Research on Incentive Mechanism and Strategy Choice for Passing on Intangible Cultural Heritage from Masters to Apprentices

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Abstract: With the increasing prosperity of the global economy, the protection and sustainable development of intangible cultural heritage (ICH) are being confronted with many problems, among which the difficulty of passing on ICH, particularly traditional handicraft, from masters to apprentices should be given attention. The main purpose of the study is, from the perspective of knowledge transfer and incentive mechanisms, to explore how to mobilize the positive factors to promote the successful implementation of passing on ICH. On the basis of identifying the key influencing factors of ICH knowledge transfer and establishing the payoff matrix between masters and apprentices, this study uses replicator dynamic equations to analyze strategy choices in different situations and verifies the impacts of these factors on passing on ICH through data simulation. The study draws the following main conclusions: (1) Increases in variables e, a, v, Ju, Jd, Ku, and Kd will drive up the probabilities of adopting a positive strategy and successful ICH inheritance and increases in variables Cu and Cd will drive probabilities down. (2) Changes in any variable have an impact on both sides through the interaction between masters and apprentices, and the impact’s direction is the same. (3) Among all economic measures, cost control should be the first to be considered. These conclusions provide important theoretical guidance for local government and related organizations to support ICH bequeathal and for masters and apprentices to make choices regarding strategy. The paper fills the literature gaps in the study of the influencing factors of ICH knowledge transfer and the game model between masters and apprentices, and on the incentive mechanism and strategy choice of passing on and developing ICH.

Keywords: intangible cultural heritage; knowledge transfer; incentive mechanism; evolutionary game

1. Introduction

In accordance with the Text of the Convention for the Safeguarding of the Intangible Cultural Heritage [1], intangible cultural heritage (ICH) means the practices, representations, expressions, knowledge, skills, as well as instruments, objects, artefacts, and cultural spaces associated therewith that communities, groups, and, in some cases, individuals recognize as part of their cultural heritage. ICH is the living carrier, living specimen, and living memory of national cultural symbols and aesthetic habits. It continues and develops around people’s production and life and is a continuous cultural chain [2]. However, with the development of the modern economy, the acceleration of urbanization, and the transformation of productive patterns and lifestyles, ICH created in the long process of human history is currently facing an increasingly serious crisis [3], with many ICHs losing their space for development, and with younger generations no longer interested in passing on ICH, which has already made some ICHs disappear and is endangering others. As Tan illustrated, after old traders die, old trades will die as well, as there are no inheritors,
and traditional skills and knowledge will disappear sooner or later [4]. Relevant research has demonstrated that one cultural relic is lost and one type of folk art disappears every minute [2]. Fortunately, the bequeathal and sustainable development of ICH have attracted the attention of many related organizations, local governments, and international communities as represented in the General Assembly of States Parties to the 2003 Convention for the Safeguarding of ICH.

The most important task of the bequeathal and sustainable development of ICH is education, as reflected in the policies of many countries and organizations. For example, both in UNESCO’s main theme areas and in the text of conventions, there is a special emphasis on ICH education; in Spain, educational programs related to ICH have been inventoried by the Spanish Heritage Education Observatory [5]; in China, ICH protection education has been included in the national education system [6]; in Turkey, ICH education has formed a key primary school curriculum since the 1960s [7]. With regard to ICH education, many scholars have conducted in-depth research. For instance, through the methods of observation, interview, and literature analysis, Wang concluded that ICH education needs to be combined with the current situation and social environment background and connected with the needs of daily life, and that a successful ICH education network cannot exist without the joint efforts of industry, government, schools, museums, and research institutions [8]. Tzima et al. emphasized the importance of ICH education for preschool children and the need to protect ICH and spread its sustainable development value and argued that digital storytelling is a good educational tool that can offer many benefits to students and teachers [9]. Cho stressed the place and importance of ICH museums in ICH education and encouraged the incorporation of ICH in museum settings [10]. Aral argued that integrating teachers into the target groups of protecting ICH capacity building will help to improve the formal education efficiency of ICH protection [11]. In addition, some scholars also discussed the great significance of information technology for the learning and bequeathal of ICH through specific cases [12–14].

Although many studies have examined ICH education, there is little research on the study of passing on ICH from masters to apprentices and its incentive mechanisms. In the long run, passing on ICH from masters to apprentices is also an economic activity, which means that it must both be beneficial and cover its own costs, i.e., obey the basic economic rules. In order to promote the inheritance and sustainable development of ICH, it is necessary to study the incentive mechanisms and strategy choice for passing on ICH from the perspective of economics, which is the basic starting point and main purpose of this study.

The rest of this paper is organized as follows. The next section reviews the ICH literature related to knowledge transfer and incentive mechanisms, points out the literature gaps in studying the influencing factors of ICH knowledge transfer and the game model between masters and apprentices, and focuses on the incentive mechanism and strategy choice of passing on and developing ICH. The Materials and Methods section establishes an evolutionary game model of passing on ICH, obtains general conclusions through model analysis and data simulation, and accordingly forms a theoretical framework for analyzing the success probability of passing on ICH. Then, in the Discussion section, the viewpoints deduced from the model analysis and data simulation are further illustrated, and corresponding suggestions are proposed. The Conclusions section presents the theoretical contributions and practical implications.

2. Literature Review

2.1. Passing on ICH and Knowledge Transfer

Knowledge transfer is the basis for the inheritance and sustainable development of human civilization, and ICH cannot be passed on from generation to generation without knowledge transfer. Many scholars have offered a definition of knowledge transfer. According to Gilbert and Cordey Hayes, knowledge transfer is a dynamic process of continuous learning, which can only be completed when the knowledge recipients assimilate
knowledge into their own knowledge [15]. Garavelli et al. considered that knowledge transfer is a communication process composed of encoding and decoding [16]. In the process of knowledge transfer, knowledge recipients search for knowledge senders through various channels and send knowledge transfer requests to knowledge senders; knowledge senders decide whether to transfer knowledge according to their own needs and external incentives. Davenport and Prusak believed that reciprocity, reputation, and interest meet the needs of knowledge senders from different perspectives and are the main motivation for knowledge transfer [17]. Osterloh and Frey believed that both knowledge senders and knowledge recipients spend their time, energy, and wealth on knowledge transfer, so both sides of knowledge transfer must be encouraged [18].

ICH knowledge can be divided into explicit knowledge and tacit knowledge. Explicit knowledge can be expressed in formal and systematic languages and shared in the form of data, scientific formulas, specifications, manuals, etc., and it can be relatively easy to process, transfer, and store [19]; by contrast, tacit knowledge is hands-on skills, best practices, special know-how, heuristic, intuitions, and so on, and it is personal in origin and context and job-specific, and thus difficult to formalize and codify, to capture, and to communicate and share, and poorly documented but highly operational in the minds of the possessor [20].

Tacit knowledge transfer plays an important role in the process of passing on ICH and has a significant impact on the sustainable development of ICH, which has been discussed by many scholars. Parts et al. discussed the economic sustainability of traditional handicraft and the intergenerational transfer of skills and determined that traditional handicraft, as a form of tacit knowledge, is not easy to explain and transfer orally [21]. Dai et al. considered that it is difficult to fully express the true content of ICH knowledge as it is long-term accumulated experience [22]. Jain and Thakkar pointed out that ICH is a kind of tacit knowledge to a great extent and is intertwined with its cultural and historical background and realization [23]. Tan et al. argued that ICH teaching is realized through face-to-face oral or operational communication between masters and apprentices, the success or failure of which depends highly on tacit knowledge transfer [13].

Additionally, certain scholars have also studied the negative impact of knowledge loss on ICH and called for strengthening the support to ICH knowledge transfer. Karakul proposed that with the loss of traditional construction methods and the rapid change of construction technology, the knowledge and skills of traditional building construction and related cultural expressions are almost forgotten, and it is necessary to reconstruct the relationship between masters and apprentices to achieve the sustainable development of traditional crafts and transfer the relevant knowledge of traditional crafts to the next generation [24]. García-Almeida claimed that the distortion or even loss of the authenticity of knowledge transfer will bring serious challenges to ICH bequeathal and even affect the competitiveness of the destination [25].

Although these documents all mention the importance and problems of knowledge transfer in the sustainable development of ICH, there is no literature that discusses the influencing factors of ICH knowledge transfer and the game model between masters and apprentices, so new research is required to fill this gap in the literature.

With regard to the key influencing factors of knowledge transfer, it is well known that they include the senders’ disseminative capacity [26,27], the recipients’ absorptive capacity [28–30], and the knowledge transfer environment [31,32]. The knowledge transfer environment is a comprehensive factor, including the social context, scale of relevant personnel, knowledge characteristics, culture, trust, risk, and so on. Considering that ICH knowledge transfer from masters to apprentices is a social exchange activity, economic factors such as the required cost, earned benefit, and penalty suffered should also be regarded as key influencing factors of ICH knowledge transfer.
2.2. Passing on ICH and Incentive Mechanism

The incentive mechanism, also known as the incentive system, refers to the process of maximizing employees’ responsibility to the organization and performance through specific methods and management systems. It is the sum of the structure, methods, relationship, and evolution law in which the incentive subject uses a variety of incentive means and makes them standardized and relatively fixed and interacts with and restricts the incentive object in the organizational system.

In the face of the severe issues pertaining to passing on ICH, it is of great significance to further study more effective incentive mechanisms and develop more appropriate incentive schemes. Some studies have discussed the issue of incentive mechanisms for passing on and developing cultural heritage. Piggott proposed that a mutuality of interests might well be achieved if appropriate incentives are provided to the owner in exchange for reasonable restrictions and obligations to promote conservation [33]. Yang et al. believed that in the protection of traditional rural landscape with cultural elements, the protection attitude of local residents was mainly affected by economic benefits and daily utility values, rather than cultural values, and it was necessary to provide appropriate incentives for the development of a protection attitude among local residents so as to realize the sustainability of cultural heritage [34]. Mat Radzuan et al., after investigating various incentive mechanisms including public subsidies, loans, tax relief, and so on developed by Japanese and Korean authorities to promote the protection of cultural heritage, studied the operation mechanism of incentive plans and the limitations of incentive policies in meeting the needs of communities and discovered the constraints of the implementation of these incentive policies [35]. In AinoKura and Kawagoe, using the methods of questionnaire and interview, Mat Radzuan et al. examined the residents’ views on the implementation of cultural heritage protection and reward schemes in traditional residential areas and proposed that incentive programs created for the community should be suitable for the fulfilment of their aspirations and real needs [36]. Based on the investigation of two heritage villages in Malaysia, Radzuan and Ahmad discussed the challenges they were facing in the implementation of the cultural heritage protection plan and pointed out that there were constraints and problems in the implementation of the current incentive policy [37]. After analyzing the issues regarding the fiscal incentives of private cultural property, Forte argued that fiscal incentives to encourage the support of private subjects for conservation activities could represent an efficacious solution, but they are not the only possible one [38].

However, in general, incentive mechanism research on passing on and developing cultural heritage is not enough, and only a few studies have examined the importance of incentives, with even fewer studies on the nature and impact of these incentives [39]. Furthermore, there is hardly any literature on the incentive mechanism and model of passing on and developing ICH, so there is a gap to fill.

3. Materials and Methods

3.1. Incentive Model

Evolutionary game theory, which has been applied broadly to different fields, such as economics, politics, sociology, biology, and so on, is also a strong tool in the study of passing on ICH. Since passing on ICH is a process of social exchange, which succeeds only if the actual benefits outweigh the cost, the output of passing on ICH is directly affected by the strategies of both sides, and the process is characterized by continuous improvement and frequent repetition. Thus, in the environment of information asymmetry and bounded rationality, whether both sides are willing to positively and effectively inherit, for the recipients, and pass on, for the senders, becomes an evolutionary game problem.

Assumption 1. In the relationship between masters and apprentices, masters are knowledge senders and apprentices are knowledge recipients (represented by u and d, respectively, according to the upstream and downstream positions of knowledge flow). Because they are rational individuals or teams, bounded rationality causes them to learn from games continuously and seek an evolutionary stability strategy (ESS) to achieve optimal equilibrium.
Assumption 2. The key influential factors are knowledge transfer environment, masters’ knowledge disseminative capacity, apprentices’ knowledge absorptive capacity, required cost, earned benefit, and penalty suffered. The actual benefits from explicit knowledge transfer are the constant values $R_u$ and $R_d$ for masters and apprentices, respectively. The actual benefit from tacit knowledge transfer changes with the key influential factors.

Assumption 3. Masters and apprentices have two pure strategies: positive or passive. In period $t$ of the game, the probability that the masters will adopt a positive strategy is $P_u$ ($0 \leq P_u \leq 1$), and the probability that they will adopt a passive strategy is $1 - P_u$. The probability that the apprentices will adopt a positive strategy is $P_d$ ($0 \leq P_d \leq 1$), and the probability that they will adopt a passive strategy is $1 - P_d$.

Assumption 4. The knowledge transfer environment support coefficient is represented by $v$, the masters’ knowledge disseminative capacity coefficient is represented by $e$, and the apprentices’ knowledge absorptive capacity coefficient is represented by $a$. The maximum value of benefit from tacit knowledge transfer for masters is $J_u$, and for apprentices, it is $J_d$. When they adopt a positive strategy in tacit knowledge transfer, the cost paid by masters is $C_u$, and that paid by apprentices is $C_d$. However, when one side adopts a passive strategy, its cost of tacit knowledge transfer is equal to zero.

Assumption 5. Suppose that there is penalty mechanism executed by related individuals or organizations for passing on ICH. When one side adopts a positive strategy but the other side does not, the passive side will be penalized by a penalty mechanism. The penalties suffered by masters and apprentices are $K_u$ and $K_d$, respectively. However, if both sides are passive, they will not be penalized.

The variable specifications are listed in Table 1.

| Variables | Description | Notes |
|-----------|-------------|-------|
| $R_u$     | Masters’ benefit from explicit knowledge transfer | $R_u > 0$ |
| $R_d$     | Apprentices’ benefit from explicit knowledge transfer | $R_d > 0$ |
| $C_u$     | Masters’ cost for tacit knowledge transfer | $C_u > 0$ |
| $C_d$     | Apprentices’ cost for tacit knowledge transfer | $C_d > 0$ |
| $J_u$     | Masters’ maximum benefit from tacit knowledge transfer | $J_u > 0$ |
| $J_d$     | Apprentices’ maximum benefit from tacit knowledge transfer | $J_d > 0$ |
| $e$       | Knowledge disseminative capacity coefficient of masters | $0 \leq e \leq 1$ |
| $a$       | Knowledge absorptive capacity coefficient of apprentices | $0 \leq a \leq 1$ |
| $v$       | Environment support coefficient for knowledge transfer | $0 \leq v \leq 1$ |
| $K_u$     | Penalty suffered by masters for passive strategy | $K_u > 0$ |
| $K_d$     | Penalty suffered by apprentices for passive strategy | $K_d > 0$ |
| $P_u$     | Probability of masters adopting positive strategy | $0 \leq P_u \leq 1$ |
| $P_d$     | Probability of apprentices adopting positive strategy | $0 \leq P_d \leq 1$ |

Based on the above assumptions, a payoff matrix in period $t$ can be set up, as shown in Table 2.

| Masters | Positive ($P_d$) | Passive ($1 - P_d$) |
|---------|-----------------|---------------------|
| Positive ($P_u$) | $(R_u + eavJ_u - C_uR_d + eavJ_d - C_d)$ | $(R_u - C_uR_d - K_d)$ |
| Passive ($1 - P_u$) | $(R_u - K_uR_d - C_d)$ | $(R_u, R_d)$ |
Let variables $U_u^P$, $U_u^n$ and $U_u$ represent the actual benefit for masters choosing a positive strategy and passive strategy and the masters’ average actual benefit, respectively. Therefore,

$$U_u^P = p_d(R_u + eavJ_u - C_u) + (1 - p_d)(R_u - C_u) = p_d eavJ_u + R_u - C_u$$

$$U_u^n = p_d(R_u - K_u) + (1 - p_d)R_u = -p_d K_u + R_u$$

$$U_u = p_u U_u^P + (1 - p_u)U_u^n = p_u(p_d eavJ_u + R_u - C_u) + (1 - p_u)(-p_d K_u + R_u)$$

According to the replicator dynamic function proposed by Friedman [40], the percentage of players will grow when the fitness of those players is greater than the average fitness, and the growth rate is represented by the differential equations in continuous time. Thus, the replicator dynamic equation of masters using a positive strategy is as follows:

$$F(p_u) = \frac{dp_u}{dt} = p_u(1 - p_u)(p_d eavJ_u - C_u + p_d K_u)$$

Equations (1) and (2) constitute a dynamic replication system in which both masters and apprentices are decision makers. In the game process, each side adjusts its own strategy along with the decision of the other side in order to obtain the maximum benefit, so the probability of strategy selection may vary over time. When the dynamic equation is equal to zero, the equilibrium point of the evolutionary game is reached. Under such conditions, the equilibrium points can be calculated.

### 3.2. Incentive Mechanism and Strategy Choice

Let $F(p_u) = \frac{dp_u}{dt} = p_u(1 - p_u)(p_d eavJ_u - C_u + p_d K_u) = 0$, then, $p_u = 0$; $p_u = 1$; $p_d = \frac{C_u}{eavJ_u + K_u}$.

When $p_d = C_u / (eavJ_u + K_u)$, the actual benefit from a positive strategy is always equal to that from a passive strategy for masters, and masters have no motivation to change their choices under this condition. When $p_d < C_u / (eavJ_u + K_u)$, the actual benefit from a positive strategy is less than that from a passive strategy for masters, which will lead masters to adopt a passive strategy. When $p_d > C_u / (eavJ_u + K_u)$, the actual benefit from a positive strategy is greater than that from a passive strategy for masters, which will result in masters adopting a positive strategy. Hence, in order to motivate masters to adopt a positive strategy, it is necessary to increase the value of the three coefficients $e$, $a$, and $v$, improve masters’ maximum benefit, enlarge the penalty suffered by masters for adopting a passive strategy, and reduce masters’ cost.

Let $F(p_d) = \frac{dp_d}{dt} = p_d(1 - p_d)(p_u eavJ_d - C_d + p_u K_d) = 0$, then, $p_d = 0$; $p_d = 1$; $p_u = \frac{C_d}{eavJ_d + K_d}$.

When $p_u = C_d / (eavJ_d + K_d)$, the actual benefit from a positive strategy is always equal to that from a passive strategy for apprentices, and apprentices have no motivation to modify their choices under this condition. When $p_u < C_d / (eavJ_d + K_d)$, the actual benefit from a positive strategy is less than that from a passive strategy for apprentices, which will lead apprentices to adopt passive strategy. When $p_u > C_d / (eavJ_d + K_d)$, the actual benefit from a positive strategy is greater than that from a passive strategy for apprentices, which will result in apprentices adopting a positive strategy. Hence, in order to motivate apprentices to adopt a positive strategy, it is necessary to increase the value of the three coefficients $e$, $a$, and $v$, improve apprentices’ maximum benefit, enlarge the penalty suffered by apprentices for adopting a passive strategy, and reduce apprentices’ cost.

The above expressions show that maximum benefit, penalty, and cost have different degrees of influence on decision making. The most direct and obvious effect is reducing...
cost, the second is increasing the penalty, and the last is increasing the maximum benefit, as the maximum benefit can only be transformed into actual benefit by multiplying the three coefficients.

In addition, the above inequalities also show that the strategy choices of both sides are influenced by each other. For example, a decrease in $C_d$ will encourage apprentices to choose a positive strategy, that is, it will increase $P_d$; an increase in $P_d$ creates more conditions for masters to choose a positive strategy, which eventually leads to an increase in $P_u$.

3.3. Data Simulation

Using phase diagrams generated by Equations (1) and (2), the effect of each key influencing factor on strategy choosing can be observed.

Assume the initial data in simulation 1 are \(e = 0.5; a = 0.8; v = 0.8; C_d = 10; C_u = 8; J_d = 25; J_u = 20; K_u = 2; K_d = 4\), in which e, a, and v are coefficients, and the values of the other variables can be thought of as money. With regard to the meanings of the specific variables, they can be explained as follows. “e = 0.5” means that the disseminative ratio of tacit knowledge from masters to apprentices is 50%; “a = 0.8” means that 80% of tacit knowledge transferred from masters is mastered by apprentices; “v = 0.8” means that the environment support coefficient for knowledge transfer is 80%; “$C_u = 10$” means that the cost paid by masters for knowledge transfer is 10 units (for instance, ten thousand dollars); and so on.

To identify the influence of the change in each variable on the results, the simulation requires that only one variable be changed, and the other variables be kept invariant under each condition. The change in variables and the saddle points of evolutionary results are listed in Table 3.

| No.     | Figure   | Variable Change | Saddle Point     |
|---------|----------|-----------------|-----------------|
| simulation 1 | Figure 1. (a) | unchanged      | (0.952,0.833)  |
| simulation 2 | Figure 1. (b) | v = 0.9        | (0.870,0.769)  |
| simulation 3 | Figure 1. (c) | e = 1.0        | (0.541,0.500)  |
| simulation 4 | Figure 1. (d) | $K_d = 8$      | (0.952,0.625)  |
| simulation 5 | Figure 1. (e) | $C_d = 4$      | (0.952,0.333)  |
| simulation 6 | Figure 1. (f) | $J_u = 30$     | (0.690,0.833)  |

The different evolutionary paths and results caused by the variable change in six simulations are shown in Figure 1. Figure 1a–f show the effect of different variable changes in the six simulations. The intersection point in each diagram is the saddle point. As variables change, the shape of the evolutionary graph, the values of the saddle point and the two areas also change.

In the phase diagrams, the upper right area of the saddle point is equal to the possibilities of converging to (1, 1), and the possibilities of converging to (1, 1) are equal to the success probability of passing on ICH. For example, if the upper right area is 0.9, then the probability of converging to (1, 1) is 90%, and the success probability of passing on ICH is also 90%. The reason the success probability is equal to the probability of converging to (1, 1) is that, in the long run, both masters and apprentices adopting positive attitudes will certainly make the process of inheritance successful; conversely, if they do not, the cultural heritage will be lost. When the upper right area becomes larger, the probability of converging to (1, 1) will rise, the probability of both sides adopting a positive strategy will increase, and the success probability of passing on ICH will increase.
Figure 1. Phase diagrams of dynamic evolution.

From Table 3 and Figure 1, it can be seen that the upper right areas of other phase diagrams are all greater than that of Figure 1a, which indicates that when $C_d$ is reduced or any of the other variables increase, the probability that both sides will adopt a positive strategy increases, and the success probability of passing on ICH increases. Based on the laws of symmetry, the conclusion can be drawn that an increase in variables $e, a, v, j_u, j_d$, $K_u$, and $K_d$ will drive up the probability that both sides will adopt a positive strategy and, thus, the probability of successfully passing on ICH; by contrast, an increase in variables $C_u$ and $C_d$ will drive down the probability that both sides will adopt a positive strategy and, thus, the probability of successfully passing on ICH. When several measures with the same direction are adopted, the effect is more obvious.

4. Discussion

The core of passing on ICH from masters to apprentices is tacit knowledge transfer of ICH. In order to promote a smooth progress of tacit knowledge transfer, it is necessary to provide appropriate environment supports, ensure sufficient disseminative and absorptive capacity, maintain penalty deterrents for passive behavior, reduce the cost of the process of bequeathal of ICH, and increase the actual benefits. The improvement of environmental support capacity, knowledge disseminative and absorptive capacity, and maximum benefit will drive up participants’ actual benefit. The increase in actual benefits, the strengthening of penalty deterrents, and the reduction of the cost of passing on ICH have obvious incentive effects on passing on ICH and can impel masters and apprentices to adopt positive strategies and thereby improve the probability of success of the process of ICH inheritance. These measures should also be present throughout the whole process of passing on ICH from masters to apprentices to ensure that both sides adopt positive strategies. Otherwise, when the conditions become unfavorable, participants may change their strategies, which will lead to the failure of passing on ICH from masters to apprentices.

The environmental support factors include the involvement of the local ICH community, ICH law enforcement environment, cultural background, place attachment and community emotion, communication atmosphere, infrastructure, and so on. Hribar et al. argued that the involvement of local communities in sustainable cultural heritage management contributes to the discovery, preservation, and development of cultural heritage [41]. Hwang and Huang proposed that the cultural background has an impact on students’ ability to learn ICH and pointed out that rebuilding the cultural ecosystem is important for the sustainable inheritance of skills [42]. Tan et al. believed that heritage places can create...
different feelings and meaning for different people, and place attachment and community emotion influence the participation of citizens and the development of ICH communities [4]. Song et al. suggested that the government and all sectors of society should help to build a platform for communication between the two generations of transmitters and believed that law protection could help ICH to be passed on and developed better [2]. Lin and Lian considered that improving copyright, patent, trademark, and geographical protections can advance the healthy development of ICH [3]. Within the context of modern digital technology, network platforms are also an important means of support to promote ICH inheritance [12,13]. All of these indicate that improving the environmental support capacity requires a number of efforts from many aspects, each of which has an important impact on passing on ICH.

The personal transmission capacity should be considered with deliberation when it comes to passing on ICH [2]. A rich experience and strong knowledge disseminative capacity make masters’ teaching more efficient; and intense interest and strong knowledge absorptive capacity make it easier for apprentices to learn, digest, and absorb the tacit knowledge of ICH. The stronger the masters’ disseminative capacity and the apprentices’ absorptive capacity are, the more efficient and effective the knowledge transfer will be [43].

Penalty measures including economic, administrative, or social credit measures and so on should be formulated at the beginning and implemented in the process of passing on ICH. Zhao et al. considered that setting incentive mechanisms to penalize passive attitudes and reward positive attitudes could significantly moderate participants’ strategy profile and enhance knowledge transfer [44]. The increase in penalties can affect masters’ and apprentices’ choice and encourage them to adopt a positive strategy in order to avoid being penalized.

Von Ledebur argued that the relation between the costs of knowledge transfer and the rewards earned by the participants determines the effort of the participants in knowledge transfer [45]. A cost which is too high may cause participants to stop the activity halfway for the sake of decreasing loss or result in participants adopting a passive strategy because they think there is little chance of success. If participants reasonably control their own cost, it will not only urge them to make the decision to adopt a positive strategy but also encourage the other participants to make the same decision through mutual influence. Subsidizing is also a way to offset the participants’ costs and has significant positive impacts on knowledge transfer [46], and so does tax deduction.

The influence of benefit is reflected by $\text{eav}_u$ and $\text{eav}_d$ in the game model. Benefits received by the masters and apprentices in various periods are embodied in spiritual and material aspects such as work motivation, organizational incentives, cultural incentives, pay incentives, etc. Zhang and Zhang indicated that non-financial incentives and team-based financial incentives have positive effects on knowledge management performance [47]. Making incentive systems more comprehensive can motivate participants to transfer their knowledge effectively [48].

5. Empirical Research

As one of the art forms of ancient Chinese ceramics, Tang Sancai has a long history of more than one thousand years. It was developed on the basis of lead glazed pottery in the Han Dynasty and reached its peak in the Tang Dynasty. It not only embodied the burial culture prevailing in society at that time but also showcased the superb sculpture and firing techniques of that period [49]. From the 1950s to 1980s, Luoyang Tang Sancai, as a precious national gift, was presented to the heads of more than 50 countries and regions in the world, known as “Oriental art treasure” [50].

However, as time passed and cultural ecology deteriorated, many old customs were gradually withdrawn from social life, and the market for traditional handicrafts was greatly impacted, which made the living conditions of the inheritors poor. As a result, many traditional Tang Sancai firing techniques were at risk of being lost, and the field
was faced with the embarrassment of low efficiency and partial or even complete lack of apprentices.

In 2008, the Luoyang Tang Sancai firing techniques were added to the national ICH list. According to the requirements of “protection first, rescue first”, the local government implemented a vigorous plan to ensure the rescue and protection of ICH. In 2015, the government invested CNY 5.19 million for the construction of the Tang Sancai firing techniques learning hall and subsidized CNY 1.24 million to encourage passing on ICH from masters to apprentices, which played an important role in mitigating the risk of this knowledge being lost [50].

In addition to the above measures, the local government, community, and related organizations also took the following measures: (1) developing ICH tourism and creating characteristic ICH towns; (2) utilizing the internet for training and publicity; (3) utilizing the internet to sell Tang Sancai products; (4) adding Tang Sancai firing techniques to the local vocational school curriculum; (5) promoting product innovation and broadening the application scope of products; and (6) implementing effective market supervision over training, tour, production, and sales. These measures not only protected ICH and promoted its development but also improved the environmental support for passing on ICH from masters to apprentices.

At present, because of the favorable economic incentive, more talent participation, and good environmental support, the risk of knowledge regarding the Tang Sancai firing techniques being lost has been completely avoided, and ICH has entered the track for sustainable development.

6. Conclusions

This study has important theoretical implications. First, it proposes that passing on ICH is in fact an economic activity, which obeys the corresponding economic rules and can be studied from the perspective of game theory. Second, it fills the literature gap in the study of the influencing factors of ICH knowledge transfer and the game model between masters and apprentices, and of the incentive mechanism and strategy choice of passing on and developing ICH. Third, it establishes a theoretical framework based on game theory for passing on ICH and analyzes the incentive mechanism and strategy choice of participants in different situations. Fourth, through data simulation, the impacts of the key factors on the success probability of passing on ICH are explained.

The findings of this study have important practical implications for the inheritance and sustainable development of ICH. Firstly, they reveal that the role of economic factors in passing on ICH should not be ignored. It is necessary to combine the economic benefit of passing on ICH with the processes of passing on ICH; otherwise, ICH cannot be developed sustainably. Especially in today’s highly developed market economy, the economic benefits of both masters and apprentices must be protected and satisfied. Secondly, through the analysis of the model, it can be seen that the strategic choices of both masters and apprentices can influence each other. When the probability of one side adopting a positive attitude is high, the other side will also choose a positive attitude, and vice versa. Therefore, in order to successfully implement ICH bequeathal, the attitudes of both masters and apprentices should be given enough attention by both sides and the related organizations. Thirdly, the conclusion that an increase in variables $e$, $a$, $v$, $J_u$, $J_d$, $K_u$, and $K_d$ will drive up the probability of successfully passing on ICH, while an increase in variables $C_u$ and $C_d$ will drive down the probability of successfully passing on ICH provides theoretical guidance for ICH management and is helpful for local government, community, and related organizations to support the inheritance and sustainable development of ICH. Fourthly, among all of the economic measures, cost control should be the first to be considered, in which subsidies and taxes can better reflect the management intention and policy guidance of the government, community, and related organizations. However, it should be noted that before taking subsidy and tax measures, they should first identify the appropriate ICH, key stakeholders, and other topics [41,51]. Fifthly, the measures enhancing environmental
Support would promote the bequeathal and sustainable development of ICH and facilitate the building of sustainable communities, which is helpful to curb communal poverty in rural areas of underdeveloped or developing countries [51]. The lack of contact with local management practices and the rupture of the transmission system have a huge effect on the deconstructing of social communities and the embedded knowledge system [52].

Despite the significant implications of the present study, the lack of empirical data for the game model is a limitation, which suggests that in the future, research could be carried out to verify these findings by collecting case data.

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