the absence of motivation for inheritance. If they just blindly inherit, they will see no results in the short term. Fourth, there is a lack of raw materials. Because of the changes of the time, the ICH embodied in physical objects ceases to be inherited due to lack of raw materials. Therefore, only when they obtain certain incentives and financial support can they be more inclined to spend time and energy to inherit ICH. Based on the above reality, we have established an evolutionary game model of "government agencies and ICH inheritors".

B. Model Assumptions and Parameter Setting

In the game process, government agencies and inheritors need to try and make mistakes to achieve the optimal set of strategies for ICH tourism development. In the dynamic system constructed by the two, ESS is finally realized after long-term adjustment. Therefore, before introducing the replicated dynamic equations into the model for analysis, the model assumptions must be done first.

Whether government agencies take support and incentive measures are crucial to the development of ICH. The government can take appropriate management measures or no measures to inheritance and development of ICH. Among them, "incentive" means that the government is prepared to manage the development of ICH by making policies and improving relevant laws and regulations, while "non-incentive" means that the government does not take measures to develop ICH. The inheritance attitude of the inheritors can be divided into active inheritance and inactive inheritance. "Active inheritance" means that the inheritor is willing and takes practical actions to inherit ICH, and "inactive inheritance" means that the inheritor is unwilling or unable to take steps to inherit ICH. If the inheritor adopts the strategy of "active inheritance", it helps to the smooth progress of related tourism projects of ICH development enterprises. The following assumptions exist:

According to the decision-making of the government and the inheritors, four sets of strategies were formed, namely {government incentives, inheritors actively inherit}, {government incentives, inheritors not actively inherit}, {government doesn't incentivize, inheritors actively inherit},

and {government doesn't incentivize, inheritors not actively inherit}.

Assumption 1. The main subjects of the game are government agencies and ICH inheritors. In the game between the government agencies and ICH inheritors, two subjects both show bounded rationality. In the game between the government agencies and ICH inheritors, the two subjects both show bounded rationality. The government's strategy set is {incentive, non-incentive}, and the inheritors' strategy set is {active inheritance, not active inheritance}.

Assumption 2. The proportion of the government's choice of "incentive" management means and "non-incentive" management means is x and $1-x$ respectively, $0 \leq x \leq 1$. The proportion of "inheritance" and "non-inheritance" chosen by the inheritors is y and $1-y$ respectively, $0 \leq y \leq 1$.

Assumption 3. When the strategy combination is {the government adopts incentive policies, inheritors actively inherit}, it is the most effective for the development of ICH tourism and will generate excess revenue R_0 . Set the distribution coefficient of excess revenue as P ($0 \leq p \leq 1$), which represents the proportion of excess income earned by the government, then the excess income of the government is pR_0 , and the excess income obtained by the inheritors is $R_0(1-p)$. When the strategy combination is {the government does not incentivize, the inheritor does not actively inherit}, only the initial income is obtained.

Assumption 4. When the government adopts an "incentive" strategy, set the management cost paid by the government to C_1 . The cost is recorded as C_2 when the government adopts "no incentive" measures. Because the ICH has precious historical value, cultural value and economic value in essence, it can bring sustainable benefits to the society through reasonable development under the premise of protection. But not paying attention to it will inevitably lead to a decline in revenue until the revenue is zero. Assume that the government's initial benefit is R_G and the inheritor's initial benefit is R_I .

Assumption 5. Most inheritors have their own jobs, and they inherit ICH will bring them opportunity cost C_4 . When the government adopts non-incentive policies and the inheritors do not actively inherit, the cultural loss of the government is recorded as M .

Refer to Table 1 for specific parameter settings:

Table 1. Parameter setting and significance of game subject

Game subject	Parameter	Interpretation of Strategy Indicators
Government	C_1	Management costs of adopting incentive policies
	C_2	The loss caused by the government's non-incentive strategy
	M	Cultural loss when the government adopts a non-incentive strategy and the inheritors adopt the inactive inheritance strategy
	R_1	Regular benefits when adopting incentive strategies

	pR_0	Excess return
	R_G	Initial income
Inheritor	C_3	The additional expenditure of ICH inheritors when the government does not adopt incentive strategies
	C_4	The opportunity cost
	R_1	Initial income
	R_2	Inheritance subsidy
	$R_0(1-p)$	Excess return

According to the basic assumptions and parameter settings, the income matrix of government agencies and ICH inheritors can be obtained as follows:

Table 2. Income matrix of government agencies and ICH inheritors

	The ICH inheritors actively inherit (y)	The ICH inheritors do not actively inherit (1-y)
The government do incentivize (x)	$R_G + pR_0 + R_1 - C_1, R_1 + R_2 + R_0(1-p) - C_4$	$R_G + R_1 - C_1, R_1$
The government does not incentivize (1-x)	$R_G - C_2, R_1 + R_2 - C_3 - C_4$	$R_G - C_2 - M, R_1 - C_3$

C. Construction and analysis of evolutionary model

i) Write down the replicated dynamic equation

Replicated dynamic equation is an important analytical tool in evolutionary game models. Its basic principle is that under the condition of bounded rationality, with the increase of time, the players gradually tend to choose a strategy that is better than the average result. On an individual basis, individuals increase the number of individuals who adopt dominant strategies by mimicking more successful strategies. As for the group, the group was adjusted according to the proportion of the selected strategies, and the strategy that was most beneficial to the group and the subjects was adopted. All of the above are presented as differential equations.

According to the above assumptions, the expected revenue of the government's choice of "incentive" means are:

$$E_A = y(R_G + pR_0 + R_1 - C_1) + (1-y)(R_G + R_1 - C_1) = ypR_0 + R_G + R_1 - C_1 \quad (1)$$

The expected revenue of the government's choice of "non-incentive" means are:

$$E_B = y(R_G - C_2) + (1-y)(R_G - C_2 - M) = -(1-y)M + R_G - C_2 \quad (2)$$

Then the average expected revenue of the government is:

$$\bar{E}_{AB} = xE_A + (1-x)E_B \quad (3)$$

In the same way, it can be seen that the expected revenue of the ICH inheritors who choose to "actively inherit" are:

$$\begin{aligned}
 E_C &= x[R_1 + R_2 + R_0(1-p)] + (1-x)(R_1 + R_2 - C_3 - C_4) \\
 &= x[R_0(1-p) + C_3 + C_4] + R_1 + R_2 - C_3 - C_4
 \end{aligned}
 \tag{4}$$

The expected revenue of the ICH inheritors who choose to "not actively inherit" are:

$$E_D = xR_1 + (1-x)(R_1 - C_3) = R_1 - (1-x)C_3 \tag{5}$$

Then the average expected revenue of the inheritors is:

$$\bar{E}_{CD} = yE_C + (1-y)E_D \tag{6}$$

According to the Malthusian dynamic equation, the growth rate of the government's number of strategies is:

$$\Delta E_{AB} = E_A - \bar{E}_{AB} \tag{7}$$

If time is assumed to be t, the government's replicated dynamic equation is:

$$\begin{aligned}
 F(x) &= \frac{dx}{dt} = x\Delta E_{AB} = x(E_A - \bar{E}_{AB}) = x(1-x)(E_A - E_D) \\
 &= x(1-x)[y(pR_0 - M) + R_1 - C_1 + M + C_2]
 \end{aligned}
 \tag{8}$$

Similarly, the growth rate of the number of ICH inheritors' strategies is:

$$\begin{aligned}
 F(y) &= \frac{dy}{dt} = y\Delta E_{CD} = y(E_C - \bar{E}_{CD}) = y(1-y)(E_C - E_D) \\
 &= y(1-y)\{x[R_0(1-p) + C_4] + R_2 - C_4\}
 \end{aligned}
 \tag{9}$$

Construct a system of replicated dynamic equation for government agencies and ICH inheritors:

$$\begin{cases}
 F(x) = \frac{dx}{dt} = x(1-x)[y(pR_0 - M) + R_1 - C_1 + M + C_2] \\
 F(y) = \frac{dy}{dt} = y(1-y)\{x[R_0(1-p) + C_4] + R_2 - C_4\}
 \end{cases}
 \tag{10}$$

$$\text{Assume that } F(x) = \frac{dx}{dt} = 0, \tag{11}$$

$$F(y) = \frac{dy}{dt} = 0. \tag{12}$$

The optimal solution in this system is obtained as $x^*=0, x^*=1, y^*=0, y^*=1$

$$x^*2 = \frac{C_4 - R_2}{R_0(1-p) + C_4}, y^*2 = \frac{C_1 - C_2 - R_1 - M}{pR_0 - M}$$

Therefore, 5 equilibrium points are obtained. $(0,0), (0,1), (1,0), (1,1), \left(\frac{C_4 - R_2}{R_0(1-p) + C_4}, \frac{C_1 - C_2 - R_1 - M}{pR_0 - M}\right)$

ii) Stability analysis of equilibrium points

With the help of Jacobi matrix, the evolutionary stability of the dynamic system composed of government and inheritance is analyzed. Assume that the Jacobi matrix is J.

$$\begin{aligned}
 J &= \begin{bmatrix} A_{11} & A_{12} \\ A_{21} & A_{22} \end{bmatrix} = \begin{bmatrix} \frac{\partial F(x)}{\partial x} & \frac{\partial F(x)}{\partial y} \\ \frac{\partial F(y)}{\partial x} & \frac{\partial F(y)}{\partial y} \end{bmatrix} \\
 &= \begin{bmatrix} (1-2x)[y(pR_0 - M) + R_1 - C_1 + M + C_2] & x(1-x)(pR_0 - M) \\ y(1-y)[R_0(1-p) + C_4] & (1-2y)\{x[R_0(1-p) + C_4] + R_2 - C_4\} \end{bmatrix}
 \end{aligned}
 \tag{13}$$

Conditions for evolutionary equilibrium points: $Det(J) > 0$ and $Tr(J) < 0$. Substitute the desired equilibrium point into the Jacobian matrix J and obtain the corresponding $Det(J), Tr(J)$. The results obtained are shown in Table 3.

Table 3. The $Det(J)$ and $Tr(J)$ of the Jacobian matrix in the game dynamic system between the government agencies and ICH inheritors

Equilibrium points	Det(J)	Tr(J)
(0,0)	$(R_1 - C_1 + M + C_2)(R_2 - C_4)$	$R_1 - C_1 + M + C_2 + R_2 - C_4$
(0,1)	$-(pR_0 + R_1 - C_1 + C_2)(R_2 - C_4)$	$pR_0 + R_1 - C_1 + C_2 + (R_2 - C_4)$
(1,0)	$-(R_1 - C_1 + M + C_2)[(1-p)R_0 + R_2]$	$-(R_1 - C_1 + M + C_2) + (1-p)R_0 + R_2$
(1,1)	$(pR_0 + R_1 - C_1 + C_2)[(1-p)R_0 + R_2]$	$-(pR_0 + R_1 - C_1 + C_2) - [(1-p)R_0 + R_2]$
	$\left(\frac{C_4 - R_2}{R_0(1-p) + C_4}, \frac{C_1 - C_2 - R_1 - M}{pR_0 - M}\right)$	$(1-x)(1-y)(R_2 - C_4)(C_1 - C_2 - R_1 - M)$
		0

When the equilibrium point is $\left(\frac{C_4 - R_2}{R_0(1-p) + C_4}, \frac{C_1 - C_2 - R_1 - M}{pR_0 - M}\right)$, $Tr(J) = 0$. Therefore, this point is not the evolutionary stable point.

Discuss the local stability of the other four points (0,0), (0,1), (1,0), (1,1). The initial strategy hypothesis of both parties in the game is: $0 \leq x \leq 1, 0 \leq y \leq 1$. If the equilibrium point $\left(\frac{C_4 - R_2}{R_0(1-p) + C_4}, \frac{C_1 - C_2 - R_1 - M}{pR_0 - M}\right)$ is meaningful, then $C_4 - R_2 > 0$ is always true. The value range of the distribution coefficient p is: $0 \leq p \leq 1$. As a result, $(1-p)R_0 + R_2 > 0$ is always true. Combined with two conditions, four cases are discussed.

The first case: when $R_1 - C_1 + M + C_2 > 0$ and $pR_0 + R_1 - C_1 + C_2 > 0$, the value $Det(J)$ of the Jacobi matrix corresponding to the equilibrium point (1, 1) is a positive number, The value $Tr(J)$ of the matrix is a negative number, so the equilibrium point (1, 1) is ESS, which is an evolutionary stable strategy.

The second case: when $R_1 - C_1 + M + C_2 > 0$ and $pR_0 + R_1 - C_1 + C_2 < 0$, the $Det(J)$ of the Jacobi matrix corresponding to the four equilibrium points (0, 0), (0, 1), (1, 0) and (1, 1) is negative number, so these four equilibrium points must not be evolution-stable strategy.

The third case: when $R_1 - C_1 + M + C_2 < 0$ and $pR_0 + R_1 - C_1 + C_2 < 0$, the equilibrium point (0, 0) is ESS, which is an evolutionary stable strategy. The equilibrium point (1, 0) is an unstable point, it is not an evolutionary stable strategy.

The fourth case: when $R_1 - C_1 + M + C_2 < 0$ and $pR_0 + R_1 - C_1 + C_2 > 0$, the equilibrium point (0, 0) and equilibrium point (1, 1) are ESS, which is an evolutionary stable strategy.

Therefore, the results of the discussion are shown in Table 4:

Table 4. Discussion results of the values $Det(J)$ and $Tr(J)$ of the Jacobi matrix

Serial number	Condition	Equilibrium point	Det(J)	Tr(J)	The result
1	$R_1 - C_1 + M + C_2 > 0$ $pR_0 + R_1 - C_1 + C_2 > 0$	(0,0)	-	\pm	Unstable point
		(0,1)	+	+	
		(1,0)	-	\pm	ESS
		(1,1)	+	-	
2	$R_1 - C_1 + M + C_2 > 0$ $pR_0 + R_1 - C_1 + C_2 < 0$	(0,0)	-	\pm	Unstable point
		(0,1)	-	-	
		(1,0)	-	\pm	ESS
		(1,1)	-	\pm	
3	$R_1 - C_1 + M + C_2 < 0$ $pR_0 + R_1 - C_1 + C_2 < 0$	(0,0)	+	-	Unstable point
		(0,1)	-	-	
		(1,0)	+	+	ESS
		(1,1)	-	\pm	
4	$R_1 - C_1 + M + C_2 < 0$ $pR_0 + R_1 - C_1 + C_2 > 0$	(0,0)	+	-	Unstable point
		(0,1)	-	+	
		(1,0)	+	+	ESS
		(1,1)	+	-	

When the two players of the game reach the ESS at point (0,1), the two strategies will eventually evolve into the fact that the government does not take any means at all, and the ICH inheritors will continue to inherit. In the same way, when the point (1, 0) reaches the ESS, the two strategies will eventually evolve into the government completely adopting the incentive strategy, and the ICH inheritor adopting the completely non-inheriting strategy, which is inconsistent with the actual situation. When both sides of the game reach ESS at point (0,0), the two strategies eventually evolve into the strategy that the government does not adopt incentive strategy and the inheritors do not inherit intangible heritage; Similarly, when ESS is reached at point (1,1), the two strategies eventually evolve into the government completely adopting the incentive strategy and the inheritors completely adopting the strategy of inheriting ICH. This situation is closer to reality.

In conclusion, in the fourth case, under the conditions of $R_1 - C_1 + M + C_2 < 0$ and $pR_0 + R_1 - C_1 + C_2 > 0$, the strategies of both sides of the game reach ESS at (0,0) and (1,1), namely, the evolutively-stable strategy is reached.

D. Numerical Simulation Analysis

i) Parameter Measurement

Parameter calculation of government agencies and the ICH inheritors. With reference to the management cost of the agency, the management cost C_1 adopted by the government

includes government publicity costs, travel expenses for coordination work and consulting expenses. According to the interview survey, the publicity effect of color printing is better than black and white printing. Therefore, color leaflets and picture albums are chosen for publicity. If printing in different places, in addition to the cost of flyers and albums, it also needs to pay a certain transportation cost. If printing in the same city, it also needs to spend a certain time cost. Therefore, only the cost of printing leaflets and picture albums is considered, and the transportation cost is assumed to be equal to the time cost, which is ignored in order to facilitate subsequent research. Since too many or too few pages cannot achieve the best publicity effect, consider adopting a three-fold leaflet publicity method. According to the average quotation of major printing companies in the market, including freight, the unit price for printing tri-fold color flyers is 0.5 yuan/piece. Suppose that 20,000 leaflets are printed and the printing cost of the publicity album is 10,000 yuan, that is, the government's publicity cost is 10,000 yuan. As the ICH inheritors are distributed in all regions of the country, the average travel expense is 300 yuan per time. Assuming that the inheritance is negotiated with the inheritor 5 times a month, the annual travel expenses are about 18,000 yuan. If the consulting fee mainly in the form of telephone and Internet is 10,000 yuan/year, the government's management cost C_1 is about 38,000 yuan.

"Central transfer payments have doubled compared to 10 years ago," Chenyang Wang, director of the Intangible Cultural Heritage Department of the Ministry of Culture and Tourism, told the 21st Century Business Herald on June 10, 2021. "The annual subsidy for representative inheritors of national intangible cultural heritage will be raised from 10,000 yuan to 20,000 yuan per person." That is, the inheritance subsidy R_2 obtained by the inheritor for active inheritance is 20,000 yuan. The opportunity cost is calculated with the daily salary of the inheritor. Assuming that the annual salary of the inheritor is 120,000 yuan, the daily salary is 329 yuan. According to Article 44 of the Labor Law, if the laborers are arranged to extend their working hours, the work remuneration shall be no less than 150 percent of the salary. They can earn at least 493 yuan per day, and the extra overtime salary is at least 164 yuan per day, so they can earn at least 60,000 yuan per year. That is, the opportunity cost C_4 for the inheritor to inherit ICH is 60,000 yuan. It is assumed that the annual loss C_2 of no means adopted by the government, the regular income R_1 of means adopted by the government, and the excess income R_0 of the ICH tourism development are 7000-yuan, 5000 yuan and 70,000 yuan respectively. Meanwhile, assuming $p = 0.7$, the excess return pR_0 of the government is 4900 yuan, and the excess return $R_0(1 - P)$ of the inheritor is 2100 yuan. Intangible cultural heritage tourism belongs to the type of appreciation and experience. In the case of excluding the influence of other force majeure factors, it is assumed that the government does not take measures and the inheritors do not inherit the cultural loss M is about 20,000 yuan/year, as shown in Table 5.

Table 5. Data measurement table of government and inheritors

	Parameter	Data (unit: ten thousand yuan)
Government	C ₂	0.7
	C ₁	3.8
	M	2
	R ₁	0.5

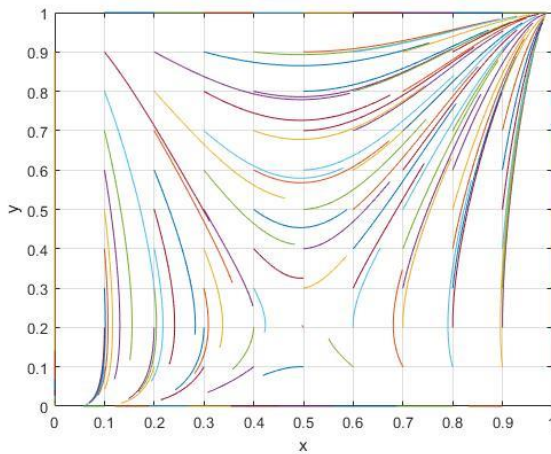
Inheritor	pR ₀	4.9
	C ₄	6
	R ₂	2
	R ₀ (1-p)	2.1

ii) The game process and simulation of government agencies and the ICH inheritors

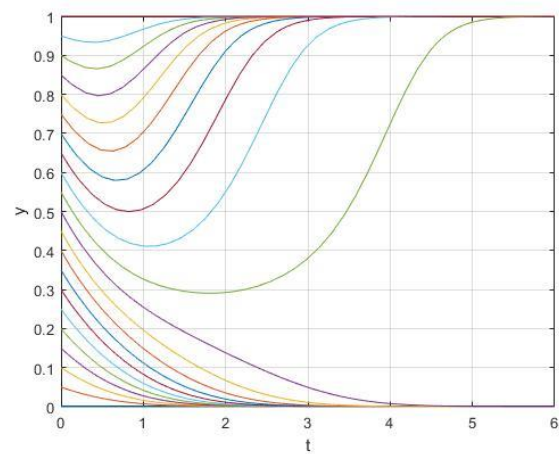
According to the calculation of the above parameters, the dynamic equation for replication of government agencies and the ICH inheritors is:

$$\begin{cases} F(x) = \frac{dx}{dt} = x(1-x)(2.9y-0.6) \\ F(y) = \frac{dy}{dt} = y(1-y)(8.1x-4) \end{cases} \quad (14)$$

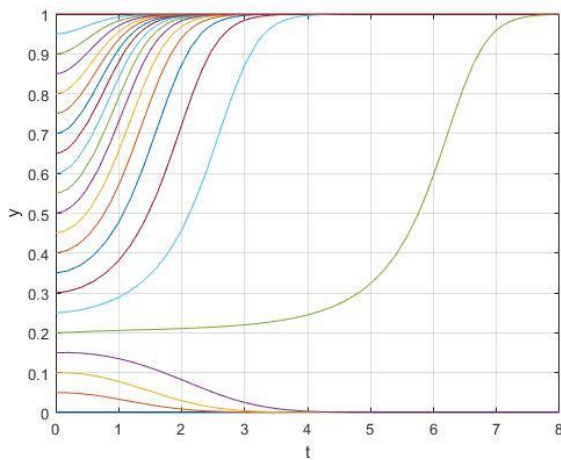
Enter the above equations and parameters into MATLAB R2019a, and run to get figure 1 a), b), c), and d). Assuming that the initial value of x is 0, the initial value of y is also 0, and the cycle step is 0.1, the strategy evolution path of the governments and the inheritors is shown in Figure b).



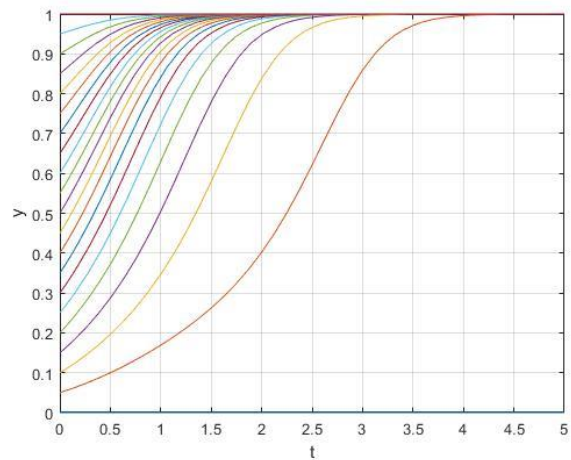
a) The dynamic evolution path of the game between the two parties



b) Evolutionary process of inheritor strategy (x=0.3)



c) Evolution process of successor strategy (x=0.5)



d) Evolution process of successor strategy (x=0.7)

Figure 1. Game simulation diagram of government agencies and inherited human bodies under initial parameters

E. Analysis of dynamic simulation results

As can be seen from Fig. 1 a), with the increase in the proportion of incentive measures adopted by the government, the probability of the inheritor to choose the active inheritance strategy will be greater, and the strategy evolution paths of both sides of the game will converge to the points (0,0) and (1, 1), reaching ESS. In the lower left area of the saddle point (0.49, 0.21), the evolution path of the two converges to (0,0). In the upper right area of the saddle point, the evolution path of the two converges to (1, 1). It is not difficult to see that the area of the upper right area of the saddle point is significantly larger than the area of the lower left area. Therefore, the probability of the game process eventually evolving to the point (1,1) is higher. At this time, the set of strategies reached by both parties of the game {the government adopts incentives means, the inheritors choose to inherit} is the most beneficial for the ICH.

From b), c) and d) of Figure 1, it can be seen that when $x=0.3$, $y=0.54$. In other words, when the investment probability of incentive strategy implemented by government agencies reaches 30%, and if more than 54% of inheritors agree to actively inherit the ICH, the whole group of inheritors will accept the "inheritance" strategy and actively inherit the ICH. When $x=0.5$, $y=0.15$. This means that when 50% of the investment is invested in the incentive strategy implemented by the government, if more than 15% of the inheritors agree with the positive inheritance of ICH, the whole group of inheritors will choose the "positive inheritance" strategy. Similarly, when $x=0.7$, $y=0.05$. Therefore, when the probability of incentive strategy investment implemented by the institution reaches 70%, as long as more than 5% of the inheritors agree to inheritance of ICH, the whole group of inheritors will agree to adopt the strategy of "inheritance". It can be seen that the measures adopted by the government have a significant effect on the inheritance of ICH.

III. EVOLUTIONARY GAME ANALYSIS OF THE GOVERNMENT AND ICH DEVELOPMENT ENTERPRISES

As a national administrative agency, government agencies have the power to supervise and manage the ICH tourism development enterprises. However, ICH tourism development companies have a tendency to earn high profits. In order to avoid excessive development of ICH resources by tourism companies, while encouraging and supporting companies to develop tourism for ICH, the government can also establish a punishment mechanism to restrain tourism companies' improper behavior. Based on the above game subjects, an evolutionary game model of government agencies and ICH development enterprises is established.

A. Model assumptions

The strategy of government agencies is: supervision and non-supervision. The strategies of ICH development companies are: protective development and over-development. The following assumptions exist:

Assumption 1. The main players of the game are the government and ICH development enterprises. In the game between the government and ICH development enterprises, the degree of rationality is manifested as bounded rationality. The government's strategy set is {supervision, no supervision}, and the strategy set of ICH development enterprises is {protective development, overdevelopment}.

Assumption 2. The ratio of the government's choice of "supervised" strategy and "non-supervised" strategy is m and $1-m$ respectively, $0 \leq m \leq 1$. The proportion of ICH development enterprises choosing "protective development" and "over-development" is n and $1-n$ respectively, $0 \leq n \leq 1$.

Assumption 3. There are four strategy combinations in the game model, namely {government supervision, enterprise protective development}, {government no supervision, enterprise protective development}, {government supervision, enterprise overdevelopment}, {government no supervision, enterprise overdevelopment}. When the strategy combination is {government supervision, enterprise protective development}, the protective tourism development of ICH is the most effective and will produce excess income, which is recorded as S_0 . Assuming that the distribution coefficient is Q , $0 \leq Q \leq 1$. It represents the proportion of excess income earned by government agencies. Then, the excess return of the government is qS_0 , and the excess return of the enterprise is $S_0(1-q)$. When the strategic combination is that the government does not supervise and the ICH development enterprises overdevelop, the ICH resources will be damaged, and the government will suffer some additional losses, such as administrative punishment for the directly responsible personnel of the government agencies. Set the additional loss to the government as W .

Assumption 4. When the government agency chooses the "supervision" strategy, the supervision cost paid by the government is recorded as H , and the reputation benefit of the government is recorded as B_1 . When the government chooses the "no supervision" strategy, the reputation loss caused by public opinion is recorded as G_1 . When the government chooses the strategy of "supervision" and the enterprise chooses the strategy of overdevelopment, the fine collected by the government from the tourism development enterprise is assumed to be K .

Assumption 5. The profits of the enterprise's protective development and over-development of ICH are denoted as U_1 and U_2 respectively, the cost of the ICH development enterprise's protective development of ICH is denoted as D , the reputation loss caused by the enterprise's excessive development due to public opinion is denoted as G_2 , and the reputation profit generated by the ICH development enterprise's protective development is denoted as B_2 .

B. Parameter setting and numerical simulation

The government's supervision cost H includes the salary of supervisors, training fees, and system costs. Through visits and investigations, the salary of supervisors is about 200 yuan/day, which is 72,000 yuan/year. The government's training cost for supervisors is about 2,000 yuan, the cost of formulating rules and regulations is 1,000 yuan, so the supervision cost is about 75,000 yuan per year. According to online surveys, the lowest ticket price of various theaters in domestic cities averages 80 yuan per person, and each theater can accommodate about 200 people. Hypothesis: 125 people actually watch the performance. Every year, tourism enterprises cooperate with local theaters for 3 ICH performances, and cooperate with 2 theaters. The company's annual income U_1 for the protection of intangible cultural heritage development in the local area is 60,000 yuan. The site rental fee for tourism enterprises is about 2,000 yuan/site, and other expenses are about 5,000 yuan in total, that is, the cost D of protective development for tourism enterprises is about 40,000 yuan. Suppose that tourism companies' over-exploitation of ICH benefits U_2 , protective development's reputation benefits B_2 , and over-development reputation losses G_2 are 66,000yuan, 15,000 yuan, and 15,000 yuan, respectively. And suppose: government-supervised reputation gain B_1 is 10,000yuan, unsupervised reputation loss G_1 is 11,000 yuan, the over-exploitation fine K charged to tourism companies under supervision is 20,000 yuan, and the unsupervised and over-exploited additional loss W is 20000 yuan. When the excess income S_0 is 70,000 yuan and the distribution coefficient q is set to 0.7, the government's excess income qS_0 is 49,000 yuan, and the intangible heritage development enterprise's excess income $S_0(1-q)$ is 21,000 yuan. As shown in Table 6.

Table 6. Parameter settings and significance of government agencies and ICH development enterprises

	Parameter	Data (unit: ten thousand yuan)
Government	H	7.5
	B_1	1
	G_1	1.1
	K	2
	qS_0	4.9

	W	2
	U_1	6
	B_2	1.5
	U_2	6.6
	D	4
The ICH Tourism Development Enterprise	G_2	1.5
	K	2
	$S_0(1-q)$	2.1

According to the basic assumptions and parameter settings of the model, the income matrix of the government and the ICH development enterprises can be obtained, as shown in Table 7.

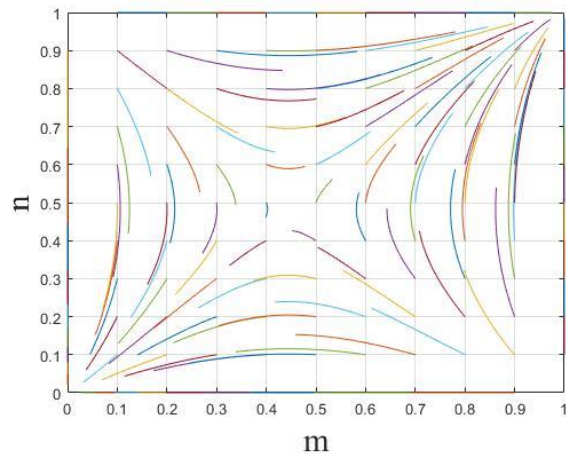
Table 7. Income matrix of government and the ICH tourism development enterprises

	The enterprises choose protective development (n)	The enterprises choose to over-exploit (1-n)
The government do supervise (m)	$qS_0+B_1-H, S_0(1-q)+U_1-D+B_1$	$K+B_1-H, U_2-G_2-K$
The government does not supervise (1-m)	$-G_1, U_1-D+B_2$	$-G_1-W, U_2-G_2$

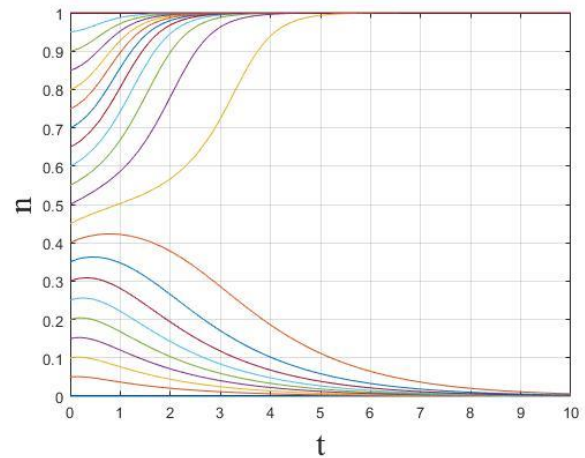
According to the calculation of the above parameters, the replication dynamic equation of the government and ICH tourism development enterprises is:

$$\begin{cases} F(m) = \frac{dm}{dt} = m(1-m)(2.9n-1.4). \\ F(n) = \frac{dn}{dt} = n(1-n)(3.6m-1.6) \end{cases} \quad (15)$$

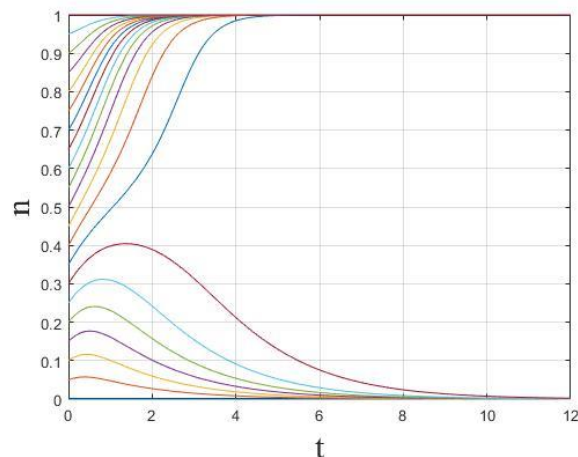
Input the above equations and parameters into MATLAB R2019a, and run to get Figures a), b), c), d). It is assumed that the initial value of M is 0, the initial value of N is also 0, and the cyclic step is 0.1. The evolutionary path of both the government and tourism enterprises is shown in Figure a). When the probability that the government chooses the supervision strategy is different, analyze the strategy changes of the ICH tourism enterprises. Set the step length to 0.05, and the strategy evolution path of tourism enterprises is shown in Figure b), c), and d).



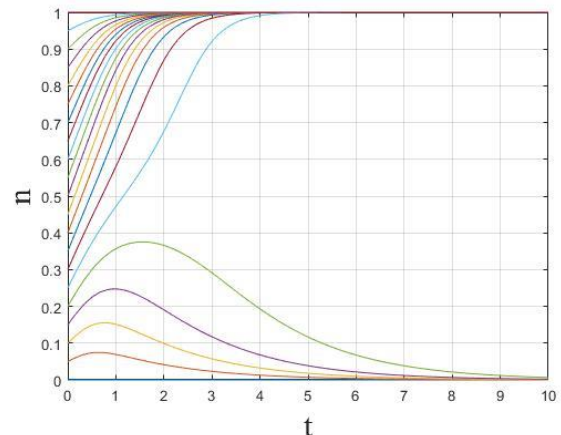
a) The dynamic evolution path of the game between the two parties



b) The strategy evolution process of the ICH tourism development enterprises ($m=0.3$)



c) The strategy evolution process of the ICH tourism development enterprises ($m=0.5$)



d) The strategy evolution process of the ICH tourism development enterprises ($m=0.7$)

Figure 2. Game simulation diagram between government and ICH tourism development enterprises under initial parameters

C. Analysis of dynamic simulation results

It can be seen from figure 2 a) that, with the increase of the proportion of government supervision strategies, the probability of intangible cultural heritage tourism development enterprises to choose protective development strategies will be greater. The evolutionary paths of the two sides of the game converge to the points (0,0) and (1,1), reaching the ESS.

In the lower left region of the saddle point (0.44,0.48), the evolutionary paths of strategies of both sides converge to point (0,0). However, in the upper right region of the saddle point (0.44,0.48), the evolutionary paths of the two sides of the game converge to point (1,1). The calculation shows that the area of the lower left region of the saddle point (0.44,0.48) is less than the area of the upper right region of the saddle point. Therefore, there is a higher probability that the game process will eventually evolve to point (1,1). At this time, the strategy set {government supervision, the ICH tourism enterprises' protective development} reached by both sides of the game is the most favorable for ICH.

It can be seen from b), c) and d) in Figure 2 that when $m=0.3$, $n=0.55$. In other words, when the government invests 30% in supervision, and if more than 55% of ICH tourism development enterprises approve of protective development, the whole group of ICH tourism enterprises will agree to adopt the strategy of "protective development". When $m=0.5$, $n=0.4$, that is, when the probability of government supervision is 50%, if more than 40% of the ICH tourism development enterprises agree to the protective development of ICH, then the entire ICH tourism development enterprise group will agree "Protective development" strategy. Similarly, when $m=0.7$, $n=0.2$, that is, when the probability of government supervision reaches 70%, as long as more than 20% of ICH tourism development enterprises agree to protect ICH, then the entire ICH tourism development enterprise group will agree to adopt a "protective development" strategy. It can be seen that the government's supervision strategy has achieved remarkable results in the development of ICH protection tourism.

IV. EVOLUTIONARY GAME ANALYSIS OF ICH TOURISM DEVELOPMENT ENTERPRISES AND INHERITORS

In order to pursue higher interests, the ICH tourism development enterprises not only have the possibility of excessive development, but also may adopt the situation of unreasonable income distribution. The reason why inheritors cooperate with the ICH tourism development enterprises is not only to inherit China's precious ICH, but also to obtain certain economic benefits. If the ICH tourism development enterprises do not distribute income reasonably, the inheritors' enthusiasm for cooperation will be reduced. Based on the above game subjects, the evolutionary game model of ICH tourism development enterprises and inheritors is established.

A. Model assumptions

Strategies of ICH tourism development enterprises are: reasonable and unreasonable distribution of income. The inheritors' strategy is: cooperate and not cooperate. The following assumptions exist:

Assumption 1. The main body of the game is the intangible cultural heritage tourism development enterprises and inheritors. In the game of the two game subjects, the degree of rationality is shown as bounded rationality. The strategy set of intangible cultural heritage tourism development enterprises is {reasonable income distribution, unreasonable income distribution}, and the strategy set of inheritors is {cooperation, non-cooperation}.

Assumption 2. The proportions of ICH tourism development enterprises choosing the strategy of "reasonable distribution of income" and "unreasonable distribution of income" are a and $1-a$ respectively, where $0 \leq a \leq 1$. The ratios of inheritors who choose the "cooperative" strategy and the "non-cooperative" strategy are b and $1-b$ respectively, where $0 \leq b \leq 1$.

Assumption 3. When the strategic combination is {reasonable distribution of income by ICH tourism development enterprises, cooperation by inheritors}, the protective development of ICH tourism will generate excess income F_0 . Assuming the distribution coefficient is e , where $0 \leq e \leq 1$, it represents the proportion of the excess income obtained by the ICH tourism development enterprise. The excess income of the enterprise is eF_0 , and the excess income obtained by the inheritor is $F_0(1-e)$.

B. Parameter settings and numerical simulation

According to the parameter calculation of the evolutionary game model of "government agency-inheritor" above, the opportunity cost of the inheritor is C_4 , which is about 60,000 yuan. Assuming that the distribution coefficient e is 0.7, when the two parties' strategy set is {reasonable distribution of income by ICH tourism development enterprise, inheritor cooperation}, the excess income F_0 is 70,000 yuan, and the excess income of the ICH tourism development enterprise eF_0 is 49,000 yuan. The excess income obtained by the inheritor is $F_0(1-e)$ of 21,000 yuan. Assumptions: The ICH tourism

development enterprise collects a fine Q of 8,000 yuan from the inheritors, the income V_1 of reasonable income distribution is 20,000 yuan, the income V_2 of unreasonable income distribution is 55,000 yuan, and the reputation loss Z_1 of the ICH tourism development enterprise is 5,000 yuan. When the inheritor does not cooperate, the reputation loss Z_3 is 50,000 yuan, as showed in Table 8.

Table 8. Data calculation table of ICH tourism development enterprises and inheritors

	Parameter	Data (unit: ten thousand yuan)
	Q	0.8
The ICH Tourism Development Enterprise	V_1	2
	V_2	5.5
	Z_1	0.5
	eF_0	4.9
Inheritor	C_4	6
	Z_3	5
	Q	0.8
	$F_0(1-e)$	2.1

C. Dynamic simulation of ICH tourism development enterprises and inheritors

According to the basic assumptions and parameter settings of the model, the income matrix of ICH tourism enterprises and inheritors can be obtained, as shown in Table 9.

Table 9. Income matrix of ICH tourism development enterprises and inheritors

	The inheritor chooses to cooperate (b)	The inheritor does not cooperate (1-b)
Reasonable distribution of income by the enterprise (a)	$eF_0+V_1, T_1-C_4+F_0(1-e)$	$Q+V_1-Z_2, T_1-Z_3-Q$
Unreasonable distribution of income by the enterprise (1-a)	V_2-Z_1, T_2-C_4	$V_2-Z_1-Z_2, T_2-Z_3$

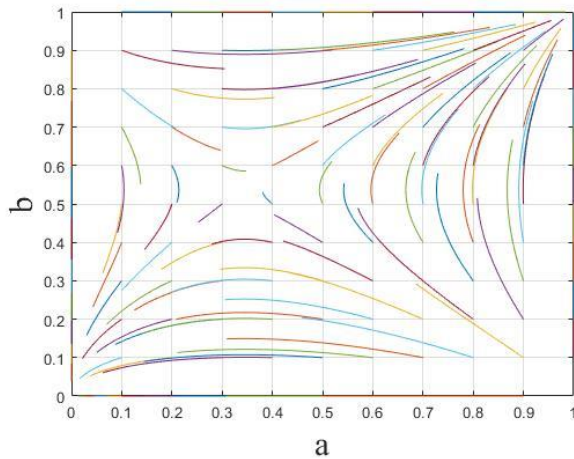
Based on the calculation of the above parameters, the dynamic equation for replication of the ICH tourism development enterprises and inheritors is:

$$\begin{cases} F(a) = \frac{da}{dt} = a(1-a)(4.1b-2.2) \\ F(b) = \frac{db}{dt} = b(1-b)(2.9a-1) \end{cases} \quad (16)$$

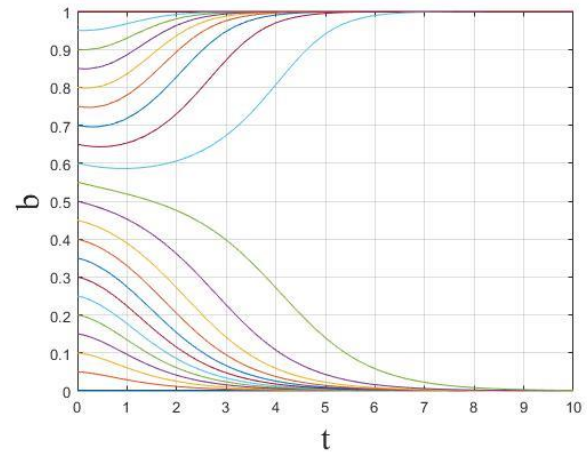
Enter the above equations and parameters into MATLAB R2019a, and run to get figures a), b), c), and d). Suppose the initial value of a is

0, the initial value of b is also 0, and the cycle step is 0.1. The strategy evolution path of both the ICH tourism development enterprise and the inheritor is shown in Figure a). Then simulate the different probabilities of ICH tourism development companies choosing the

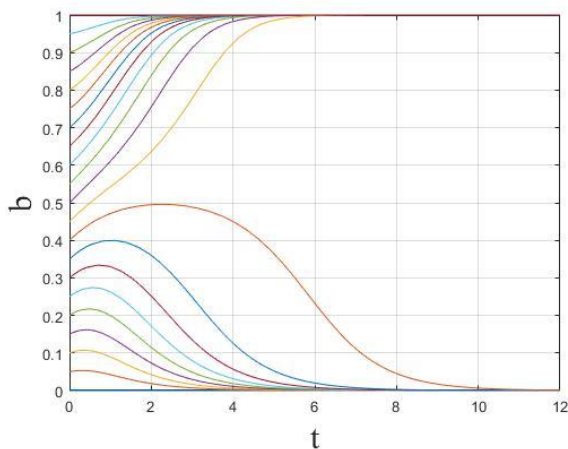
strategy of "reasonable distribution of income", analyze the change of the successor's strategy, set the step length to 0.05, and the successor's strategy evolution path as shown in b), c), and d).



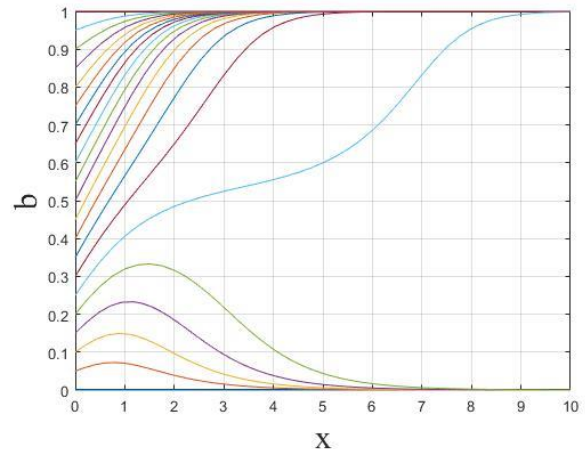
a) The dynamic evolution path of the game between the two parties



b) Evolution process of inheritors' strategies ($a=0.3$)



c) Evolution process of inheritors' strategies ($a=0.5$)



d) Evolution process of inheritors' strategies ($a=0.7$)

Figure 3. Evolutionary game simulation of intangible cultural heritage tourism development enterprises and inheritors

D. Analysis of dynamic simulation results

It can be seen from Fig.3 a) that as the probability of ICH tourism development enterprises choosing the strategy of "reasonable income distribution" increases, the probability of inheritors choosing the strategy of "cooperation" increases. The strategy evolution paths of both sides of the game converge to the points (0,0) and (1,1), reaching the ESS. In the lower left region of the saddle point (0.34,0.53), the evolutionary path of the two strategies converges to point (0,0). In the upper right region of the saddle point (0.34,0.53), the evolutionary path of the two strategies converges to point (1,1). The calculation shows that the area of the lower left area of the saddle point (0.34,0.53) is less than the area of the upper right area of the saddle point. Therefore, the probability that the game process will eventually evolve to point (1,1) is higher. At this time, the set of strategies reached by both parties of the game {ICH tourism development enterprise reasonable distribution of income, the inheritors choose to cooperate} is

the most important for ICH tourism development favorable. From Fig. 3 b), Fig. 3 c) and Fig. 3 d), it can be seen that when $a = 0.3$, $b = 0.55$. That is when the probability of ICH tourism development enterprises reasonably distributing profits is 0.3, if more than 55% of the inheritors agree to cooperate with the ICH tourism development enterprises to inherit and develop the ICH, the whole inheritors group will agree to adopt the strategy of "cooperation". When $a=0.5$, $b=0.4$. In other words, when the probability of ICH tourism development enterprises to reasonably distribute profits is 0.5, if more than 40% of the inheritors agree to cooperate with the ICH tourism development enterprises to inherit and develop ICH, the whole inheritors group will agree to adopt the strategy of "cooperation". Similarly, when $a=0.7$, $b=0.2$. In other words, when the probability of a development company's reasonable distribution of income is 0.7, as long as more than 20% of the ICH tourism development companies agree to the protective development of ICH, then the entire group of inheritors will agree to adopt a "cooperative" strategy. It can be seen that the

strategy of "reasonable distribution of income" selected by ICH tourism development enterprises has a significant role in promoting the development of ICH tourism.

V. SUGGESTIONS AND COUNTERMEASURES FOR ICH TOURISM DEVELOPMENT

In view of the above research, this paper provides the following suggestions for the development of ICH tourism and explains the specific countermeasures.

First, government agencies should step up supervision and improve the supervision mechanism. According to the above research results, only by strengthening the supervision of ICH tourism development enterprises can government agencies effectively prevent ICH tourism development enterprises from over-exploiting valuable ICH resources.

Second, government departments and ICH tourism development enterprises have formulated specific incentives, rewards and punishments measures. Based on the perspective of the protective development of ICH, any act that is conducive to the protection and inheritance of ICH and the enhancement of the value of ICH is commended, and any act that is not conducive to the protective development of ICH is punished.

Third, government agencies should appropriately reduce the management cost of choosing incentive strategies. Through numerical simulation analysis of the influence of saddle point position, it can be seen that the selection of parameters determine the final strategy. In the evolutionary game model of "government agency-successor of ICH", appropriate reduction will make the saddle point closer to (0,0) and the probability of the final evolutionary path closer to (1,1) is higher. In addition, in the three groups of evolutionary game models, the allocation rules of the excess returns can be formulated under the condition that both parties reach an agreement, and the proportion allocated to both parties can be determined, thus stabilizing the strategies of both parties.

Fourthly, improve the inheritors' subsidy system and increase the national ICH inheritors' subsidy. In the process of inheriting the ICH, it is difficult for the inheritors to collect raw materials or high cost and financial resources, which is the main obstacle to inherit the ICH and protect the development. At this time, in order to ensure the smooth development of ICH, the government needs to provide policy and financial support. The more subsidies the inheritors receive, the greater the motivation to inherit ICH and the more willing they are to give up their opportunity cost.

Fifth, improve the inheritors' reputation and status among the people. The establishment of ICH which can inherit the honorary title can draw lessons from foreign experience. Different titles have different treatment, which can greatly improve the enthusiasm of the inheritors to inherit ich.

Sixth, establish a national online social networking platform and feedback platform for inheritors. The platform will be in close contact with government agencies, inheritors of ICH and tourism development enterprises. Collecting inheritors to inherit ICH and establishing cooperative relationship with them is an effective channel for ICH tourism development enterprises. It is also an effective channel for feedback to the

government and ICH tourism development enterprises on difficult issues in the process of ICH inheritance.

Seventh, the ICH tourism development enterprises should formulate the inheritor default management rules. In the game of " ICH tourism development enterprises and inheritors", enterprises can punish the inheritors for their breach of contract.

Eighth, government agencies provide financial support for the development projects of ICH tourism development enterprises. For example, financial subsidies are set up for the construction of facilities, lease of the venues, construction of ICH exhibition platforms, teaching classes of ICH, and organization of exhibitions.

Finally, various localities have set up "creative groups for the development of ICH ". ICH tourism development enterprises and other local tourism enterprises should put their heads together to explore innovative points for the protection and development of ICH, and discuss the ICH tourism development plan from time to time. For example, selling ICH tourism products, scanning two-dimensional codes to pay, listening to ICH exhibits to explain and so on.

Based on the above analysis, the strategic choices of three stakeholders, namely government agencies, inheritors and ICH tourism development enterprises, are interrelated. Only by taking precise measures from the perspective of different stakeholders, can be the development of ICH conservation tourism be the key means to promote the development of local economy.

VI. CONCLUSION

ICH can realize the innovative development and creative transformation of traditional culture through reasonable inheritance, protection, development and utilization.

Of course, in the process of research, most previous studies only unilaterally study the tourism development of ICH or unilaterally study the static game of ICH, while the dynamic game of ICH tourism development is seldom studied. Therefore, the biggest limitation and challenge of this study is how to perfectly combine the tourism development of ICH with the dynamic game, and many problems need further consideration and exploration.

To sum up, the strategic choice of stakeholders is the key factor to determine whether the development can proceed smoothly. This paper establishes three evolutionary game models: "government agencies and inheritors of ICH", "government agencies and ICH tourism development enterprises", " ICH tourism development enterprises and inheritors of ICH ", systematically analyzes the relationship chain in the process of protective development of ICH, discusses the obstacles of ICH tourism development, and finds out the best cooperation mode among stakeholders. Focusing on the decision-making linkage mechanism among the government, inheritors and ICH tourism development enterprises, this paper puts forward feasible suggestions for the development of ICH protective tourism in the aspects of reducing costs, optimizing reward and punishment mechanism, providing financial support and setting up research groups.

ACKNOWLEDGEMENTS

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