World Scientific Research Journal Volume 5 Issue 9, 2019
ISSN: 2472-3703 DOI: 10.6911/WSRJ.201909_5(9).0015

Creative Incentive Contract Design of Cultural Creative Industry Chain in the Perspective of Ambidexterity

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Abstract

Based on the clash of "artistic" and "commerce" of cultural creative industry, this paper is aims to enhance the enthusiasm of creative designers and promote the coordination of ambidexterity. We construct the creative incentive contract model of the cultural creative industry chain, analyze the influence of model parameters on the optimal input level and optimal incentive level of the creative designer in the two design activity, explore the issue of investment transfer caused by changes in external or personal conditions. Results show that: 1) the lower cost of the creative designer in a design activity can increase the level of the incentive and input in the activity, and reduce the incentive and input level of the other activity. 2) High risk of any design activity can reduce the incentive level of creative designers in two design activities. 3) The change of ambidexterity correlation can transfer the activity input of the creative designer. If the correlation increases, the transfer direction is inferior activity to the dominant activity, if the correlation decreases, the direction will be opposite.

Keywords

Ambidexterity; cultural creative industry; incentive; contract.

1. INTRODUCTION

In the era of knowledge-driven economy, cultural creative industry triggers an economic wave across the world. The output of USD 2250 billion was created in 2016, exceeding global output in telecommunications industry and GDP of India. In the same year, 29.50 million of operating posts were created, and the number of employees accounted for nearly 1% of total world population. Cultural creative industry is of ambidexterity of high commerce and artistry[1]. The deviation to either party will lead to obstruction of creative value achievement. The industry chain operation mode which is oriented to link division and takes the contract as a bond provides the preliminary thought for solving the conflict of ambidexterity. On this basis, studying the incentive contract of cultural creativity industry chain in the perspective of ambidexterity carries important significance for promoting innovative vigor and economic benefit of creative enterprises and then accelerating the development of cultural innovative industry.

The design of income distribution contract linked with creative commercial value based on Dual Task Principal-agent Theory can resolve quantitative incentive problem of creative designers and stimulate creative designers to complete commercial design activity and artistic design activity, thus coordinating ambidexterity of creativity. Dual task principal-agent issue has extensive research basis in the academic circle. Aghion et al. took into account of the contradiction between short-term selling profit and strategic growth and designed the two-period multitask contract on this basis[2]. Kaarboe et al. considered dual task principal-agent issue of medical service supply chain, designed a contract model and verified its positive incentive function[3]. Hosseinian et al. established the optimal linear incentive model for risk

ISSN: 2472-3703 DOI: 10.6911/WSRJ.201909_5(9).0015

neutral contractors[4]. However, existing studies lack organic combination with cultural creativity industry, and there are even rare researches on dual task principal-agent issue based on ambidexterity problem of cultural creative industry.

In conclusion, this study considers stimulating the creativity which conforms to market conditions at the upstream and downstream of the industry chain through lengthways stripping creative designers and creative operators and crosswise stripping artistic design and market design so as to solve the harmonic problem of ambidexterity of cultural creative industry. The dual task principal-agent model is constructed, and the optimal risk sharing and interest distribution mechanism of two design activities under the condition of information asymmetry is studied. On this basis, the effects of design cost and risk aversion on the optimal contract and the optimal behavior of creative designers are planned to be solved.

2. CREATIVE INCENTIVE MODEL OF CULTURAL CREATIVE INDUSTRY CHAIN

2.1. Model Description and Hypothesis

We consider that creative designers (hereinafter referred to as “designers”) and creative operators (hereinafter referred to as “operators”) in the cultural creative industry chain carry out creative industrialized and commercial activities through principal-agent cooperation. The operators as the principals let the originality to be contracted, and sign the incentive contract with the designers as the agents, including fixed investment and expected performance, to stimulate designers to produce the excellent originality with both artistry and marketability (for example, an animation production issuing company entrusts an animation creation tram for original creation, and promises the fixed investment support and future performance distribute). After accepting the excellent cultural creativity that the designer provides, the operator is responsible for the follow-up creative industry process, including production, issuance and operation of creative products and derivatives at all levels.

An important characteristic of cultural creative industry lies in its high risks. The high risks make the expected performance after creativity industrialization uncertain: the originality with great energy input may encounter the commercial crisis, while the ordinary creativity may be accepted by the market. This may cause moral hazard of nonfeasance of upstream designers. Hence, incentive contract meets the optimal risk sharing of both parties.

The implementation process of incentive contract involves the following five steps:

1) The operator designs the incentive contract which contains basic fixed investment, expected income distribution mode of creative products and payment time node in the preliminary stage of creativity contract awarding according to the optimal income.

2) The designer weighs the cost and income and decides whether to accept the contract. When the expected income is not lower than the retained earnings, they will sign a contract, and then the contract takes effect.

3) The designer conducts two design activities (marketization and artistry), and take expected benefit maximization as the goal to choose the optimal investment of two design activities until the originality is fitted, completed and submitted.

4) The operator regards revenue maximization as the objective to carry out sufficient product-based and industrialized operation of the originality.

5) After the contracted time node is met, the operator checks the project revenue and pays the designer as per the contract.

The research hypotheses are as below:

ISSN: 2472-3703 DOI: 10.6911/WSRJ.201909_5(9).0015

Hypothesis 1 The risk of the operator is neutral, and the designer avoids the risks. Besides, there is constant Arrow-Pratt absolute risk aversion degree $\rho\ (>0)$.

Hypothesis 2 The designer exhibits the performance through artistic design activities $s_1=\psi_1 h_1+\theta_1$, and exhibits the performance through market design activities $s_2=\psi_2 h_2+\theta_2$. The total performance refers to commercial value of originality after industrialization, and the numerical value is equal to the sum of performance of two activities, namely $S=s_1+s_2$. Wherein, ψ_1 refers to the designer's artistic attainments, and ψ_2 is the designer's market awareness. h_1、$h_2\ (>0)$ are the investment degrees of two design activities, respectively. $\theta_1 \sim N\left(0,\sigma_1^2\right)$, $\theta_2 \sim N\left(0,\sigma_2^2\right)$ refer to external uncertain factors disturbing the performance of two design activities, and θ_1 and θ_2 are not related to each other.

Hypothesis 3 The cost function of the designer in the process of completing the creative products is $C(h_1,\ h_2)=l_1h_1^2/2+l_2h_2^2/2+\omega h_1h_2$ [5], where l_1 and $l_2\ (>0)$ are the cost coefficients of two design activities. $\omega(0\le\varphi\le1)$ is binary correlation coefficient, and means the inhibition of the completion of a design activity to another design activity. In particular, φ=0 represents inaction.

Hypothesis 4 The risks exist in the cultural creative industry in many aspects, like the risk of creative design failure, market acceptance risk, risk of malicious competition, and intellectual property risk resulting from originality leakage, embezzlement and imitation. All these risks affect both creative design activities[6]. In addition, the specific risks of artistic design include too long creation period caused by perfectionism. The risks of market-based design include the risks of laws and regulations brought by demand vulgarization.

Hypothesis 5 The operator designs the linear contract $W=\alpha+\beta_1 s_1+\beta_2 s_2$, wherein W is the remuneration of the designer, and a is the fixed investment provided by the operator for the designer to guarantee the basic expenditure of creative design. $\beta_1,\ \beta_2(0\le\beta_1,\ \beta_2\le1)$ are the incentive coefficients of two design activities.

2.2. Model Establishment and Solution

The designer's deterministic equivalent income is:

$$\mathrm{CE}=\alpha+\beta_1\psi_1h_1+\beta_2\psi_2h_2-1/2l_1h_1^2-1/2l_2h_2^2-1/2\rho\beta_1^2\sigma_1^2-1/2\rho\beta_2^2\sigma_2^2-\omega h_1h_2 \qquad (1)$$

The operator faces two constraints during designing the creative incentive: 1) involvement restriction (IR), that is, the expected revenue needs to be greater than or equal to the reservation utility $\bar{r}$ when the designer accepts the contracts; 2) incentive compatible constraint (IC), that is, when the designer's performance cannot be observed in the two design activities, the designer will choose the effort level to maximize deterministic equivalent income. The operator needs to determine α, β_1 and β_2 under IC and IR to achieve revenue maximization. The creative incentive of the operator and designer can be deemed ad the following planning problems:

$$\begin{aligned}
&\max_{\alpha,\ \beta_1,\ \beta_2} \quad -\alpha+(1-\beta_1)\psi_1h_1+(1-\beta_2)\psi_2h_2\\
(\mathrm{T1}) \quad &s.t.\\
&h_1,\ h_2\in\arg\max \mathrm{CE} \qquad (\mathrm{IC})\\
&\mathrm{CE}\ge\bar{r} \qquad (\mathrm{IR})
\end{aligned}$$

ISSN: 2472-3703 DOI: 10.6911/WSRJ.201909_5(9).0015

Solve IC and gain the optimal input of two design activities:

$$h_1 = \frac{\psi_1\beta_1 l_2 - \psi_2\omega\beta_2}{l_1 l_2 - \omega^2}, h_2 = \frac{\psi_2\beta_2 l_1 - \psi_1\omega\beta_1}{l_1 l_2 - \omega^2} \tag{2}$$

The operator's optimal choice is to only pay the designer the remuneration equal to the revenue reserve, so the equal sign is taken for IR, and h_1^* and h_2^* solved in IC are substituted into the objective function to remove α, h_1^* and h_2^*. And, the equivalence problem is obtained:

$$(\mathrm{T2}) \quad \max_{\beta_1,\ \beta_2} -\bar{r} + \psi_1\left(\frac{\psi_1\beta_1 l_2 - \psi_2\omega\beta_2}{l_1 l_2 - \omega^2}\right) + \psi_2\left(\frac{\psi_2\beta_2 l_1 - \psi_1\omega\beta_1}{l_1 l_2 - \omega^2}\right) - \frac{l_1}{2}\left(\frac{\psi_1\beta_1 l_2 - \psi_2\omega\beta_2}{l_1 l_2 - \omega^2}\right)^2 - \frac{l_2}{2}\left(\frac{\psi_2\beta_2 l_1 - \psi_1\omega\beta_1}{l_1 l_2 - \omega^2}\right)^2 - \omega\left(\frac{\psi_1\beta_1 l_2 - \psi_2\omega\beta_2}{l_1 l_2 - \omega^2}\right)\left(\frac{\psi_2\beta_2 l_1 - \psi_1\omega\beta_1}{l_1 l_2 - \omega^2}\right) - \frac{\rho\beta_1^2\sigma_1^2}{2} - \frac{\rho\beta_2^2\sigma_2^2}{2}$$

Solve T2 and gain the optimal incentive coefficients of two design activities:

$$\beta_1 = \frac{\psi_1^2\psi_2^2 + \left(\psi_2 l_1^2 - \omega\psi_1\psi_2\right)\rho\sigma_2^2}{\psi_1^2\psi_2^2 + \psi_2 l_1^2\rho\sigma_2^2 + \psi_1 l_2\beta_2^2\sigma_1^2 + \beta_1^2\sigma_1^2\left(l_1 l_2 - \omega^2\right)} \tag{3}$$

$$\beta_2 = \frac{\psi_1^2\psi_2^2 + \left(\psi_1 l_2^2 - \omega\psi_2\psi_1\right)\rho\sigma_1^2}{\psi_1^2\psi_2^2 + \psi_1 l_2^2\rho\sigma_1^2 + \psi_2 l_1\beta_2^2\sigma_1^2 + \beta_1^2\sigma_1^2\left(l_1 l_2 - \omega^2\right)} \tag{4}$$

Formula (7) and Formula (8) are substituted into Formula (6) to gain the optimal investment of the designer into the two design activities:

$$h_1 = \frac{\psi_1^2 l_2\left(\psi_1\psi_2^2 - \psi_2\omega\rho\sigma_2^2 + \psi_1 l_2\rho\sigma_2^2\right) - \psi_2^2\omega\left(\psi_1^2\psi_2 - \psi_1\omega\rho\sigma_1^2 + \psi_2 l_1\rho\sigma_1^2\right)}{\left(\psi_1^2\psi_2^2 + \psi_1^2 l_2\rho\sigma_2^2 + \psi_2^2 l_1\rho\sigma_1^2 + \rho^2\sigma_1^2\sigma_2^2\left(l_1 l_2 - \omega^2\right)\right)\left(l_1 l_2 - \omega^2\right)} \tag{5}$$

$$h_2 = \frac{\psi_2^2 l_1\left(\psi_1^2\psi_2 - \psi_1\omega\rho\sigma_1^2 + \psi_2 l_1\rho\sigma_1^2\right) - \psi_1^2\omega\left(\psi_1\psi_2^2 - \psi_2\omega\rho\sigma_2^2 + \psi_1 l_2\rho\sigma_2^2\right)}{\left(\psi_1^2\psi_2^2 + \psi_1^2 l_2\rho\sigma_2^2 + \psi_2^2 l_1\rho\sigma_1^2 + \rho^2\sigma_1^2\sigma_2^2\left(l_1 l_2 - \omega^2\right)\right)\left(l_1 l_2 - \omega^2\right)} \tag{6}$$

3. MODEL ANALYSIS

3.1. Effect of Cost Coefficient on Optimal Input and Incentive Strength

Proposition 1 l_m presents the negative correlation with h_m and β_m, and shows the positive correlation with h_n and β_n, where β_i and β_j decrease with l_i change range.

If the designer pays large cost in the artistic design process, the artistic attainments of the works improve slowly, and the designer's creative enthusiasm will decrease, and transfer to market compliance promotion design of the works. Then, the operator's incentive for artistic design dimension task is also reduced. If the designer pays large cost in the market compliance design and the works gradually deviate from public aesthetics, the input in the market compliance design will further decrease, and the designer then transfers to artistic design of the works. Thus, the less incentive is gained.

ISSN: 2472-3703 DOI: 10.6911/WSRJ.201909_5(9).0015

When the cost paid to a design activity is high, this means the design is puzzled so that the design is completely abandoned, which is adverse to balanced development of the two design activities. The operator should know the situation of works according to market feedbacks, pay sufficient attention to the gap of cost between the two design activities, reduce the designer's dislike of puzzled design through sufficient communication, psychological counseling and moral encouragement, fully understand and solve the reason for cost increase. After the cost decreases to an acceptable range, the two design activities can restart again to ensure smooth fulfillment of the incentive contract.

3.2. Effect of Environmental Uncertainty on Optimal Input and Incentive Strength

Proposition 2 σ_m^2 is positively correlated with h_n, and negatively correlated with h_m, β_m and β_n.

The high risks of cultural creative industry make the two design activities faced with expectation uncertainty. When the interference of artistic design is low, the return of this activity is expected, so the designer's enthusiasm for artistic design is high. As the risks of artistic design increase, the designer's enthusiasm for the activity decreases, and pays more attention to marketability design. No matter which activity increases the risk, the total prospect of the works will be affected, and the market expectation foe the works will lower. Thus, the operator will reduce the incentive strength of the two activities, and the range of strength reduction will decrease gradually.

When a design activity confronts the external disturbance which is big enough, the designer will totally give up performance-oriented design input. The operator will not continue to provide the incentive measures. And, basic fixed guarantee is only provided, and the design depends on the designer's enthusiasm. If the operator wants to restart the incentive effect, more attention should be paid to the peer's benchmarking to reach the purpose of eliminating external risks in the way of "relative performance comparison". In this way, the input degree of creative designer cam be displayed more clearly, and the "passive" ideology can be avoided.

3.3. Effect of Ambidexterity on Optimal Input and Incentive Strength

Proposition 3 In the definition domain of $\omega \in \left(0, \sqrt{l_1 l_2}\right)$, two possible relations exist between independent variable and dependent variable: 1) ω presents first negative correlation and then positive correlation with h_n, and shows negative correlation with h_m, β_m and β_n; 2) ω presents first negative correlation and then positive correlation with h_n and β_n, and shows negative correlation with h_m and β_m.

The mutual obstruction degree of artistry and marketability in the design process of creative products is mainly influenced by external and internal aspects: management level and external aesthetic vision of audiences. The management level is high, and the management problem of ambidexterity coordination. As well, the binary obstruction faced by the diversified designers in the creation process is low. On the contrary, if the innovation management level of the designer organization is poor, and the audience of the works is single, the binary obstruction faced in the creation process is large.

When the binary obstruction degree is higher, the allocation proportion of two design activities given to the designer by the operator will decrease. If the obstruction further increases, the phenomenon of input transfer will happen: the designer's input in the disadvantaged design activity will be gradually transferred to the advantageous design activity. If the creative designer wants to consider ambidexterity and gain the extensive revenue, lateral modularization means can be taken to strip art module and market module. If the operator pursues incentive effect,

ISSN: 2472-3703 DOI: 10.6911/WSRJ.201909_5(9).0015

the designer taking into account of ambidexterity should be dominated, and supplemented by the designer with high ambidexterity barrier during considering the partner.

4. CONCLUSION

The ambidexterity clash of "artistry" and "marketability" in the cultural creative industry is considered in this paper. The dual task creative incentive contract of cultural creative industry is designed to simulate the creative designer to take into account of ambidexterity during completing the design of works. The effects of design capability, risks, cost coefficient and binary correlation of two design activities of the creative designer on the optimal input level and optimal risk sharing level are investigated. Further, the input transfer phenomenon caused by the change of the above conditions is discussed.

If the creative designer owns the high ability, low cost and weak risk in a design activity, the designer will input more in the design activity. With the cost rise, risk enhancement and risk aversion, some input of the design activity will be transferred to the other design activity. If the mutual obstruction of two design activities increases, the input of creative designer will turn to the preponderant activity from the disadvantaged activity. Finally, the designer may totally give up the disadvantaged activity. For the cultural creative industry with strong binary obstruction, the operator should be dominated by the fixed investment under the large risks and the designer's risk aversion. On the contrary, the operator should be dominated by the incentive.

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