

# Evolutionary Game of Cooperation between Cultural and Creative Enterprises from Both Sides of the Taiwan Strait: From the Perspective of Anthropology

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**ABSTRACT** Nowadays, the cultural and creative industry is one of the most dynamic and promising industries in the world economy and has become an emerging force that drives economic development in both Mainland China and Taiwan. Meanwhile, cultural and creative enterprises in both Mainland China and Taiwan are highly complementary to one another so the cooperation in this field between the two sides is an issue in need of more study. This paper applies the evolutionary game theory to construct the evolutionary game model for the cooperation between cultural and creative enterprises from both sides of the Taiwan Strait. All situations under which these enterprises from both sides will cooperate and related indexes are discussed and analyzed. The theory and method of anthropology are then used to revise the conclusions and suggestions to make them more realistic and practical.

## INTRODUCTION

Human behaviors are always sophisticated and satisfactory explanations cannot always be given using economic principles, especially when the behaviors are closely linked to culture. The cultural anthropology perspective is necessary for a better understanding of these situations.

Cultural anthropology is a subject that studies the reasons behind the similarities and differences of humankind all over the world. It does not study whether the way people think and behave is problematic or reasonable. Due to cultural differences, cultural anthropology offers an opportunity to study the dramatic changes in thoughts and actions happening in today's world. Meanwhile, the record of anthropological literature provides a great number of different solutions to cross-cultural issues (Tian et al. 2013). Therefore, anthropologists simply record, identify, and describe the diversity of human culture, and also expose the familiarity that can be found in different cultural contexts (Ferraro 2006). Just as Schein (1990) believes that culture is "perception, thinking, feeling and behavior," Beals and Hoijer (1953) assert, "culture is the abstraction of behaviors."

Mariampolski (2006) stated the importance of culture as the principle of description and classification of human behaviors, which is used to explain the result of individual choices, and cul-

ture is an analytical concept covering the influence of interpersonal relationships and is representative of ordinary daily life. According to Mariampolski, cultural materials and non-material human experiences form the basis for the collective behavior of all humans. Harris and Moran (1987) held that culture tells people who they are, give people a sense of belonging, regulates their behaviors and, above all, lets people know what kind of goals are important. Culture provides the symbols, rules, knowledge, and values that are mutual, interrelated, and can be learned and used to judge and motivate human behaviors. Sunderland and Denny (2007) state that, in recent years, many people with international experience have written articles and books about foreign countries, which can help those people who were involved in international business enterprises better understand different cultures and work more efficiently in an international business environment (Tian et al. 2015).

In analyzing the game theory problem of cooperation among cultural and creative enterprises from both sides of the Taiwan Strait, it is difficult to explain the situation from only the cost-benefit perspective. Therefore, the researchers introduce cultural anthropology theory. This paper applies evolutionary game theory (Taylor and Jonker 1978; Webull 1995; Sheng and Jiang 2002; Yu 2007) to study this problem and to draw its conclusions. At the end, the researchers re-

vises the relevant conclusions in terms of cultural anthropology.

The cultural and creative industry has become one of the most dynamic and promising industries. With the global financial crisis, many industries declined, but the cultural and creative industry, with low costs and high added value, showed a strong momentum and potential of development, and has thus become the new “bright spot” in economic growth (Gu et al. 2010). The vigorously developed cultural and creative industry can provide a viable path for China’s economic transformation and upgrading (Li 2010). It has become an emerging force that drives sustainable and rapid economic development. The grave shortages of talent, a complete industrial chain, and internationally well-known creative brands as well as weak protection of intellectual property rights have resulted in a bottleneck of the development of cultural and creative enterprises in the Chinese mainland (Dong 2012). By starting early in the cultural and creative industry and establishing a solid foundation in it, Taiwan has been able to establish global brand images and have great influence among Chinese in Asia as well as across the world. In doing so, Taiwan has kept up with its trend of development of international cultural and creative enterprises. Since the beginning of the 21<sup>st</sup> Century, Taiwan’s cultural and creative industry has increased rapidly in its number of companies, volume of business, and number of employees (Liang 2011; Dai 2013).

Taiwan has numerous talents in creative fields, so much so that “creativity is Taiwan’s most important asset” (Xia 2007). However, a small market scale, insufficient support from the government and funds, as well as other factors, have also restricted the development of cultural and creative enterprises in Taiwan. Evidently, cultural and creative enterprises from both sides of the Chinese mainland and Taiwan are highly complementary to one another. To achieve great improvement in competency and developmental levels, it would be in the best interests of cultural and creative enterprises from both sides of the Taiwan Straits to cooperate. As Liu (2012) asserts in an address to the chairman of the Association of Creative Economy (ACE) in Taiwan, “To accelerate the communication and cooperation of cultural and creative enterprises from both sides of the Taiwan Strait has become an issue requiring handling.” Since enterprise is impor-

tant as both a subject and a carrier for industrial cooperation, this thesis focuses on cultural and creative enterprises from both sides of the Taiwan Strait. So what are the key factors that affect the cooperation? On what conditions will they cooperate? What can governments from both sides do? These are the key issues involved in the cooperation of both sides. This thesis tries to apply evolutionary game theory to seek the solution to this problem and uses anthropological principles to revise conclusions and offer suggestions in practical and theoretical aspects.

## METHODOLOGY

This thesis analyzes the spontaneous evolutionary processes and evolutionary stable strategies of the two parties—cultural and creative enterprises, from both the Chinese mainland and Taiwan. The asymmetric evolutionary game is a theory that combines classical game theory analysis with dynamic evolutionary procedure analysis. On one hand, it uses the Bounded Rationality and learning ability in place of the traditional game theory concerning the hypothesis of perfect rational subject, which is consistent with reality. On the other hand, it uses a dynamic frame to analyze the system equilibrium and the process of achieving it so as to describe the change and development of the system more accurately.

The evolutionary game is the model of game theory concerning the interaction of behavior strategy and the iteration process, wherein the basic principle is the survival of the fittest from the biological evolutionary theory. Each kind of individual participant can choose different behavior strategies, and then gain the corresponding “reward” or “fitness.” After several iterations, the adoption of a behavioral strategy will lead to the increase or decrease of its fitness, thereby making some kind of individual behavior’s distribution evolutionary according to the principle of survival of the fittest.

The most essential concept of evolutionary game theory is the “Evolutionary Stable Strategy” (ESS), which applies extensively and gains continuous improvement in development. ESS is a strategy where if a member of the majority of a population chooses it, small mutations’ in the populations invade it, or say that under the pressure of natural selection, mutations either change the strategies and choose the evolutionary sta-

ble strategy, or log out and disappear in the process of evolution.

For  $K$  populations that game mutually, each population  $k$  ( $k=1, \dots, K$ ) has  $N$  strategies which are devoted by subscript  $i = 1, \dots, N$ . Population  $K$ 's corresponding  $N$  dimensional vector set  $S^k = \{x = (x_1, \dots, x_N) : x_i \geq 0, \sum x_i = 1\}$ . Any vector  $S^k$  with this form devotes any individual mixed strategies of population  $K$ , and vector  $S^k$  with this form devotes that the proportion of individual who adopts each strategy in population  $K$ . There for,  $k$  such  $N$  dimensional space's Cartesian product  $S = S^1 \times \dots \times S^K$ , that is strategy set, is state space also.

The evolutionary game takes the fitness of individuals in each population as payment to describe the game strategy. The individual fitness is the individual strategy and the function of the current state. Fitness function is a mapping,  $f^k : S^k \times S \rightarrow R$ , in which,  $k = 1, \dots, K$ . It assumes this function to the linear function of the first variable (its strategy)  $r^k \in S^k$ , and is continuously derivable for the second variable (population status). Fitness function can also be marked as  $f : S \times S \rightarrow R^K$ , or  $f(r, s) = (f^1(r, s), \dots, f^k(r^k, s))$ . The fitness function concerning the linear hypothesis of variable  $x = r^k$  can be seen as a "large number" hypothesis: for a large population, a mixed fitness of strategy is the expectant fitness that formed every kind of pure strategies.

The final basic model of evolutionary game is a dynamic structure that describes the status  $S$  how to evolve with time. For the situation of continuous time, the variable of time corresponding to status is defined as:  $\dot{s} = (\dot{s}^1, \dots, \dot{s}^K)$ , in which,  $\dot{s}^k = (\dot{s}_1^k, \dots, \dot{s}_N^k) = (ds_1^k / dt, \dots, ds_N^k / dt)$ , ( $k = 1, \dots, K$ ). Thus, it can be shown with some function  $F : S \rightarrow R^{NK}$ , that is  $\dot{s} = F(s)$ . This is an autonomous system of differential equations, in which, if the initial condition is given, the answer of the system of differential equations  $\dot{s} = F(s)$  corre-

sponds to a curved line that describes the process of evolution of all populations (Friedman 1991).

## RESULTS

### Basic Hypotheses and Payoff Function

To analyze this process, the paper makes the following hypotheses concerning the evolutionary game model (Gao and Sheng 2004; Wang 2008; Zhao 2013).

The researchers assume that the separate operating profits of cultural and creative enterprises in the Chinese mainland and Taiwan are  $R_1$  and  $R_2$ , respectively, and the prospective additional gross net benefits gained from cooperation of both sides are  $R$  (profits gained from cooperation deduct the costs to maintain cooperation in both sides); in which, the researchers distribute the proportion of net profits gained from cooperation; the proportion of Chinese mainland is  $k(0 < k < 1)$ , and Taiwan is  $1-k$ . Moreover, no matter what cooperation is formed eventually, the upfront investment required to attract one another to cooperate including information collection, the establishment of the facilities and negotiation, is viewed as initial cost. Therefore, the researchers assume the upfront cost needed to cooperate is  $C_1$  for the Chinese Mainland and  $C_2$  for Taiwan. Accordingly, the researchers derive the game payoff matrix between cultural and creative enterprises, which respectively adopt cooperative and non-cooperative strategies in both Chinese mainland and Taiwan. The matrix is shown in Table 1.

### Dynamic Equation and Evolutionary Stable Strategy

This paper assumes that  $p$  denotes the proportion of strategy 1 (cooperation), and is adopt-

**Table 1: Game Payoff Matrix of cooperation between cultural and creative enterprises in both sides of the Taiwan Strait**

		Cultural creative enterprises in Taiwan	
		1 (Cooperation)	2 (Non-cooperation)
1 Cultural creative enterprises in Chinese mainland	1 (Cooperation)	$R_1 + kR - C_1$ $R_2 + (1 - k)R - C_2$	$R_1 - C_1$
	2 (Non-cooperation)	$R_1$ $R_2 - C_2$	$R_1$ $R_2$

ed by cultural and creative enterprises in Chinese mainland, and  $q$  denotes strategy 1 (cooperation), and is adopted by cultural and creative enterprises in Taiwan. Therefore, one point  $(p, q)$  in the area of  $[0, 1] \times [0, 1]$  is used to describe the state,

in which,  $s_1^1 = p, s_1^2 = q$ , thus,  $s_2^1 = 1 - p, s_2^2 = 1 - q$ .  $r^1 = (1, 0)$  denotes the strategy 1 (cooperation) that enterprises select with probability 1,  $r^2 = (0, 1)$  denotes the strategy 2 (non-cooperation) that enterprises select with probability 1. Provided that the growth rate of the proportion of individuals using one strategy in populations is regarded as the relative fitness, the strategy will develop as long as its fitness is higher than the average (Yao, Di, Ding 2007; Zhao, Zhang, Tian 2014).

From Table 1, the researchers know that:

Strategy 1 (cooperation) is adopted by cultural and creative enterprises in Chinese mainland, wherein fitness is,

$$f^1(r^1, s) = q(R_1 + kR - C_1) + (1 - q)(R - C_1)$$

The fitness of adopting strategy 2 (non-cooperation) is,

$$f^1(r^2, s) = qR_1 + (1 - q)R_1$$

Its average fitness is,  $f^1(q, s) = qf^1(r^1, s) + (1 - q)f^1(r^2, s)$

Similarly, strategy 1 (cooperation) is adopted by cultural and creative enterprises in Taiwan, wherein fitness is,

The fitness of adopting strategy 2 (non-cooperation) is,

Its average fitness is,

$$f^1(p, s) = pf^1(r^1, s) + (1 - p)f^1(r^2, s)$$

In evolutionary game theory, duplicators of populations are dynamically assumed to be such that the growth rate of one strategy depends on its fitness, and the strategies that produce higher profits have a higher growth rate. Therefore, according to the Malthusian equation (Friedman 1991, 1998), strategy 1 (cooperation) is adopted by cultural and creative enterprises in Chinese mainland, where the fitness  $f^1 = (r^1, s)$  minus the average fitness  $f^1(p, s)$  equals its growth rate  $p/p$ , that is,

$$p/p = f^1(r^1, s) - f^1(p, s)$$

It means that the duplicate dynamic equation of growth rate for cultural and creative enterprises adopting cooperation strategy in Chinese mainland is,

$$p = p(1 - p)(qkR - C_1) \quad (1)$$

Similarly, the researchers know that the duplicate dynamic equation of growth rate  $q$  for

cultural and creative enterprises adopting cooperation strategy in Taiwan is,

$$q = q(1 - q)[p(1 - k)R - C_2] \quad (2)$$

A two-dimensional, dynamic and autonomous (not containing time  $t$ ) system is made up of (1) and (2).

According to the theory of differential equations,  $(p_0, q_0)$  if makes the right side of (1) and (2) is zero, then  $(p_0, q_0)$  is the equilibrium point or singular point. Therefore, this autonomous system has five equilibrium points (singular point):

$$E_1(0, 0), E_2(0, 1), E_3(1, 0), E_4(1, 1), E_5\left[\frac{C_2}{(1-k)R}, \frac{C_1}{kR}\right]$$

According to the method proposed by Friedman, if there is a population dynamic systematically described by the differential equation, its stability at the equilibrium point is obtained through a local stability analysis of the Jacobian matrix.

(1) When  $kR > C$  and  $(1 - k)R > C_2$ , there is Jacobian matrix  $\det J > 0$  and  $\text{tr} J < 0$  in the point  $E_1(0, 0)$  and  $E_4(1, 1)$ , that is  $E_1(0, 0)$  and  $E_4(1, 1)$  are locally and asymptotically stable points, and their evolutionary stable strategy (ESS) are (non-cooperation, non-cooperation) and (cooperation, cooperation),  $S = \{(0, 1 - p), (q, 1 - q)\}$

It shows that when the net benefits of the cultural and creative enterprises in both, the Chinese mainland and Taiwan gained through cooperation surpass the costs each of them invest earlier for cooperation, the point  $E_1(0, 0)$  (cultural and creative enterprises in both Chinese mainland and Taiwan tend to non-cooperate) and the point  $E_4(1, 1)$  (cultural and creative enterprises in both Chinese mainland and Taiwan trend to cooperate) are the evolutionary stable strategy of the system. The problem remains that which one point will be the last equilibrium point, that is, whether they work together finally, and in what proportion these two sides will choose one of them. This topic will be discussed in the parameter analysis part.

In this dynamic and autonomous system, the other three equilibrium points cannot be locally and asymptotically stable points. Therefore, other strategies cannot be the evolutionary stable strategy of the system (ESS).

### Duplicate Dynamic Equation and Evolutionary Stable Strategy under the Support of Government

The researchers assume that the government has launched some relevant support policies to

encourage cooperation such as subsidies for cultural and creative enterprises adopting cooperation in both sides of the Taiwan Strait, and the government subsidies they receive are  $D_1 > 0, D_2 > 0$ , respectively. Given the same other assumptions above, the researchers can get the game payoff matrix with government support between cultural and creative enterprises that respectively adopt cooperative and non-cooperative strategy in both, the Chinese mainland and Taiwan. The matrix is shown in Table 2.

In the same way, the duplicate dynamic equation of growth rate with government support for cultural and creative enterprises adopting cooperation strategy in Chinese mainland is,

$$p = p(1 - p)(qkR - C_1 + D_1) \tag{3}$$

Similarly, the duplicate dynamic equation of growth rate with government support for cultural and creative enterprises adopting cooperation strategy in Taiwan is,

$$q = q(1 - q)[p(1 - k)R - C_2 + D_2] \tag{4}$$

A two-dimensional, dynamic and autonomous system is made up of (3) and (4),

$$q = q(1 - q)[p(1 - k)R - C_2 + D_2]$$

This autonomous system has five equilibrium points (singular point):

$$E_1(0, 0), E_2(0, 1), E_3(1, 0), E_4(1, 1), E_5$$

$$\left[ \frac{C_2 - D_2}{(1 - k)R}, \frac{C_1 - D_1}{kR} \right]$$

The trace of the Jacobian matrix is:

$$trJ = (1 - 2p)(qkR - C_1 + D_1) + (1 - 2q)[p(1 - k)R - C_2 + D_2]$$

(2) When,

$kR > C_1, (1 - k)R > C_2, C_1 > D_1 > 0, C_2 > D_2 > 0, \det J > 0,$  in the point  $E_1(0, 0)$  and  $E_4(1, 1)$ , that is  $E_1(0, 0)$  and  $E_4(1, 1)$  are locally and asymptotically stable points, and their evolutionary stable strategy (ESS) are (non-cooperation, non-cooperation) and (cooperation, cooperation). It suggests that when the net benefits for cultural and creative enterprises in both the Chinese mainland and Taiwan gain through cooperation surpass the costs each of them investing earlier for co-

operation, and when the government subsidies they receive are less than the upfront costs, both sides tend to be uncooperative or cooperative. The problem remains that which one will be the last strategy, that is, whether they work together finally, and in what proportion these two sides will choose one of that. This topic will be discussed in the parameter analysis part.

(3) When

$C_1 > D_1 > C_1 - kR, C_2 > D_2 > C_2 - (1 - k)R, \det J > 0,$  #  $tr J < 0$  in the point  $E_1(0, 0)$  and  $E_4(1, 1)$ , that is, their evolutionary stable strategy (ESS) also are (non-cooperation, non-cooperation) and (cooperation, cooperation). It suggests, although the net benefits which cultural and creative enterprises in both Chinese mainland and Taiwan gain through cooperation are less than the costs each of them invest earlier for cooperation, the government subsidies they receive, not reaching the costs, overcome the difference between the costs and the net benefits. In this situation, there are two strategies for their final choice: both sides can choose to cooperate or choose not to cooperate. The final evolutionary behavior of enterprises is the same as situation (2), which is shown in the parameter analysis part.

(4) When  $D_1 > C_1, C_2 > D_2 > C_2 - (1 - k)R$ , the point  $E_1(0, 0)$  is the only point that exists  $\det J > 0, tr J < 0$  that is  $E_4(1, 1)$ , is the only locally and asymptotically stable point, its evolutionary stable strategy (ESS) is (cooperation, cooperation). It suggests that when the government subsidies received by cultural and creative enterprises in mainland Chinese surpass the upfront costs for cooperation, and those received by Taiwan do not reach the costs also surpass the shortfall between the costs and the net benefits, both sides all finally tend to cooperate.

(5) When  $D_1 \geq C_1, D_2 \geq C_2$ , the point  $E_4(1, 1)$  is the only point that exists  $\det J > 0, tr J < 0$ , that is  $E_4(1, 1)$ , is the only locally and asymptotically stable point, its evolutionary stable strategy (ESS) is (cooperation, cooperation). It sug-

**Table 2: Game Payoff Matrix of cooperation between cultural and creative enterprises in both sides of the Taiwan Strait**

		<i>Cultural creative enterprises in Taiwan</i>	
		<i>1 (Cooperation)</i>	<i>2 (Non-cooperation)</i>
<i>1</i>	<i>2</i>		
		<i>1 (Cooperation)</i>	<i>2 (Non-Cooperation)</i>
<i>Cultural Creative Enterprises in Chinese Mainland</i>		$R_1 + kR - C_1 + D_1$ $R_2 + (1 - k)R - C_2 + D_2$ $R_1, R_2 - C_1 + D_1$	$R_1 - C_1 + D_1, R_2$ $R_1, R_2 \#$

gests that when the government subsidies received by cultural and creative enterprises in Taiwan surpass the upfront costs for cooperation, and those received by Chinese mainland do not reach the costs also surpass the shortfall between the costs and the net benefits, both sides all finally tend to cooperate.

(6) When  $D_1 \geq C_1, D_2 \geq C_2$ , the point  $E_4(1,1)$  is the only point that exists  $\det J > 0, \text{tr} J < 0$ , that is  $E_4(1,1)$ , is the only locally and asymptotically stable point, its evolutionary stable strategy (ESS) is (cooperation, cooperation). It suggests when the government subsidies received by cultural and creative enterprises in both Chinese mainland and Taiwan surpass the costs each of them invest earlier for cooperation, both sides all finally tend to cooperate.

Situation (4), (5), (6) have the only evolutionary stable strategy (ESS) of (cooperation, cooperation). To sum up, the conclusion is that although the net benefits from cooperation between cultural and creative enterprises in both Chinese mainland and Taiwan are not high and the upfront costs are higher (such as initial stage of cooperation), that is, the net benefits are less than the costs each of them invested earlier for cooperation, they will choose the cooperative strategy eventually only if the government subsidies received by one of the both sides (no matter which one) exceed the upfront costs for cooperation and another despite not reaching the costs also surpass the shortfall between the costs and the net benefits.

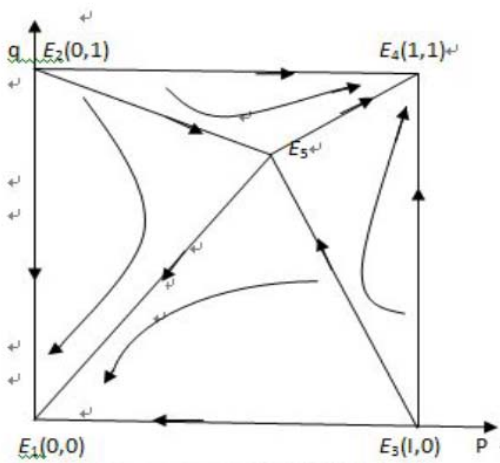


Fig. 1. System dynamic evolutionary figure of situation (1)

### PARAMETER ANALYSIS

The researchers assume that the initial state of the enterprises' behavior in both sides is distributed in the area of randomly and evenly. The adjustment of parameters will affect the enterprises' behavior on both sides. The following is to discuss the influence the feasible control methods of the parameters' change on the system evolutionary behavior. The researchers use Figures 1 and 2 to describe it.

**1. Parameter R.** Parameter  $R$  denotes the prospective additional gross net benefits gained by cooperation of cultural and creative enterprises in Chinese mainland and Taiwan (profits gained by cooperation deduct the costs to maintain cooperation in both sides). When the distributive proportion coefficient is definite, the increase of means the net benefits gained by cooperation increase, which leads to a rise in the net profits for each of cultural and creative enterprises in the Chinese mainland and Taiwan, that is, the saddle point  $E_5$  confirmed by probability  $p, q$  is closer to the bottom left, and the borderline confirmed by the fold line links between the unstable equilibrium points  $E_2(0,1) E_3(1,0)$  and the saddle point  $E_5$  is closer to the point  $E_1(0,0)$ , and the area of  $E_2 E_5 E_3 E_4$  is larger, that means, the cooperation strategy (that is, which converges to  $E_4(1,1)$ ) that enterprises will select with higher probability. Contrarily, when  $R$  decreases, it means that the net benefits gained by cooperation decrease, which leads to a drop in the net profits for each of them, that is, the saddle point  $E_5$  confirmed by probability  $p, q$  is closer to the upper right, and the borderline confirmed by the fold line links between the unstable equilibrium points  $E_2(0,1) E_3(1,0)$  and the saddle point  $E_5$  is closer to the point  $E_4(1,1)$ , and the area of  $E_2 E_5 E_3 E_4$  is smaller and the area of  $E_2 E_5 E_3 E_1$  is larger, that means, the non-cooperation strategy (that is, which converges to  $E_1(0,0)$ ) that enterprises will select with higher probability.

**2. Parameter k.** Parameter  $k$  denotes the proportion of net benefits obtained by cultural and creative enterprises in Chinese mainland account for the gross net benefits gained by cooperation of both sides, and for Taiwan is  $1-k$ . When  $k$  increases, it means the proportion of net benefits enterprises obtain in the Chinese mainland increases, which leads to a rise in the net profits for the Chinese mainland, that is, the saddle point  $E_5$  confirmed by probability  $p, q$  is closer to the

upper right, while the cooperation strategy that the enterprises in Chinese mainland will select with higher probability and the enterprises in Taiwan will have lower probability. When  $k$  decreases, it means the proportion of net benefits enterprises obtain in Chinese mainland decreases, which leads to a drop in the net profits for Chinese mainland, that is, the saddle point  $E_5$  confirmed by probability  $p, q$  is closer to the bottom left, while the cooperation strategy that the enterprises in Chinese mainland will select with lower probability and the enterprises in Taiwan will have higher probability.

**3. Parameter  $C_p, C_2$ .** Parameter  $C_p, C_2$  denotes the upfront costs needed for cooperation, and for the Chinese mainland is denoted by  $C_p$ , while Taiwan is denoted by  $C_2$ . An increase in  $C_p, C_2$  means an increase in the upfront costs, that is to say, the saddle point  $E_3$  confirmed by probability  $p, q$  is closer to the upper right, and the borderline confirmed by the fold line links between the unstable equilibrium points  $E_2(0,1)E_3(1,0)$  and the saddle point  $E_3$  is closer to the point  $E_4(1,1)$ , and the area of  $E_2E_3E_4$  is smaller and the area of  $E_2E_3E_4E_1$  is larger, that means, the non-cooperation strategy (that is, which converges to  $E_1(0,0)$ ) that enterprises will select with higher probability. In contrast,  $C_p, C_2$ , when decreases, the saddle point confirmed by probability  $p, q$  is closer to the bottom left, and the borderline confirmed by the fold line links between the unstable equilibrium points  $E_2(0,1)E_3(1,0)$  and the saddle point  $E_3$  is closer to the point  $E_1(0,0)$ , and the

area of  $E_2E_3E_4$  is larger, that means, the cooperation strategy (that is, which converges to  $E_4(1,1)$ ) that enterprises will select with higher probability.

**4. Parameter  $D_1, D_2$ .** Because of  $D_1 > 0, D_2 > 0$ , when other parameters' value is invariant, the point  $E_5$  will move to the bottom left, and the larger  $D_2$  is, the more left the point  $E_5$  moves to, that is, it is closer to vertical axis. Moreover, the larger  $D_1$  is, the more it moves to the bottom the point  $E_5$  moves to, that is, it is closer to horizontal axis. In brief, compared with situation (1) the borderline confirmed by the fold line links between the unstable equilibrium points  $E_2(0,1)E_3(1,0)$  and the saddle point  $E_3$  is closer to  $E_1(0,0)$ . Therefore, the area of  $E_2E_3E_4$  is larger than situation (1). It means that the probability of cooperation strategy that both sides enterprises select will be higher than situation (1) (Fig. 2). It also means that there are more cultural and creative enterprises on both sides that will choose the cooperation strategy only if they receive government funding whatever the strength is, of course, the more strength is, the more enterprises are.

According to the analysis above, the researchers can also find that a gain of government support will greatly influence whether the enterprises choose cooperation strategy eventually: when they do not have government support, the best situation is that a few enterprises will choose cooperation; and under the same condition, more enterprises will choose cooperation if they have government support even though the support is not strong. Without doubt, when the government support is strong enough, the enterprises from both sides will choose the cooperation strategy eventually as the researchers can see from situation (4), (5), (6).

At this point, the researchers analyze all cases in which those enterprises will choose the cooperation strategy eventually (including the situations where the government provides support or not). In the first three situations there are two evolutionary stable strategies: both sides all trend to non-cooperate or cooperate, and in what proportion these two sides will choose cooperation strategy, which is affected by the parameters. Therefore, the researchers discuss all parameters and how they influence the results in the parameter analysis. In the latter three situations there is only one evolutionary stable strategy, that is—both sides choose the cooperation strategy.

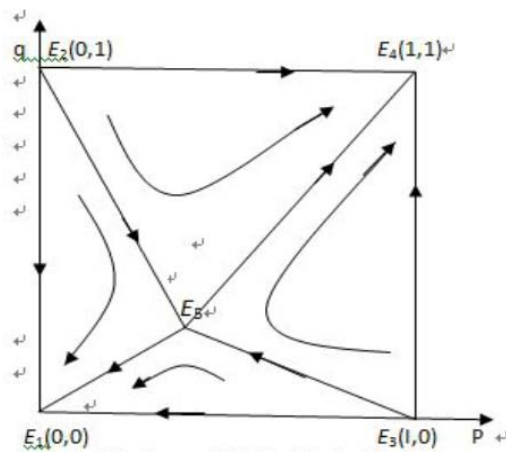


Fig. 2. System dynamic evolutionary figure of situation (2)

The researchers have applied evolutionary game theory to build a model of evolutionary game for cross-strait cooperation in cultural and creative industries. They also discuss and conduct a parameter analysis about the situations under which enterprises from both sides of the strait will choose to cooperate with the other. In all, the researchers can get the result as follows:

1. Cultural and creative enterprises from both sides of the strait can complement one another and take the advantage of each other's strengths so that they get the best benefits of cooperation.

2. The role of the government is very important. In particular, when at the initial stage of cooperation the income of cross-strait cultural and creative enterprises cooperation is low and the initial investment cost is large, few companies are willing to cooperate, and the positive behavior of the government is likely to change this situation. The government can build a cultural and creative industrial park and reduce the initial cost of the cross-strait cultural and creative enterprises to promote their active cooperation. To encourage cross-strait cooperation in the cultural and creative industry, the government can also support the enterprises with funds and provide tax reductions and exemptions. In fact, even if only the cultural and creative businesses from one side (for example, Mainland of China) can get strong government support, cultural and creative businesses from the other may start to receive some government support as well, which will attract an increasing number of cross-strait cultural and creative enterprises to choose the cross-strait cooperation.

### DISCUSSION

The theoretical results above are drawn only from the perspective of the cost-benefit concept in economics. If the researchers use the basic study method of the anthropology-field investigation method, problems might occur. After making further onsite observations and doing in-depth interviews in Xiamen Longshan, Xiamen Niuzhuang, Fuzhou Shaoyuan No.1 and the Strait Cultural Creative Park, the researchers found that, even if the local government made a contribution actively towards building the cultural creative industrial park where little or even no rental was charged for the first three years, it was still difficult to attract Taiwan creative design enter-

prises to enter. Although Xiamen and Taiwan share Minnan culture and Xiamen is the place where cross-strait communications happen most frequently, there are differences in ideas, aesthetic and behaviors between people on the two sides because of different political institutions and decades of separation. As a result, products designed by well-known Taiwanese designers cannot be completely recognized by customers in China's mainland. In addition, if companies in Taiwan want to cooperate with enterprises from the Chinese mainland, the differences may lead to high transaction costs. Eventually, it turns out that Taiwan independent creative design companies find it hard to survive in Mainland China.

Therefore, the inevitable results deduced from economic theory have been challenged. The study of pure economics tells us that there are complementary advantages and win-win situations between Taiwan that have excellent design capacity and China mainland that has solid foundation of manufacturing and a huge consumer market. The cooperation in the cultural and creative industry between the two sides should have been in full swing and upgrading with the support of the government. The creative design companies in Taiwan would have entered creative industry parks in China mainland one after another. However, in reality, despite that creative parks have been calling for Taiwan design companies actively by offering favorable conditions to attract them, the creative design companies in Taiwan did not choose to enter. This phenomenon cannot be explained by economic theory alone, but it can be better explained and understood from an anthropological perspective. Indeed, this phenomenon is caused by cultural differences between the crowds of the two sides. When cooperation occurs between people with different cultural backgrounds, the researchers should apply not only economics theory, but also involve an anthropological perspective into the analysis of the case. One needs to analyze different values, ideas and behaviors of people from different cultural backgrounds and see how the differences may affect the cooperation.

The study of cultural anthropology also tells that two different kinds of cultural systems may somehow converge by influencing and exchanging ideas with each other. So it is possible that differences will gradually be reduced, and eventually misunderstandings might be eliminated entirely. In order to remove the barriers of com-



prehensive cooperation between Taiwan and the Chinese mainland, the governments should not only build cultural and creative parks or provide a tax reduction and exemption, but also actively promote comprehensive exchanges and communications to enhance mutual understanding and trust of both sides (Tian 2014; Tian et al. 2013).

### CONCLUSION

After the analyses and discussions above, the conclusions can be drawn as follows:

1. When cultural and creative enterprises in China mainland and Taiwan seek partnership with the other side they should understand each other's advantages to remedy their own weaknesses and complement each other. To be more specific, good creative ideas and management in Taiwan's cultural and creative enterprises can be combined with a huge consumer market and sufficient funds in China mainland organically so both sides can gain great benefits, which is essential for sustainable cooperation.

2. The governments should play positive roles in promoting and facilitating the cooperation. The government, especially the government of mainland China, can construct cultural creative industrial parks, build cultural creative websites and setup associations for cultural and creative enterprises from both sides to provide a platform for their cooperation, promote the communication of information as well as mutual understanding and decrease the initial costs of cooperation to motivate the enterprises to cooperate.

3. The government can launch some preferential policies to motivate the cooperation of both sides such as setting up funds specially for cultivating the cooperation (financial support for enterprises that choose cooperation) and providing tax deductions to support the enterprises that are in the initial stage of cooperation.

4. Cultural and creative industry, as a new industry whose core asset is intelligence and creative ideas, cannot develop well unless the intellectual property is under strong protection. Without this, copyrights infringers can erode benefits and actual profits of cooperation will be little, which will make the cooperation hard to sustain.

5. The two sides of the strait should be open to each other comprehensively, have multilevel, multi-channel exchanges and communications,

establish more cross-strait communication governmental organizations and civil society institutions, and increase mutual understanding and trust so as to remove cultural barriers on the way to better cooperation between cultural and creative enterprises from both sides.

### RECOMMENDATIONS

It is suggested that the governments, especially the governments at various levels in mainland China should pay high attention to intellectual property and enhance intellectual property protection for cultural and creative industry to defend their copyrights and therefore provide a good institutional environment for their cooperation. Without the perspectives and methods of anthropology to analyze cross-regional and cross-cultural issues, the conclusions may be impractical and unreliable. On the contrary, by including theory and methods of anthropology into the discussion, a study of this type regarding issues will be more realistic and valuable.

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