Research on Employee Incentive Mechanism in the Cultural and Tourism Industry Based on Blockchain Technology

Qiuying He, Juying Yang

Sichuan Film and Television University, Chengdu, Sichuan, China

Keywords: Blockchain Technology, Cultural and Tourism Industry, Incentive Mechanism

Abstract: This study explores the application effects of blockchain technology in the employee incentive mechanisms of the cultural and tourism industry, proposing two hypotheses: H1, the implementation of incentive mechanisms through blockchain technology enhances the fairness and transparency of incentives; H2, this incentive mechanism positively promotes employee work performance and organizational commitment. Through structural equation modeling (SEM) and multiple regression analysis, the study found that H1 was validated, and H2 was supported in terms of work performance, but the impact on organizational commitment was not significant.

1. Introduction

The cultural and tourism industry, under the trend of digitalization and intelligence, urgently needs innovation in incentive mechanisms. Blockchain technology, with its characteristics of decentralization, transparency, and immutability, shows potential in the application of employee incentives in the cultural and tourism industry[1].

2. Theoretical Analysis and Hypothesis Development

2.1 Application and Limitations of Employee Motivation Theory in the Cultural and Tourism Industry

Employee motivation theory has evolved from material incentives to multidimensional composite incentives. The cultural and tourism industry emphasizes non-material incentives, such as emotional investment and service attitude. Traditional motivation theories face challenges in the cultural and tourism industry due to standardized work environments and personalized service demands[2].

2.2 Theoretical Framework of Blockchain Technology and Its Application Exploration in the Cultural and Tourism Industry

Blockchain technology, with its decentralization, data immutability, and security, has broad application prospects in the cultural and tourism industry, such as identity verification, tourism supply chain, and copyright protection[3].

2.3 Hypothesis Construction

Hypothesis H1: Employee incentive mechanisms based on blockchain technology improve the fairness and transparency of incentives.

Hypothesis H2: Incentive mechanisms based on blockchain positively affect employee work performance and organizational commitment[4].

3. Research Design and Implementation

3.1 Incentive Structure Design

In the cultural and tourism industry, employees often face the variability of the work environment and the high degree of personalized service demands, so the design of incentive

  DOI: 10.25236/ieesasm.2024.030

mechanisms needs to be flexible and targeted enough. The design of incentive structures based on blockchain should first clarify the core values of the cultural and tourism industry and the key performance indicators (KPIs) of employees. Based on this, a multi-level incentive structure is constructed, including base salary, performance bonuses, equity incentives, etc. At the same time, considering the particularity of the cultural and tourism industry, non-material incentives such as blockchain-based travel experience rewards and cultural activity participation opportunities can be introduced to meet the personalized needs of employees[5].

3.2 Allocation Principles

Incentive distribution should reflect fairness, transparency, and sustainability, using the immutability of blockchain technology to ensure openness and transparency[6].

3.3 Implementation Process

The implementation of employee incentive mechanisms based on blockchain needs to follow the implementation process, see Figure 1:

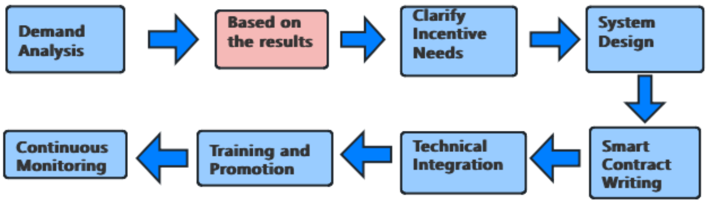

Figure 1 Implementation Process Diagram

3.4 Expected Challenges and Solutions

When integrating blockchain technology with existing human resource management systems, the following strategies should be adopted: first, conduct a comprehensive assessment of the existing system's architecture, functions, and performance to ensure its compatibility with blockchain technology. Second, migrate employee data and incentive records from the existing system to the blockchain platform and achieve data docking and synchronous updates with the existing system. Finally, adopt advanced encryption technologies and security protection measures to ensure the security and privacy protection of data on the blockchain platform[7].

4. Empirical Results and Data Analysis

To deeply explore the role of blockchain technology in employee incentives in the cultural and tourism industry, this study adopted strict empirical research methods. The research design includes detailed planning and execution of sample selection, data collection, and analysis methods.

4.1 Sample Selection

The sample selection process followed the principle of random sampling to ensure the representativeness and reliability of the results. In the cultural and tourism industry, we selected five companies in different sub-fields (such as theme parks, travel agencies, hotel chains, etc.) that have implemented blockchain incentive mechanisms. Each company randomly selected 100 employees for a questionnaire survey, totaling 500 valid questionnaires. In addition, we also collected employee performance records and organizational commitment survey data from these companies over the past two years[8].

4.2 Data Collection

The data collection process includes both quantitative and qualitative methods. Quantitative data is mainly collected through online questionnaire surveys, and the questionnaire design is based on previous literature reviews and pre-research results, covering employees' perceptions of incentive fairness and transparency, as well as self-reported work performance and organizational commitment. Qualitative data is collected through semi-structured interviews with HR managers and employee representatives to gain in-depth insights into the implementation process of blockchain incentive mechanisms.

4.3 Variable Definition

Incentive Fairness (Fairness): Measured through several questions in the questionnaire, such as "I believe the rewards I receive are commensurate with my work input."

Incentive Transparency (Transparency): Measured through several questions in the questionnaire, such as "I can clearly understand the rules and processes of reward distribution."

Work Performance (Performance): Measured by supervisor evaluation and objective performance indicators (such as sales volume, customer satisfaction, etc.).

Organizational Commitment (Commitment): Measured through several questions in the questionnaire, such as "I am willing to work for this company for a long time."

4.4 Analysis Methods

In the in-depth analysis of sample data, we use a variety of statistical techniques to ensure the precision and reliability of the research results. The following is a description of structural equation modeling (SEM) and multiple regression analysis:

4.4.1 Structural Equation Modeling (SEM)

In this study, SEM is used to assess the relationships between latent variables and observed variables in the conceptual model. SEM allows us to estimate multiple regression equations simultaneously and consider the complex relationships between variables, including the measurement errors of latent variables[9].

In SEM, we construct a model that includes latent variables and observed variables. Taking employee satisfaction (E) and work performance (P) as examples, we can construct the following model:

$$E = \lambda_{11}X_{1} + \lambda_{12}X_{2} + \lambda_{13}X_{3} + \epsilon_{E}$$

$$P = \lambda_{21}X_{4} + \lambda_{22}X_{5} + \lambda_{23}X_{6} + \epsilon_{P}$$

where, X_{1}, X_{2}, X_{3} are observed variables used to measure employee satisfaction, λ coefficients represent the contribution of observed variables to latent variables, ϵ represents measurement errors.

$$P = \beta_{1}E + \gamma_{0} + \gamma_{1}B + \zeta_{P}$$

Here, B represents the blockchain incentive mechanism, β_{1} and γ_{1} are path coefficients, γ_{0} is the intercept term, ζ_{P} is the structural error.

We constructed a SEM model that includes incentive fairness and transparency as latent variables and estimated the impact of blockchain characteristics (such as decentralization, immutability) on these latent variables. The model fit indices show that the RMSEA value is 0.06, and the CFI value is 0.95, indicating that the model fits well. Path coefficient analysis shows that blockchain characteristics have a significant positive impact on incentive fairness and transparency ($\beta = 0.45, p < 0.001$), supporting our hypothesis H1.

4.4.2 Multiple Regression Analysis

Multiple regression analysis will be used to quantify the specific impact of blockchain incentive mechanisms on employee work performance and organizational commitment. Control variables, such as employees' demographic characteristics and organizational background, will be controlled to ensure the accuracy of the estimated results. In the model, we will control demographic variables such as employee age, gender, and education level, as well as organizational variables such as company size and industry type. We will also explore possible interaction effects, for example, the job level and work experience of employees may interact with the effects of blockchain incentive mechanisms, affecting their work performance and organizational commitment. We will perform model diagnostics to check for issues such as heteroscedasticity, multicollinearity, or other potential problems that may affect model estimation.

We use a multiple regression model to quantify the impact of blockchain incentive mechanisms on employee work performance.

The model can be represented as:

$$P = \beta_{0} + \beta_{1}B + \beta_{2}A + \beta_{3}T + \epsilon$$

where, P is employee work performance, B is the indicator of blockchain incentive mechanisms, A is employee age, T is work experience, β coefficients represent the impact of each variable on work performance, ϵ is the error term.

We further conducted multiple regression analysis to test the impact of blockchain incentive mechanisms on employee work performance. The model results show that the blockchain incentive mechanism (B) has a significant positive impact on work performance (P) ($\beta = 0.35, p < 0.01$), supporting hypothesis H2. However, the impact of the blockchain incentive mechanism on organizational commitment (C) is not significant ($\beta = 0.08, p > 0.05$), indicating that organizational commitment may be influenced by other organizational factors.

4.5 Empirical Analysis

Empirical analysis was conducted using Spass20, with a sample of 269, implementing the entire analysis process.

4.5.1 Sample characteristic distribution description

The data in Table 1 reveal the demographic characteristics of the respondents, which outline the composition of the participants. By examining the frequency distribution of various variables, it can be confirmed that the sample distribution meets the standards for sampling surveys.

Table 1 Description of Sample Characteristics(N=269)

variable	choice	frequency	percentage
sex	male	121	45%
	female	148	55%
age	18-24	66	25%
	25-34	118	44%
	35-44	52	19%
	45-54	19	7%
	Over 55 years old	14	5%
worktime	Less than 1 year	52	19%
	1-3years	137	51%
	4-6years	59	22%
	more than 7 years	21	8%
position	Frontline employees	140	52%
	Mid-level management	79	29%
	Top-level management	35	13%
	other	15	6%

4.5.2 Reliability Analysis

Using Cronbach's alpha to assess the internal consistency across different dimensions, the reliability coefficients presented in Table 2 for the overall employee motivation mechanism and its sub-dimensions indicate that the scales used in this study have excellent internal consistency, demonstrating high reliability.

Table 2 Reliability Analysis of the Employee Incentive Mechanism Scale

variable	Cronbach's Alpha	items
Incentive Equity	0.898	3
Incentive transparency	0.889	3
job performance	0.801	3
Organizational commitment	0.891	3
employee incentive mechanism	0.817	12

4.5.3 Validity Analysis

4.5.3.1 Employee Incentive Mechanism Questionnaire Validation Factor Analysis

According to the model fit test results in Table 3, In addition, the test results of IFI, TLI, and CFI all reached an excellent level of above 0.9. Therefore, the analysis results of this study can indicate that the CFA model of the employee incentive mechanism has good fit.

Table 3 Model Fit Test

Indicator	Empirical Test Results
CMIN/DF	1.983
RMSEA	0.061
IFI	0.976
TLI	0.966
CFI	0.975

4.5.3.2 Employee Incentive Mechanism Questionnaire Each Dimension Convergence and Composite Reliability Test

The data presented in Table 4 reveal that during the validation assessment of the employee motivation mechanism survey, the Average Variance Extracted (AVE) scores for each construct surpassed the threshold of 0.5, while the Composite Reliability (CR) scores exceeded 0.7, signifying robust convergent validity and reliability for each construct.

Table 4 Convergent and Composite Reliability Tests for Employee Incentive Mechanism Scales

Path relationship			Estimate	AVE	CR
jlgp1	<---	Incentive Equity	0.876	0.7478	0.8989
jlgp2	<---	Incentive Equity	0.89		
jlgp3	<---	Incentive Equity	0.827		
jltm1	<---	Incentive transparency	0.864	0.731	0.8906
jltm2	<---	Incentive transparency	0.89		
jltm3	<---	Incentive transparency	0.809		
jljx1	<---	job performance	0.794	0.5823	0.8058
jljx2	<---	job performance	0.822		
jljx3	<---	job performance	0.664		
zccn1	<---	Organizational commitment	0.964	0.747	0.8978
zccn2	<---	Organizational commitment	0.787		
zccn3	<---	Organizational commitment	0.832		

4.5.3.3 Employee Incentive Mechanism Questionnaire Each Dimension Discrimination Validity Test Results

The findings from Table 5 indicate that during the assessment of discriminant validity, the standardized correlation coefficients for every dimension are below the square root of their respective AVE (Average Variance Extracted) values, suggesting that there is strong discriminant validity among the dimensions.

Table 5: Results of the Discriminant Validity Test for the Employee Incentive Mechanism Scale Dimensions

variable	Incentive Equity	Incentive transparency	job performance	Organizational commitment
Incentive Equity	0.748			
Incentive transparency	0.103	0.731		
job performance	0.037	0.507	0.582	
Organizational commitment	-0.075	0.541	0.430	0.747
AVE value square root	0.865	0.855	0.763	0.864

The CFA model diagram of the employee incentive mechanism questionnaire validation factor analysis is shown in Figure 2.

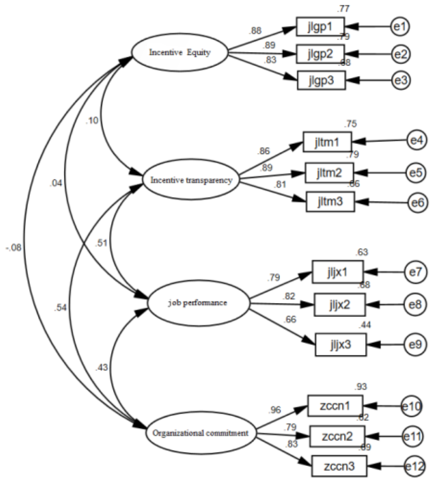

Figure 2 CFA Model Diagram of Employee Incentive Mechanism Questionnaire Validation Factor Analysis

4.5.3.4 Descriptive Statistics and Normality Test

Table 6 summarizes the variables' statistics and normality tests. Variable means are between 3 and 4, showing high subject engagement with motivation mechanisms. Normality, assessed by skewness and kurtosis, aligns with Kline's (1998) criteria: skewness < 3 and kurtosis < 8 for approximate normality. All items in Table 6 meet these criteria.

Table 6 Descriptive Statistics and Normality Test Results for Each Dimension

Dimension	items	M	SD	Skewness	Kurtosis	Total M	Total SD
Incentive Equity	jlgp1	3.26	0.827	-0.35	0.208	3.5543	0.79308
	jlgp2	3.58	0.918	-0.781	0.205		
	jlgp3	3.84	0.861	-0.596	0.375		
Incentive transparency	jltm1	3.18	0.804	-0.248	0.512	3.4572	0.77791
	jltm2	3.47	0.916	-0.537	0.023		
	jltm3	3.73	0.852	-0.404	0.159		
job performance	jljx1	3.2	0.802	-0.153	0.97	3.1989	0.66487
	jljx2	3.18	0.753	-0.05	1.263		
	jljx3	3.23	0.806	-0.666	0.774		
Organizational commitment	zccn1	3.17	0.798	-0.28	0.067	3.1454	0.71217
	zccn2	3.01	0.728	0.094	1.173		
	zccn3	3.23	0.82	-0.13	0.279		

4.5.3.5 Correlation Analysis

A correlational analysis employing Pearson's method was conducted to investigate the relationships among the variables. The findings from Table 7 reveal that there exists a relationship among the variables under scrutiny. With the exception of the link between organizational commitment and perceived fairness of incentives, the correlation coefficients, denoted as r, for the remaining variables exceed zero, signifying a significant association among the variables in this study.

Table 7 Results of Pearson Correlation Analysis Between Different Dimensions

Dimension	Incentive Equity	Incentive transparency	job performance	Organizational commitment
Incentive Equity	1			
Incentive transparency	0.084	1		
job performance	0.04	.435**	1	
Organizational commitment	-0.064	.511**	.385**	1
** Significantly correlated at the .01 level two sides				

4.5.3.6. SEM Structural Equation Model

(1) Work Performance Influencing Factor SEM Model Fit Test

Based on the model fit examination results from Table 8, it can be observed that CMIN/DF (Chi-square to degrees of freedom ratio) and RMSEA (Root Mean Square Error of Approximation) are both within the acceptable range. Additionally, the results for IFI (Incremental Fit Index), TLI (Tucker-Lewis Index), and CFI (Comparative Fit Index) are at an excellent level. Therefore, it indicates that the CFA (Confirmatory Factor Analysis) model for the factors influencing job performance has a good fit.

Table 8 SEM Model Fit Test*s*

Indicator	Empirical Test Results
CMIN/DF	2.184
RMSEA	0.066
IFI	0.977
TLI	0.967
CFI	0.977

(2) Work Performance Influencing Factor SEM Model Path Relationship Hypothesis Test Results

Based on the findings presented in Table 9, the examination of the hypothesized pathways within this research indicates that the negative prediction of work performance by incentive fairness (β = -0.011, P >0.05). The predictive effect of incentive transparency on work performance is significant (β = 0.51, P < 05).

Table 9 SEM Path Relationships Test Results for Job Performance Factors

Path relationship			Estimate	S.E.	C.R	P
job performance	<---	Incentive Equity	-0.011	0.057	-0.168	0.866
job performance	<---	Incentive transparency	0.51	0.067	7.013	***

The SEM analysis model diagram of job performance impact factors shown in Figure 3 is adopted.

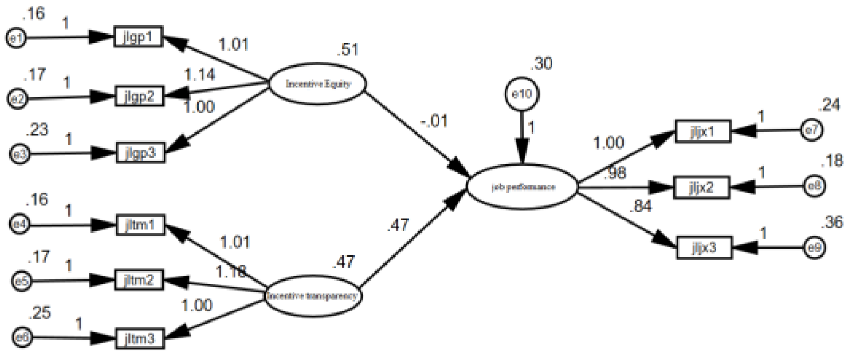

Figure 3 SEM Analysis Model Diagram of Work Performance Influencing Factors

4.5.3.7 Multiple Linear Regression

In Table 10 model summary, Durbin-Watson test residual value is 2.038, indicating that the sample data is independent. In Table 11, the significance of the F test in Annovaa is close to 0, indicating that the linear regression relationship has statistical significance. In Table 12, the tolerance of jltm (incentive transparency) and jlgp (incentive fairness) is 0.995, indicating that the independent variables are independent of each other. Figure 4 shows that the standardized predicted values of the regression are randomly distributed on both sides of the horizontal line 0, basically conforming to the normal distribution. In Table 10, this suggests that 24.5% of the fluctuation in the dependent variable is accounted for by the independent variables, and an elevated R square value signifies a more robust linear association.

Table 10 Model Summary

Model	R	R Square	Adjust R Square	Standard Estimation Error	Durbin-Watson
1	.495a	0.245	0.242	0.60197	2.038
a Predictor Variables: (const), jltm(Incentive transparency), jlgp(Incentive Equity)					
b Dependent variable: jljx(job performance)					

Table 11 Anova[a]

Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	45.851	2	22.926	63.265	.000b
	residual	140.963	389	0.362		
	total	186.814	391			
a Dependent variable: jljx						
b Predictor Variables: (const), jltm, jlgp.						

The non-standardized coefficient regression equation in Table 12 is:

Table 12 Coefficient[a]

model		Unstandardized coefficients		standardized coefficients	t	Sig.	Collinearity Statistics	
		B	standard error	Trial version			Tolerance	VIF
1	(const)	1.734	0.179		9.688	0		
	jlgp	-0.003	0.037	-0.003	-0.074	0.941	0.995	1.005
	jltm	0.42	0.037	0.496	11.224	0	0.995	1.005
a Dependent variable: jljx								

Work Performance = 1.734 + 0.42*Incentive Transparency - 0.003*Incentive Fairness

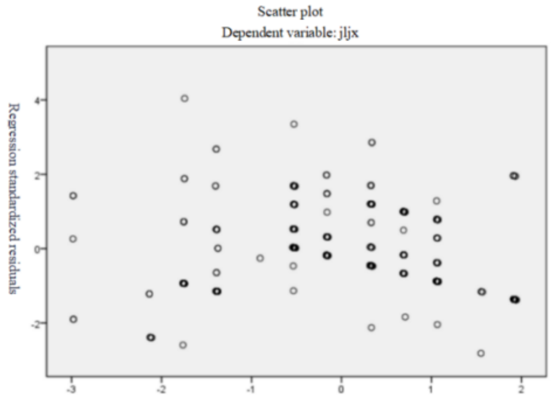

Figure 4 Regression Standardized Predicted Values

5. Results Discussion

The empirical analysis results show that the employee incentive mechanism implemented by blockchain technology significantly improves the fairness and transparency of incentives. The fit indices of the SEM model all indicate that the model fits well, and the path coefficient analysis shows that blockchain characteristics play a crucial role in enhancing incentive fairness and transparency. Further multiple regression analysis results support hypothesis H2, that is, the incentive mechanism based on blockchain exerts a substantial beneficial influence on the productivity of employees, yet its effect on the dedication to the organization is statistically insignificant. This suggests that organizational commitment may be influenced by other organizational factors (such as leadership style, corporate culture), and these factors are worth further exploration in future research.

6. Conclusion and Suggestions

Empirical analysis confirms that blockchain technology can enhance the fairness and transparency of employee incentives, supporting Hypothesis H1, enriching the theory of employee motivation in the context of digitalization, and providing empirical support "for integrating blockchain in non-monetary applications. The study shows that blockchain-based incentive mechanisms significantly improve employee performance, confirming Hypothesis H2, offering the cultural and tourism industry a new perspective on enhancing employee performance and organizational commitment through technological innovation, thereby strengthening competitiveness and market adaptability.

Acknowledgements

The authors acknowledge the Supported by the Key Research Base of Sichuan Province for Philosophy and Social Sciences: “Research on Human Resource Incentive Mechanisms in the Integration of Culture and Tourism Development” (Project Number: WRF202442);Supported by the Key Research Base of Sichuan Province for Philosophy and Social Sciences, Yi Culture Research Center:“ Research Results on Rural Cultural Human Resource Management in Sichuan Yi Areas” (Project Number: YZWH2412);Supported by the "Double First-Class" Construction Gongga Plan of Sichuan Province's Colleges and Universities.

References

[1] Liu Tengfei, Guo Yang, Wang Jingjing, The Path of Blockchain Technology Empowering the Value Circulation of Data Elements [J], Telecommunications Express, 2023(11)

[2] Gao Fang (Supervisor: Wang Zhining), A Study on the Formation Mechanism of Employee Creativity Based on Self-Determination Theory [J], Master's Thesis, 2017-05-31

[3] Chen Baoyu, Exploration of the Path of Financial Opening under the Background of Hainan Free Trade Zone Construction, [J] Proceedings of the Guilin Forum of the 2023 Higher Education Scientific Research Forum, - 2023(11)

[4] Yuan Chaochao (Supervisors: Zhang Lei; Yang Chaoquan), Research on Safety Management of Construction Engineering Based on Smart Construction Site, Master's Thesis, Shandong University of Architecture, 2023-06-10

[5] Zheng Yanyan, A Study on the Application of Blockchain Technology in Financial Management [J], Industrial Science and Technology Innovation, - 2023(08)

[6] Liu Liu. An Analysis of the Application of Blockchain Technology in Performance Management [J]. Green Finance and Accounting, 2019, (03): 53-56.

[7] Wang Mengqi. The Integrated Development of Corporate Performance Management in the Era of Blockchain 3.0 [J]. Liaoning Economy, 2020, (06): 94-96.

[8] Shi Wan, Chen Kaiyu, "Blockchain + Performance Management" Issues and Strategies [J]. Enterprise Management, 2020 (6): 118-120.

[9] Yu Jing, Cai Wen. An Empirical Analysis of the Impact of Executive Incentives on Corporate Innovation—A Study Based on the Mediating Effect of Analyst Attention [J]. Technology Economy, 2021, 40(1): 20-29.