December 25 , 2025

DOI: 10.71113/JMSS.v2i4

Volume 2

Number 4

J M S S

JOURNAL OF MODERN SOCIAL SCIENCES

ISSN (P): 3078-4433

ISSN (E): 3078-4441

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Volume 2 Issue 4 , 2025

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ATRI PRESS

Journal of Modern Social Sciences

Volume 2 Issue 4 , 2025

ISSN: 3078-4433 | eISSN: 3078-4441

Digital economy, new quality productivity and common prosperity

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Abstract

Digital economy provides digital technology and financial foundation for cultivating and developing new quality productivity, and also Using the panel data of 30 provinces in China from 2012 to 2022 as research samples, this paper adopts benchmark regression model and intermediary effect model to study the impact and mechanism of digital economy on common prosperity from the perspective of the digital economy. Using the panel data of 30 provinces in China from 2012 to 2022 as research samples, this paper adopts benchmark regression model and intermediary effect model to study the impact and mechanism of digital economy on common prosperity from the perspective of new quality productivity. The findings are as follows: (1) Digital economy can significantly promote the development of common prosperity; (2) The mechanism test shows that the digital economy can promote the development of common prosperity in China from 2012 to 2022 as research samples. mechanism test shows that the digital economy can promote the development of common prosperity by improving the new quality productivity; (3) Heterogeneity test shows that the impact and mechanism of digital economy on common prosperity from the perspective of new quality productivity. The mechanism test shows that the digital economy can promote the development of common prosperity by improving the new quality productivity; (3) Heterogeneity test shows that the enabling effect of digital economy on common prosperity is more obvious in regions with large population density, high Heterogeneity test shows that the enabling effect of digital economy on common prosperity is more obvious in regions with large population density, high level of economic development and high level of digital infrastructure construction.

Keywords

Digital economy; New quality productivity; Common prosperity; Mediating effect

Suggested citation: Li, Z. (2025). Digital economy, new quality productivity and common prosperity. *Journal of Modern Social Sciences*, 2(4), 234–244. https://doi.org/10.71113/JMSS.v2i4.322

Introduction

The report of the Twentieth Party Congress clearly states that Chinese-style modernisation is a modernisation in which all people share in the common prosperity, and that common prosperity is an essential requirement of socialism with Chinese characteristics. Common wealth is not egalitarianism; rather, while encouraging people to create wealth through labour and innovation, it focuses on narrowing the gap between the rich and the poor, and promotes the idea that all groups in society can benefit from economic growth. Under this concept, economic development is no longer purely the pursuit of total economic growth, but through the optimisation of the economic structure, the improvement of production efficiency and the rational allocation of resources, gradually eliminating the gap between urban and rural areas, regional disparities, and income disparities so as to achieve the balanced development and prosperity of the whole society.

With the promotion of cloud services, artificial intelligence and other digital technologies, the digital economy has accelerated the penetration of all levels of society and gradually become an important engine of modern economic growth. Relying on digital technology, digital economy has the characteristics of breaking the spatial division, low threshold, sharing and universal benefit, which can make up for the short board of public services and promote the equalisation of public services; it can accelerate the trans-regional flow of all kinds of factors of production and reorganisation and allocation(Chen&Zhou,2023).can enhance the interactivity of economic activities between regions, industries and groups, laying the foundation for balanced regional development and fair income distribution. (Han et al,2023). At a time when the digital economy is booming, China's goal of achieving common wealth will certainly have to rely on the digital economy.

At the same time, under the leadership of the digital economy, digital technology has promoted productivity from

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.322

"old quality" to "new quality" by transforming the mode of production, improving the efficiency of production and optimising the means of production. The new quality of productivity formed by the structural leap in productivity is becoming the key driving force for the construction of modern industrial system(Zhou et al,204). New quality productivity is innovation-led, deeply integrating digital technology and traditional industries, opening up new fields and new tracks, shaping new kinetic energy and new advantages, injecting a steady stream of vitality into the economy and society, and making substantial progress in promoting common prosperity(Ding Min,2024). There have been more studies in the literature on the relationship between the digital economy, new quality productivity and common wealth. However, few scholars have systematically analysed the digital economy, new quality productivity and common wealth in a unified framework.

This provides a research idea for this paper, which incorporates the digital economy, new quality productivity and common wealth into a unified framework from a systematic perspective, and takes the panel data of 30 provinces in China from 2012 to 2022 as the research sample. The data sample is used to empirically test the impact mechanism of digital economy on common wealth and the transmission mechanism of new quality productivity on common wealth.

This paper will be elaborated from the following aspects: (1) From a global perspective, the digital economy, the new quality productivity and the common wealth will be included in a unified research framework, in-depth analysis of the internal logic of the three and the mechanism of influence, to make up for the research gaps. (2) It has been pointed out that the digital economy promotes the common wealth, the digital economy significantly drives the new quality productivity, and the new quality productivity is an important part of the common wealth, which provides theoretical inspiration for this paper, which introduces the mediating effect model, treats the new quality productivity as a mediating variable, and examines the conduction effect of the digital economy to promote the common wealth through the new quality productivity.

(i) Theoretical analysis of research hypotheses and research hypotheses

1. The direct impact of the digital economy on the development of shared prosperity

Common wealth is the essential requirement of socialism, an important feature of Chinese-style modernisation and the common aspiration of the people. The essential connotation of common wealth has two characteristics, that is, it contains two dimensions: "common" "affluence"(Chen &Yang,2023). With data elements as the core and information technology as an important driving force, the digital economy can effectively break the space-time barriers, make up for the short board of inclusive resources, and promote the development of economically lagging regions, and the digital economy has become an important driving force for realising common wealth in China. On the one hand, the digital economy can promote sustained and balanced growth, and on the other hand, it can also promote shared and inclusive development, with the dual characteristics of wealth creation and wealth sharing. Therefore, whether it is "common" or "affluent", the digital economy has unique advantages in this regard. Based on this, this paper proposes:

Hypothesis 1: The digital economy can contribute to the development of shared prosperity.

2. Indirect impacts of the digital economy on the development of shared prosperity

The digital economy cultivates new industries, new modes and new kinetic energy by optimising resource allocation and driving innovative technologies, and provides strong support for the realisation of common wealth while promoting the development of new quality productivity . (Ji et al,2024). Firstly, the development of digital economy is conducive to accelerating the integration process of frontier technologies such as big data, artificial intelligence and Internet of Things with traditional industries such as manufacturing and service industries (Shi &Xu , 2024) the use of digital technology can effectively improve the traditional industrial production process in the production link coordination and connectivity barriers, to promote capital, talent, technology and other types of factors of production flow and configuration is more convenient, and comprehensively drive the new quality of productivity(Bai &Peng ,2024). Secondly, the enhancement of new quality productivity not only implies the optimisation of resource allocation efficiency and the enhancement of innovation ability, but also brings about the extension of the industrial chain and the upgrading of the production process, which helps to promote the development of the industry in the direction of high quality and high value-addedness, and provides a basic guarantee for the balance of the regional economy (Yan &Niu,2024). In this process, the digital economy has brought more high-quality employment opportunities through the enhancement of new quality productivity, optimised the structure of income distribution, effectively narrowed the income gap between urban and rural areas and regions, and empowered common prosperity.

Thus, by promoting the development of new quality productive forces, the digital economy promotes sustainable economic and social growth and provides a deep technological and industrial foundation for the realisation of common wealth. This process not only enhances production efficiency and the total amount of social wealth, but also accelerates the realisation of the goal of common wealth through a fairer and more reasonable distribution that allows more people to share the fruits of prosperity in the digital economy era. Based on this, this paper proposes:

Hypothesis 2: NQPs play a mediating effect between the digital economy and the development of shared prosperity.

Research design

(i) Modelling

1. Baseline modelling

In order to investigate the effect of the digital economy on the common wealth, the following province and time double fixed-effects model is set up

$$CP_{it} = \alpha_0 + \alpha_1 DIG_{it} + \alpha_2 Control_{it} + \mu_i + \upsilon_t + \varepsilon_{it} \quad (1)$$

In equation (1),CP_{it} represents the level of common wealth of province i in period t, and DIG_{it} represents the level of digital economy development of province i in period t; control denotes a series of control variables; μ_i and υ_t are used to portray the province and time effects, respectively;

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.322

and ε_{it} represents the random disturbance term. In order to test hypothesis 2, based on model (1), a mediation effect model is constructed with new quality productivity level (NQP) as the mediating variable:

$$NQP = \beta_0 + \beta_1 DIG_{it} + \beta_2 Control_{it} + \mu_i + \upsilon_t + \varepsilon_{it} \quad (2)$$

$$CP_{it} = \gamma_0 + \gamma_1 DIG_{it} + \gamma_2 NQP_{it} + \gamma_3 Control_{it} + \mu_i + \upsilon_t + \varepsilon_{it} \quad (3)$$

Where NQP denotes the mediating variable, the level of new quality productivity, and the definitions of the rest of the variables are consistent with equation (1). Since there are few theories to explore the impact effect on common wealth with new quality productivity as mediator, this paper adopts step-by-step regression method. First of all, use equation (1) to test the effect of the digital economy on the common wealth, if the regression coefficient of equation (1) is significant, then we can use equation (2) to verify the effect of the digital economy on the new quality of productivity, and then use equation (3) to verify that the digital economy and the new quality of productivity on the common wealth of the common effect of the digital economy and the new quality of productivity. Finally, the combination of formula (2) and formula (3) can test the mediating effect of new quality productivity.

(ii) Selection of variables

1. Explained variables

Common Wealth (NQP). Based on the existing research results of Common Wealth (Li ,2024; Liu et al,2021) , from the nature of common wealth, combined with the characteristics of digital economy and NQP. Construct the common wealth evaluation index system with four dimensions of sharing degree, affluence, common degree and sustainability, containing 25 three-level indicators, and use the entropy weight method to obtain the comprehensive evaluation index of common wealth after objectively assigning the weights to each indicator. As listed in Table 1.

Table 1 Common Wealth Evaluation Indicator System

Level 1 indicators	Secondary indicators	Tertiary indicators	Indicator properties	Weights
Mutual enrichment	Affluence	Average income level of residents	+	0.0467
		Consumption level of the population	+	0.0398
		GDP (in billions of yuan)	+	0.0462
		Engel's coefficient for rural	–	0.0090
		Engel's coefficient for urban	–	0.0087
	Commonality	Income gap between urban and rural residents	–	0.0129
		Expenditure gap between urban and rural residents	–	0.0105
		Urbanisation rate of resident	+	0.0227
	Sharing degree	Public library collections	+	0.0703
		Average years of education	+	0.0224
		Level of health care	+	0.0494
		Health technicians	+	0.0263
		Percentage of public service expenditures in local finances	+	0.0453
		Level of public transport	+	0.0235
		Level of development of public	+	0.0281
		Percentage of local finance expenditure on social security and	+	0.0457
		Social pension insurance	+	0.0651
		R&D investment intensity	+	0.0113
		Internet development	+	0.0649
		Wage level of urban employment	+	0.0498
		unemployment rate	–	0.0662
	Sustainability	Level of patent development	+	0.1290
		Level of green space in parks	+	0.0191
		forest cover	+	0.0409
		Local fiscal expenditures	+	0.0451

2. Core explanatory variables

Digital economy development level (DIG). This paper draws on existing relevant studies to construct a digital economy evaluation index system from three dimensions of digital technology application, digital infrastructure, and digital science and technology innovation (Zhang et al,2024; Zhang et al ,2019) . The specific index system is shown in Table 2.To avoid problems such as subjective evaluation, the entropy value method is also applied to measure the level of digital economy development in each province.

Table 2 Digital Economy Evaluation Indicator System

Level 1 indicators	Secondary indicators	Tertiary indicators	Indicator properties	Weights
Digital economy level of development	Numeric infrastructure	Number of Internet access ports	+	0.0314
		Number of domain names	+	0.0715
		Mobile base station density	+	0.0833
		Mobile phone penetration rate	+	0.0133

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	Numeric industrialisation	Long distance optical cable length per unit area, meters per square meter	+	0.0676
		Software business revenue as a share of GDP	+	0.0728
		Revenue from IT services as a share of GDP	+	0.0831
		Number of employees in the information services industry	+	0.0580
		Total telecoms business as a share of GDP	+	0.0433
		Proportion of enterprises with e-commerce trading activities	+	0.0098
		Business e-commerce as a share of GDP	+	0.0312
		Computers per 100 persons in enterprises	+	0.0201
		Websites per 100 enterprises	+	0.0052
		Digital Inclusive Finance Index	+	0.0130
	Numeric science, technology and innovation	Full-time equivalent of R&D personnel in industrial enterprises above large scale	+	0.0718
		R&D expenditure of industrial enterprises above designated size	+	0.0665
		Number of R&D projects (topics) of industrial enterprises above designated size	+	0.0789
		Total technology contract turnover	+	0.1008
		Number of patent applications granted	+	0.0775

3. Mediating variables

The starting point of new quality productivity is "new", and the focus is on "quality". The "new" is in the technology, mode and concept, and only through continuous breakthroughs in the existing technology and production mode can new vigour be injected into productivity. The new quality of productivity is not only concerned with the quantity of production, but also with the improvement of "quality", which is a whole-mode transformation and upgrading centred on high-quality development. New-quality productivity generally involves new-quality labour force, new-quality labour objects and new-quality labour materials, which are combined with relevant research results (Zhu et al,2024;Xu et al,2023) constructed a new quality productivity evaluation index system. As shown in Table 3, the entropy value method was also applied to measure the new quality productivity index.

Table 3 Indicator system for evaluating new quality productivity

Level 1 indicators	Secondary indicators	Tertiary indicators	Indicator properties	Weights
New quality production capability	New quality labour force	GDP (in billions of yuan)	+	0.0618
		On-the-job workers' wages in yuan	+	0.0475
		Share of tertiary employment	+	0.0218
		Average years of schooling per capita	+	0.0052
		Intensity of funding for education	+	0.0179
		Number of innovative enterprises per 100 people	+	0.0438
	New quality object of labour	Energy efficiency	+	0.0428
		Number of enterprises with e-commerce trading activities	+	0.0288
		Robot mounting density	+	0.1508
		Sulphur dioxide emissions	+	0.1273
		Environmental protection expenditure General financial expenditure	+	0.1692
	New quality labour resources	Number of green patent applications Number of patent applications	+	0.0268
		Road mileage	+	0.0383
		Railway mileage	+	0.0389
		Fibre optic cable line length	+	0.0579
		Treatment capacity of waste gas treatment facilities	+	0.0699
		Provision for new product development	+	0.0505

4. Control variables

In order to mitigate the bias effect of omitted variables on the empirical results, reference is made to the existing research results (Shi et al,2023;Yang et al,2023)government financial support (GOV), education development (EDU), industrial structure upgrading (IS), and the level of financial development (FIN) are selected as control variables. The measurement method is as follows: government financial support (GOV), finance, as the foundation and important pillar of regional governance, plays a crucial role in promoting common prosperity. The amount of regional fiscal expenditure is measured against the regional GDP; Education Development (EDU), education development is the foundation of people's livelihood, and quality and balanced education resources can cultivate more talents with high quality, thus creating more wealth and value for the society and promoting the common wealth of the society. Measured by the number of students enrolled in higher education per million people in the region; industrial structure upgrading (IS), the adjustment and upgrading of the industrial structure is an important means to promote high-quality economic development, through the

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.322

optimisation of the industrial layout, the promotion of the transformation and upgrading of traditional industries and the development of new industries, which will create more employment opportunities, improve the income and welfare of workers, thus promoting the common prosperity. Especially for those regions with relatively lagging economic development, upgrading the industrial structure is a key way to realise economic development. Measured using the proportion of regional tertiary industry value added to regional GDP; the level of financial development (FIN), moderate financial development is conducive to reducing social inequality and promoting common prosperity. By providing effective financial support to the real economy, it can promote economic growth and increase employment opportunities, and narrow the gap between the rich and the poor. However, imbalances and irregularities in financial development may also lead to increased inequality. Measured with the help of the year-end ratio of the balance of RMB loans to GDP of financial institutions.

Table 4 Descriptive Statistics and Correlation Coefficient Matrix for Key Variables

	CP	DIG	NQP	GOV	FIN	IS	EDU
CP	1						
DIG	0.884***	1					
NQP	0.623***	0.588***	1				
GOV	-0.057	0.100*	-0.209***	1			
FIN	0.343***	0.269***	-0.005	0.384***	1		
IS	0.581***	0.547***	0.023	0.499***	0.692***	1	
EDU	0.539***	0.470***	-0.013	0.246***	0.363***	0.622***	1
Average value	0.271	0.123	0.167	0.113	1.462	0.503	0.272
Standard deviation	0.081	0.099	0.049	0.032	0.481	0.087	0.085
Median	0.257	0.092	0.159	0.106	1.432	0.495	0.251

(iii) Data sources and descriptive statistics

This paper takes 30 provinces in China (excluding Hong Kong, Macao and Taiwan, and Tibet) as the research object, and sets the research period as 2012-2022. The main data for the study period come from the China Statistical Yearbook, Markdata.com, Wind Database, and the statistical yearbooks of each province. Some of the data come from the Report on China's Digital Economy Development Index. In addition, considering that some of the original data are missing, interpolation or regression analysis is used to make up for the missing data in some regions and years. The descriptive statistics of each variable in the paper are shown in Table 4.

From the results in the table, the standard deviation of Common Prosperity Index (CP) is 0.081, the mean is 0.271, and the median is 0.257. It shows that there is a significant difference in the level of common prosperity among different provinces, and the main reasons for this may lie in the tilted and prioritised order of policies, inadequate social security system, uneven productivity levels, and imperfections in the system of distribution structure. The standard deviation of the digital economy (DIG) is 0.099, the mean is 0.123, and the median is 0.092, indicating that there are obvious regional differences in the level of development of the digital economy, which may be attributed to the fact that some regions are constrained by the imperfections of the digital infrastructure, the lack of endogenous motivation of the talent pool and innovation capacity, which makes the development of the regional digital economy tend to be weaker. The above descriptive statistics indicate that there is still much room for development in both the level of China's digital economy and the level of common wealth, and there is an urgent need to improve the institutional mechanism for the development of digital economy according to local conditions. In addition, the standard deviation, mean and median of the NQP index are 0.032, 0.167 and 0.159 respectively, which means that the development level of NQP is still relatively low, and there are obvious regional differences in the development level of NQP in various provinces due to the differences in the allocation and utilisation of factors of production, the differences in the level of development and structure of industries, and the differences in the policy environment and the strength of support. The correlation coefficient matrix of the variables shows that the development level of new quality productivity is still low. From the correlation coefficient matrix of the variables, it can be seen that the coefficient between common wealth and digital economy is significantly positive, which initially indicates that the digital economy helps to promote common wealth, and hypothesis 1 is initially proved. The statistical values of the rest of the variables are all within a reasonable range.

Empirical analysis

(i) Baseline regression analysis

Firstly, the fixed effects model was selected based on the Hausman test results, and secondly, to exclude the possible problem of multicollinearity, the sample data were tested for multicollinearity, and the results showed that the maximum VIF value was 4.03, and the average VIF value was 2.42, which were much less than 10, indicating that there was no multicollinearity in this data sample. In the benchmark regression results in Table 5, model (1) presents the results of the study with only the inclusion of the explanatory variables and the core explanatory variables under

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controlling for both individual and year effects. The coefficient of digital economy is found to be 0.269, which is significantly positive at the 1% level, implying that digital economy has a significant contribution to the development of common wealth. Models (2) to (5) are the test results of gradually adding government financial support (GOV), education development (EDU), industrial structure upgrading (IS), and financial development level (FIN) control variables. The regression coefficient of digital economy on common wealth in model (5) is 0.247 and significant at 1% level, which indicates that the digital economy is very favourable to the development of common wealth at the overall level, and verifies hypothesis 1. The detailed reason is that the development of digital economy not only achieves key breakthroughs in technology and innovative allocation of factors of production, but also releases the economic multiplier effect that empowers the development of common wealth. In terms of control variables, the regression coefficient of the level of financial development on the common wealth is significantly negative, indicating that the level of financial development will inhibit the common wealth, mainly due to the imperfection of the modern financial system, the development of financial science and technology will exacerbate the digital divide, the uneven distribution of financial resources will bring about the "siphon effect of capital", and more importantly, the financial regulation and policy imperfections will lead to frequent problems. More importantly, imperfect financial regulation and policies lead to frequent problems.

Variant	Model (1) CP	Model (2) CP	Model CP	Model CP	Model CP
DIG	0.269***	0.248***	0.244***	0.234***	0.247***
	(8.92)	(8.81)	(8.55)	(8.28)	(9.83)
GOV		0.444***	0.437***	0.373***	0.381***
		(7.31)	(7.17)	(7.09)	(7.09)
FIN			-0.003	-0.008***	-0.009***
			(-0.83)	(-2.62)	(-2.82)
IS				0.234***	0.219***
				(6.39)	(6.27)
EDU					0.176***
					(4.32)
Constant	0.270***	0.199***	0.207***	0.056*	-0.024
	(29.62)	(14.30)	(12.30)	(1.87)	(-0.74)
N	330	330	330	330	330
R-squared	0.977	0.980	0.980	0.983	0.984
Zone	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES

Table 5 Direct effect test of the impact of the digital economy on shared prosperity

Note: *, **, *** represent 10 per cent, 5 per cent and 1 per cent significance levels, respectively, with standard errors in parentheses. Same as below.

(ii) Robustness tests

In order to avoid the omission of important variables, sample selection bias and other factors adversely affecting the results of the study, and to enhance the objectivity and scientific validity of the results of the impact of the digital economy on the common wealth. In this paper, the robustness test is carried out in three aspects: replacing core explanatory variables, excluding epidemic years and removing municipalities. The first is to replace the core explanatory variables. In order to further ensure that the results of the study are real and reliable, the core explanatory variables of digital economy are lagged one period and two periods to get two new explanatory variables, and then the two are brought into the model to re-regression analyses, and the results are shown in Table 6, Column (1) and Column (2). After replacing the core explanatory variables, the test results are still consistent with the previous conclusions, which shows that the basic regression results have strong robustness. The second excludes epidemic years. As the country is affected by the epidemic in 2020, 2021, the epidemic control policies of local governments are different, the response speed to the epidemic varies, and the epidemic situation varies from place to place, which may interfere with the verification of the impact of the digital economy and common wealth. In order to exclude this interference, the data of this second year is excluded before regression. The results are presented in column (3) of Table 6. The results show that the regression coefficient of digital economy is still significantly positive after excluding the data of epidemic years, indicating that the positive effect of digital economy on common prosperity still exists after excluding the influence of epidemic. Thirdly, the sample of municipalities directly under the central government is excluded. As the sample of municipalities has great advantages in resource allocation and policy support, it is not directly comparable with ordinary prefecture-level cities. In order to reduce the sample bias and avoid the influence of the characteristic differences between municipalities and ordinary prefecture-level cities on the study, municipalities are excluded to ensure the scientific validity of the research results and the comparability of the data, and the results are shown in column (4) of Table 6. It can be seen that the regression coefficient of digital economy is still significantly positive, which proves the robustness of the benchmark regression results again.

Table 6 Robustness test results

Variant	Replacement of core explanatory variables	Excluding epidemic years	Remove municipalities

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	(1)	(2)	(3)	(4)
Delayed by one period DIG	0.237***			
	(12.03)			
Delayed by two period DIG		0.202***		
		(8.73)		
DIG			0.242***	0.262***
			(11.31)	(12.55)
EDU	0.222***	0.161***	0.177***	0.179***
	(5.83)	(3.82)	(4.42)	(4.07)
GOV	0.430***	0.446***	0.366***	0.473***
	(7.05)	(6.56)	(5.80)	(5.86)
FIN	-0.004	-0.004	-0.014***	-0.010***
	(-1.31)	(-1.12)	(-3.69)	(-2.70)
IS	0.207***	0.242***	0.222***	0.216***
	(5.46)	(5.61)	(5.70)	(5.67)
Constant	-0.041	-0.019	-0.011	0.016
	(-1.24)	(-0.51)	(-0.32)	(0.85)
N	300	270	270	286
R-squared	0.985	0.985	0.983	0.981
Zone	YES	YES	YES	YES
Year	YES	YES	YES	YES

(iii) Endogenous treatment

According to the theoretical analysis of this paper, the digital economy can promote the development of common wealth in many ways, and regions with higher levels of common wealth usually have more perfect infrastructure, stronger industrial cluster effects, and more policy support in digital incubation and digital transformation, so common wealth is likely to have an impact on the digital economy, resulting in a bi-directional causality between the two. In order to alleviate the interference of this problem on the regression results, this paper adopts the instrumental variable method for further research. The choice of instrumental variables is based on the common practice of existing studies(Cong et al,2024), the lagged period of digital economy is used as the instrumental variable (IV). As shown in column (1) of Table 7, the coefficients of the instrumental variables are significantly positive at the 1% level. And the results pass the under-identification test and weak identification test of instrumental variables, which proves that instrumental variables are reasonable and feasible. In the second stage regression in column (2), the coefficient of digital economy is significantly positive, which indicates that the promotion of digital economy on common wealth still holds after considering endogeneity issues such as reverse causality.

Table 7 Endogeneity test results

	Phase I	Phase II
variant	(1)	(2)
DIG		(0.304)***
		11.03
IV	(0.780)***	
	8.57	
Kleibergen-Paap		30.371***
Cragg-Donald		305.861
control variable	YES	YES
Constant	(0.015)	(-0.457)
	0.22	-1.55
N	330	330
R-quared		0.2607
Zone	YES	YES
Year	YES	YES

(iv) Heterogeneity test

1. Geographic location heterogeneity test

"The Hu Huanyong Line divides China into two regions with relatively stable population densities, with the north-west being sparsely populated and the south-east accounting for 40 per cent of the country's territory but home to 90 per cent of the country's population. China's economic geography, population distribution pattern has long been "Hu Huanyong line" locked, while the development of the two sides of the line is not coordinated, the Northwest region of the relatively underdevelopment of the problem may lead to the role of the digital economy on the common wealth of the effect of the difference also exists. Therefore, this paper will sample according to the "Hu Huanyong line" is divided into eastern provinces and western provinces, the digital economy on the common wealth of the impact of the role of regional heterogeneity analysis, the results are shown in Table 7, column (1), column (2). From the results in the table, it is found that the enabling role of the digital economy on common wealth is established in both cities east and west of the Hu Huanyong line, with a more pronounced facilitating role for cities east of the line. The reason for this is that the high proportion of traditional industries, the slow process of digital transformation, and the relatively insufficient allocation of digital resources in the region west of the Hu Huanyong Line have constrained the development of its digital economy. In contrast, the region east of the Hu Huanyong line started earlier in the broadband network, 5G base station construction and other aspects, the coverage and technology level is higher. The difference between the development patterns of the eastern and western regions is also an important reason for the inconsistent development of the digital economy in the east and west. In recent years, the state has strongly attached great importance to the development of the digital economy in the west, and has made concerted efforts in digital infrastructure, talent training, industrial upgrading, etc., to promote the realisation of an east-west linked digital economy situation.

2. Heterogeneity in levels of economic development

The level of urban economic development is one of the key factors in the development of the digital economy. A city's

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.322

level of economic development will directly affect all aspects of its innovation ability, infrastructure construction, enterprise development, and talent gathering in the field of digital economy. In order to explore whether there is a difference in the impact of digital economy development on common wealth among cities with different economic levels, this paper divides the original sample with the national GDP per capita as the boundary. Cities higher than the per capita GDP are set as developed regions; vice versa, they are set as developing regions, and the sample data are analysed for heterogeneity in the level of economic development, and the results are reported in Table 7, columns (3)(4). From the results, it can be seen that in economically developed regions, the digital economy coefficient is significantly positive at the 1% level, indicating that the digital economy effectively enhances the level of common wealth in developed regions. In developing regions, the coefficient of digital economy, on the other hand, does not pass the significance test, which indicates that the impact of digital economy on common wealth is not significant in developing regions. The reason is that economically developed regions have a higher concentration of resources, including capital, technology, talent, etc., in the process of digital economy development, these resources can efficiently circulate and drive technological innovation, promoting the balanced development of the region. On the other hand, the construction of digital infrastructure in economically underdeveloped regions tends to lag behind, with problems such as incomplete network coverage and insufficient data processing capacity restricting the development of the digital economy. A single economic structure and a large share of traditional industries are common characteristics of less economically developed regions. These regions may lack an industrial structure adapted to the transformation of the digital economy, making it difficult for the digital economy to effectively penetrate and drive economic development.

3. Heterogeneity in the level of digital infrastructure development

Digital infrastructure construction is the cornerstone of the stable development of the digital economy and can provide data support for the accelerated development of the digital economy. Through digital infrastructure, all kinds of industrial resources can be ubiquitously connected, flexible and complementary and efficient allocation, promoting the deep integration of various industries, upstream and downstream linkage, and helping more enterprises to improve quality, reduce costs, increase efficiency and reduce inventory. To this end, this paper draws on relevant research results(Liu et al,2023)use the median mobile phone penetration rate as a division criterion, and define regions below and above the median value during the sample period as low-level digital infrastructure regions and high-level digital infrastructure regions. According to columns (5) and (6) of Table 8, the regression coefficient of high level of digital infrastructure development is 0.290 and is significantly positive at 1% statistical level, while the regression coefficient of low level of digital infrastructure development is positive but only significant at 5% statistical level. It shows that the impact of digital economy development on the modernisation of common wealth in areas with high level of digital infrastructure development is more significant. The reason for this is that regions with higher levels of digital infrastructure construction have laid more favourable hardware conditions for regional economic development and digital technology enhancement, and have greater resource and location advantages in the wave of digital economic development, releasing a stronger enabling effect on common wealth. Comparatively speaking, the development of digital technology innovation and industrial digital transformation in regions with lower levels of digital infrastructure construction has been slow, making it more difficult to create large-scale digital industry clusters, and providing a slightly weaker boost to the development of the digital economy.

Table 8 Results of heterogeneity test

	Geographic location heterogeneity		Heterogeneity in levels of economic		Heterogeneity in the level of digital	
	(1)	(2)	(3)	(4)	(5)	(6)
	Western region	Eastern region	Developed region	Developing region	High level region	Low level region
DIG	0.177**	0.218***	0.241***	0.041	0.290***	0.079**
	(2.29)	(8.03)	(8.84)	(1.63)	(8.10)	(2.24)
EDU	-0.040	0.139***	0.275***	0.301***	0.147**	0.244***
	(-0.33)	(3.04)	(3.61)	(6.91)	(2.20)	(4.57)
GOV	0.275**	0.472***	0.419***	0.458***	0.307***	0.525***
	(2.25)	(7.73)	(4.72)	(6.84)	(3.47)	(5.11)
FIN	-0.015	-0.007**	-0.005	-0.009	-0.008	-0.015**
	(-1.60)	(-2.14)	(-1.35)	(-1.50)	(-1.48)	(-2.54)
IS	0.204***	0.115**	0.111*	0.269***	0.212***	0.246***
	(3.15)	(2.38)	(1.87)	(7.33)	(2.90)	(4.09)
Constant	0.047	0.057	-0.015	-0.007	-0.007	-0.118***
	(1.13)	(1.18)	(-0.36)	(-0.37)	(-0.11)	(-3.13)
N	88	242	132	198	165	165
R-squared	0.971	0.986	0.990	0.975	0.987	0.983
Zone	YES	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES	YES

(v) Mechanism testing

Based on the previous analyses, it can be seen that digital economic development may affect common wealth through new quality productivity. In order to test this hypothesis, new quality productivity is tested and analysed as a mediating variable. From column (1) of Table 9, it can be seen that the coefficient of digital economy is significantly positive at 1% level, which indicates that digital economic

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.322

development helps to promote common prosperity, i.e., hypothesis 1 is verified. from column (2) (3), it can be seen that the impact of digital economic development on new quality productivity is significantly positive, with a coefficient of influence of 0.372, and the coefficient of the direct impact on common prosperity is 0.123. at the same time, when all other factors remain unchanged, every 1 percentage point increase in the new quality productivity will have a significant impact on common prosperity. At the same time, when other factors remain unchanged, every 1 percentage point increase in new quality productivity will promote the common wealth index by 0.333 percentage points, and the coefficients of the digital economy and new quality productivity are both significantly positive, which confirms that both the digital economy and new quality productivity can contribute to the common wealth. Compared with column (1), the coefficient of digital economy in column (3) decreases from 0.247 to 0.123, which indicates that the new quality productivity plays a mediating effect in the impact of digital economy on common wealth, and the increase of digital economy under the influence of new quality productivity makes the common wealth indirectly increase by 0.124 percentage points (0.372× 0.333), and Hypothesis 2 holds. The possible reason is that the digital economy promotes the intelligence, automation and efficiency of the production process through the advantages of digital technology, thus raising the new quality productivity. With the development of new quality productivity, the industrial structure is optimised, and resources achieve a more rational flow and allocation between regions, thus helping low-income and less developed regions to receive greater support and further reduce the gap between the rich and the poor.

Table 9 Results of the mediation effect test

variant	(1) CP	(2) NQP	(3) CP
NQP			0.333***
			(4.89)
DIG	0.247***	0.372***	0.123***
	(9.83)	(7.63)	(4.21)
GOV	0.381***	0.300***	0.281***
	(7.09)	(3.32)	(5.81)
FIN	-0.009***	-0.017***	-0.004
	(-2.82)	(-2.82)	(-1.44)
EDU	0.176***	0.221***	0.102***
	(4.32)	(3.30)	(3.09)
IS	0.219***	0.444***	0.071*
	(6.27)	(6.59)	(1.77)
Constant	-0.024	-0.452***	0.126***
	(-0.74)	(-8.75)	(3.16)
N	330	330	330
R-squared	0.984	0.851	0.990
Zone	YES	YES	YES
Year	YES	YES	YES
Sobel test		8.595***	

In addition, this paper also argues the robustness of the mediating effect of new quality productivity by Sobel test and Bootstrap test. Firstly, as can be seen from Table 9, the Sobel statistic with new quality productivity as the mediating variable passes the significance test and rejects the original hypothesis, suggesting that there is a mediating effect in the original model. Secondly, the Bootstrap number is set to 500 and the confidence interval is 95%. Table 10 shows the results of the Bootstrap test, and it can be seen that the confidence intervals for both the direct and indirect effects do not contain a value of 0 when using new quality productivity as the mediating variable, which significantly rejects the original hypothesis and indicates that there is such an effect mechanism in the original model.

Table 10 Bootstrap method test

Variant	Effect	Ratio	Standard deviation	z	P>z	95 percent confidence interval
NQP	direct effect	0.1920	0.0282	6.79	0.000	[0.1332, 0.2467]
	indirect effect	0.4042	0.0358	11.29	0.000	[0.3340,0 .4743]

Conclusion

This paper takes the panel data of 30 provinces in China from 2012 to 2022 as the research object, uses the entropy weight method to measure the digital economy, new quality productivity and common wealth, and establishes models such as two-way fixed effects to examine the impact of the digital economy on the common wealth and the mechanism of action.

The results of the study show that, firstly, the digital economy has a significant contribution to the common wealth. Second, the new quality of productivity is an important channel through which the digital economy empowers the common wealth. Third, heterogeneity analyses show that the enabling effect of the digital economy on shared prosperity is more pronounced in areas with high population concentration and in economically developed areas and areas with high levels of digital infrastructure.

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.322

Based on the above findings, the paper makes the following recommendations:

(1) Continuously strengthening the enabling effect of the digital economy and fully unleashing its potential in promoting common prosperity. We will accelerate the spread of digital infrastructure, promote the construction of 5G networks, fibre-optic broadband, data centres and other digital infrastructure nationwide, especially in less-developed regions, to narrow the "digital divide" and provide solid digital support for balanced development in urban and rural areas. Strongly support the integration of digital technology with agriculture, manufacturing and service industries, promote the intelligence and efficiency of industrial chains, and enhance the added value and competitiveness of various industries. Strongly support the innovative application of the digital economy in the countryside, develop rural e-commerce, smart agriculture, online education and telemedicine, etc., empowering the upgrading of rural industries and the equalisation of public services, providing farmers with more income-generating channels, and helping to revitalise the countryside and the common wealth. Strongly support digital skills training to equip more workers with the skills required by the digital economy, especially in areas with insufficient educational resources, and use digital education to bridge the education gap and empower individual and community development. Strongly support the development of low-carbon technologies and smart energy systems, promote the green transformation of traditional industries, and achieve synergistic progress in economy, society and ecology, so as to provide a sustainable foundation for common prosperity.

(2) Accelerating the cultivation of new quality productivity and giving full play to the innovation-driven role of new quality productivity. On the one hand, it is necessary to increase investment in basic research, especially to achieve technological breakthroughs in areas such as artificial intelligence, quantum computing and new materials, and to build a core technology system to support new quality productivity. Promote the deep integration of industry, academia and research, establish a mechanism for the synergistic development of the innovation chain and the industrial chain, promote efficient cooperation among universities, research institutes and enterprises in research and development and technology transformation, accelerate the transformation of scientific and technological achievements into productive forces, and promote the effective allocation of innovation resources. On the other hand, to meet the needs of the development of the new quality productivity, strengthen the cultivation of complex and highly skilled talents, promote the reform of the education system, improve the overall quality of the labour force, and form a strong intellectual guarantee to support the development of the new quality productivity. Improve the policy system to support the new productive forces, including measures such as tax incentives, innovation subsidies and intellectual property protection, so as to create an institutional environment conducive to innovation and entrepreneurship, and to stimulate the innovation vitality of enterprises and scientific research institutions.

Acknowledgments

Thank you to the scholars who have put forward valuable ideas for this research, as well as to the editors and reviewers for their work and valuable opinions.

Institutional Review Board Statement

Not applicable.

Informed Consent Statement

Not applicable.

Data Availability Statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Statements and Declarations

No funding was received for conducting this study. The present study has no relevant financial or non-financial interests to disclose.

Publisher's Note

Author Contributions

This work was carried out in collaboration among all authors. This project was conducted jointly by the authors. The authors reviewed and agreed to the final manuscript. All authors read and approved the final manuscript.

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References

Chen Menggen&Zhou Yuanren (2023). Digital economy, shared development, and common prosperity Quantitative Economics, Technical Economics Research, 40 (10), 5-26. doi: 10.13653/j.cnki.jqte.20230818.003

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.322

Han Xudong, Liu Chuang&Liu Heguang (2023). The theoretical logic and practical path of promoting rural industrial transformation through the digitization of the entire agricultural chain Reform, (03),121-132.

Careful, Guo Jiahong, Wang Weihua Research on Empowering Modern Industrial System with Digital Industry under the Guidance of New Quality Productivity: Based on the Perspective of Supplementing Points, Building Chains, and Fixed Networks [J]. Management World, 2024, 40 (07): 1-26. DOI: 10.1974/j.cnki. 11-1235/f.2024.0079

Ding Min (2024). New quality productivity, employment quality of labor force, and common prosperity Statistics and Decision Making, 40 (17), 12-17. doi: 10.13546/j.cnki.tjyjc.2024.17.002

Chen Zongsheng&Yang Xilei (2023). On the measurement indicators and phased progress of China's common prosperity Economic Research, 58 (09), 79-97

Jiyuan Garden, Yang Lan&Cheng Dongpo (2024). Digital Economy Empowering Common Prosperity: Based on Quantile Regression Method Systems Engineering Theory and Practice, 44 (09), 2887-2901

Shi Jianxun&Xu Ling (2024). Research on the significant strategic significance and implementation path of accelerating the formation of new quality productivity Research on Financial Issues, (01),3-12.doi:10.19654/j.cnki.cjwtyj.2024.01.001.

Bai Bing&Peng Xueqing (2024). Digital economy, allocation of innovative factors, and new quality productivity Statistics and Decision Making, 40 (18), 109-113. doi: 10.13546/j.cnki.tjyjc.2024.18.019

Yan Lianfu&Niu just now (2024). The internal logic and promotion path of empowering common prosperity with new quality productivity Research on Marxist Theory Discipline, 10 (02), 82-90

Li Shi (2021). The goal of common prosperity and the path to achieve it Economic Research, 56 (11), 4-13

Liu Peilin, Qian Tao, Huang Xianhai&Dong Xuebing (2021). The connotation, implementation path, and measurement methods of common prosperity Managing the World, 37 (08), 117-129.doi: 10.1974/j.cnki.11-1235/f.2021.011

Zhang Xinyan, Xie Luhua, and Xiao Jianhua (2024). Government procurement, digital economy development, and industrial structure upgrading Contemporary finance, (03),43-55.doi:10.13676/j.cnki.cn36-1030/f.20231124.001.

Zhang Xun, Wan Guanghua, Zhang Jiajia&He Zongyue (2019). Digital economy, inclusive finance, and inclusive growth Economic Research, 54 (08), 71-86

Zhu Fuxian, Li Ruixue, Xu Xiaoli&Sun Jiachang (2024). Construction and spatiotemporal evolution of China's new quality productivity indicators Industrial Technology and Economics, 43 (03), 44-53

Xu Zheng, Zheng Linhao, and Cheng Mengyao (2023). New quality productivity supports high-quality development: advantages, key issues, and path selection Journal of Southwest University (Social Sciences Edition), 49 (06), 12-22. doi: 10.13718/j.cnki.xdsk.2023.06.002

Shi Yiming, Zheng Yuanyuan, and Fei Rongrong (2023). Digital Economy and Common Prosperity: Empowerment Effect and Promotion Path Statistics and Decision Making, 39 (16), 11-16. doi: 10.13546/j.cnki.tjyjc.2023.16.002

Yang Shuigen&Wang Ji (2023). Does digitalization of circulation promote common prosperity? ——Empirical evidence from prefecture level cities in China Research on Industrial Economics, (02),112-125.doi:10.13269/j.cnki.ier.2023.02.007.

Xu Cong (2024). New quality productivity, modernization of Chinese style industrial chain, and common prosperity Statistics and Decision Making, 40 (19), 5-10. doi: 10.13546/j.cnki.tjyjc.2024.19.001

Liu Chuanming, Chen Liang, and Wei Xiaomin (2023). Research on the Impact of Data Element Agglomeration on Technological Innovation: A Quasi Natural Experiment Based on Big Data Comprehensive Experimental Zone Journal of Shanghai University of Finance and Economics, 25 (05), 107-121.doi: 10.16538/j.cnki.jsufe.2023.05.008

ATRI PRESS

Journal of Modern Social Sciences

Volume 2 Issue 4 , 2025

ISSN: 3078-4433 | eISSN: 3078-4441

Galamsey as an Asset and a Menace in the Ghanaian Space Economy

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Abstract

Illegal small-scale mining, popularly referred to as galamsey, is a long-standing issue in Ghana, impacting its economy and environment. While it provides livelihood opportunities, it threatens sustainable land use, environmental health, and socio-economic stability. The complexity of this activity has created debate regarding its value as an economic asset and threat. While it provides employment and contributes to local economic activity, it also leads to severe environmental degradation, loss of agricultural land, and socio-economic instability. This paper examines the dual role of galamsey as an asset and a menace in Ghana's economy. The paper adopted a systematic review approach to examine the impact of galamsey on land use, governance, and livelihoods. The study concludes that the social and environmental costs of galamsey are higher than its economic benefits. The need arises for strict policies, sustainable land use planning, and community action to arrest these impacts. By providing a balanced perspective on galamsey's role in Ghana, this paper contributes to discussions on resource governance, environmental sustainability, and economic resilience in developing economies.

Keywords

Galamsey, Asset, Menace, Ghana

Suggested citation: Sarpong, C. K., & Dinye, R. D. (2025). Galamsey as an asset and a menace in the Ghanaian space economy. *Journal of Modern Social Sciences*, 2(4), 245–256. https://doi.org/10.71113/JMSS.v2i4.253

Introduction

Owusu (2021) discussed that the space economy was an activity that had an impact on land use, natural resources, and development. The principal sectors are agriculture, mining, real estate, and infrastructure, affecting the nation's economy. Mining, especially artisanal and small-scale gold mining (ASM) or "galamsey," is a curse and a blessing in the economies of mineral-producing countries. It has a significant impact on the world mining sector, especially in the developing world. The sector supports over 40 million livelihoods, and some 150 million people indirectly depend on it (Intergovernmental Forum on Mining, 2018). ASM, as economically significant as it is, has negative effects on the environment, health, and the socio-economy (Hilson, 2002). Trade-offs between the economic benefits of mining and its downsides are a fundamental policy dilemma, especially in governance-scarce, resource-rich areas (Hilson, 2002).

Sub-Saharan Africa has extensive artisanal mining, especially in gold-endowed countries like Ghana, Mali, and the Democratic Republic of Congo (Bryceson & Geenen, 2016). ASM activates local economies, supplementing farm incomes and offering rural livelihoods. Poor governance and informal activities have caused severe environmental issues like deforestation, water contamination, and land degradation (Hirons, 2020). Conflicts between small-scale and large-scale miners cause challenges in regulating the industry (Hilson & Maconachie, 2020).

The mining industry is vital to Ghana's economy, generating more revenue than foreign aid (World Gold Council, 2015). It provides jobs for both local and migrant workers in mineral-producing areas and comprises two substantial sectors: large-scale gold mining (LSM) and small-scale gold mining (SSM). Ghana's ASM has a history of close to 1000 years and is more established relative to most of the neighboring nations. Traditionally, people started ASM in search of gold nuggets to 'collect' and 'sell,' which is presently termed as "galamsey." In the last two decades, ASM has thrived as a rural economic activity in Ghana. Boom, as observed in literature, is propelled by the increase in gold prices, and ASM has also provided jobs for thousands left jobless by the 80s economic recovery plans (Hilson & Hilson, 2015). People opt for ASM in a bid to compete with multinationals to claim minerals and land.

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.253

Multistep registration and licensing in formal small-scale mining have driven ASM growth. Bureaucratic delays anger operators (Hilson, 2009). SSM and ASM are equivalent and thus used interchangeably. Gold mining has recently seen a significant boom (Reuters, 2024).

This unregulated mining industry has offered economic prospects to numerous people while creating severe environmental, health, and economic issues. In spite of its livelihood contribution, galamsey not only to the present but also extends the mechanism to long-term consequences, raising issues regarding sustainable development in Ghana. This paper examines (i) the impacts of galamsey on the space economy of Ghana; (ii) its social and environmental implications; and (iii) sustainable strategies to formalize small-scale mining.

Overview of Literature

Ghana's mining sector is critical to economic growth, contributing to GDP, exports, and government revenue. It creates direct jobs in mining and indirect jobs in transport, construction, and manufacturing (Sarpong & Dinye, 2025). Responsible mining, environmental sustainability, and corporate social responsibility are promoted by the government through policy. These initiatives aim at fair distribution of revenue, reduced environmental impact, and social good to host communities.

Although it has economic benefits, mining has also generated environmental and social problems. They include deforestation, land degradation, water pollution, and air pollution, which result in respiratory diseases. Mining has also led to the displacement of individuals, loss of livelihood, and social tensions. A scan of scholarly literature identifies the outstanding themes of employment creation, government revenue management, economic development, environmental degradation, and stakeholder involvement, and underscores the need for a balanced approach to resource exploitation.

Galamsey as an Asset

Employment Generation: Ghana's mining industry has created employment, not only affecting miners but also auxiliary workers. This affects transport, building, manufacturing, and other linked industries. Mining employs mine workers, engineers, geologists, and technicians. It creates jobs for skilled and semi-skilled workers, generating income. Demand for goods in mining communities has boosted local businesses, providing more jobs (Ghana Chamber of Mines, 2020). Indirect employment takes place through the demand for mining goods and services. Transport services facilitate the movement of equipment, supplies, and labor to mining operations. Construction firms construct infrastructure to support mining. The manufacturing industry supports the mining industry by producing essential machinery and equipment, generating indirect jobs in the economy (World Bank, 2020). Mining plays a significant part in poverty alleviation and livelihood improvement, especially among the mining communities.

Employment in the industry secures regular incomes for individuals, enabling them to meet basic needs and access services, improving living standards. This raised living standards and reduced poverty in these areas (Ghana Chamber of Mines, 2020). Long-term job creation in mining requires ongoing investment, capacity building, and economic diversification. Deepening connections between mining and other sectors is required to increase jobs in non-mining sectors. This strategy would build a stronger, fairer economy that works for more individuals and communities.

***Government Revenue and Fiscal Management*:** Ghana's mining sector is vital to government income, enhancing fiscal capability and funding development programs. The government obtains revenue from mining by way of corporate income tax, withholding tax, VAT, and royalties on mineral production value, which plays a major role in budgetary allocation (Ghana Extractive Industries Transparency Initiative, 2021). Mining receipts have financed infrastructure development such as telecommunications, energy, and roads, enhancing mining activities and upgrading economic activity and standards of living (World Bank, 2020). Mining revenues finance education, health, and welfare through school and hospital construction, scholarships, and support to vulnerable groups. Nonetheless, fiscal responsibility, openness, and revenue distribution continue to pose problems. Revenue leakages must be addressed and accountability ensured to maximize benefits and minimize illicit financial flows (Ghana Extractive Industries Transparency Initiative, 2021).

Contribution to GDP and foreign exchange earnings: The mining sector considerably contributes to the country's GDP via foreign exchange, investment, and linkages to other industries. Mining revenues finance infrastructure and social services, which are crucial for economic development and societal advancement. These investments have built transport infrastructure, schools, hospitals, and utilities (World Bank, 2020; Aryee, 2001). The mining sector has spearheaded the economic diversification and industrialization of Ghana.

The industry has initiated growth in manufacturing, construction, and transport. The reliance on these other sectors has created jobs and spurred the economy (Aryee, 2001). Mineral exportation has also increased Ghana's foreign exchange income. The foreign exchange inflow finances the nation's place in foreign trade, consolidates its balance of payments, and allocates resources to the acquisition of goods and services that are essential to economic activities of various kinds (World Bank, 2020). In addition, the mining sector has stimulated innovation and technological development in the economy of Ghana. Mining involves the use of sophisticated equipment and

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.253

skills, which promotes the creation of new technology. The transfer of technology increases productivity and competitiveness in other industries (Aryee, 2001). Economic value of mining relies on factors like commodity prices volatility, regulatory environment, and environmental management. Its monetary contribution requires careful observation and proper practices to sustain Ghana's economy and citizens.

Galamsey is a menace

Deforestation and land degradation: Deforestation is a common concern associated with mining operations. Forest areas are often cleared to make way for mining activities, resulting in the loss of biodiversity and ecological habitats. This loss of forests can have far-reaching environmental consequences, including the disruption of ecosystems, increased carbon emissions, and reduced resilience to climate change. It is important to enforce strict regulations and implement reforestation programs to mitigate the impacts of deforestation caused by mining (Ghana Environmental Protection Agency, 2019).

Water pollution and contamination: Water pollution is another significant environmental challenge linked to mining activities. The use of chemicals and heavy machinery in mining operations can lead to the contamination of water sources, including rivers and groundwater. This pollution can have detrimental effects on aquatic life, ecosystems, and communities that rely on these water sources for drinking water and irrigation. Implementing robust water management practices, such as proper containment of mine tailings and wastewater treatment, is essential to minimize water pollution (World Bank, 2020).

Respiratory diseases and lung conditions: Galamsey activities subject miners to noxious fumes and dust, which is detrimental to respiratory health. Silica dust from rocks with gold content could lead to silicosis, a long-term lung disease (Fortin et al., 2010). Poor living conditions and dust exposure heighten susceptibility to respiratory infections, especially where health care is inadequate. Silicosis is an acute respiratory disease for galamsey miners caused by the inhalation of fine silica dust from gold mineral rocks (Banunle et al., 2018). Miners who break and grind ores are more exposed to silica dust, leading to inflammation and scarring of the lungs (Wiafe et al., 2022). Silicosis leads to permanent lung injury, lowering elasticity and function (Sebiawu et al., 2020). Its symptoms are chronic cough, shortness of breath, chest pain, and, in extreme cases, respiratory failure. It also compromises the immune system, exposing miners to TB co-infection (Afriyie et al., 2023; Esdaile & Chalker, 2018). The living conditions in galamsey areas are deplorable, and exposure to pollution and dust is constant, putting miners at high risk of contracting respiratory infections.

These infections have many challenges (Esdaile & Chalker, 2018). Galamsey workers live in crowded, unsanitary conditions conducive to respiratory pathogen transmission (Esdaile & Chalker, 2018). The workers in wet, poorly ventilated tunnels inhale fungi and bacteria capable of causing lung infection, particularly in the presence of pre-existing lung damage from silicosis. Healthcare access in rural galamsey areas is generally inadequate, worsening respiratory infections and complicating treatment (Yen et al., 2012).

Loss of livelihoods: Illegal mining activities, known as galamsey, have resulted in the displacement of farmers and the destruction of cocoa farms, which are Ghana's most important cash crop. This has led to a decline in food crop production, posing a threat to food security. The depletion of forests due to mining has dramatically reduced the harvesting of non-timber forest products such as snails, honey, and firewood (Gilbert & Albert, 2016). Cocoa is a crucial source of income and a significant contributor to Ghana's economy, generating a substantial portion of its export revenue. However, galamsey has displaced cocoa farmers in many regions (Yen et al., 2012). The unregulated mining activities often result in the degradation of fertile farmland, rendering it unsuitable for cocoa cultivation. This further exacerbates the loss of livelihoods for cocoa farmers (Donkor et al., 2023). Displaced farmers not only experience a significant reduction in income but also face economic instability as they are compelled to seek alternative means of livelihood (Mensah & Darku, 2021).

Galamsey impacts cocoa production and disrupts the cultivation of food crops such as cassava, plantains, and yams. Mining activities pollute water bodies and contaminate the soil, leading to reduced crop yields and poor crop quality (Bessah et al., 2021). As food crop production declines, Ghana’s food security is compromised. This poses a risk to the country’s ability to adequately feed its population, potentially resulting in food shortages, higher prices, and increased food insecurity for vulnerable communities (Owusu-Nimo et al., 2018). Galamsey contributes to widespread deforestation and the destruction of habitats, causing a significant decline in the availability of non-timber forest products (Rajaee et al., 2015). Local communities that traditionally depend on resources such as snails, honey, and firewood for income and sustenance are adversely affected. The scarcity of these resources limits their options for making a living. The loss of forest resources erodes the traditional ecological knowledge of communities that have relied on these resources for generations (Akyeampong & Xu, 2023).

***Soil erosion and degradation*:** Soil degradation is a concern in mining areas due to the removal of topsoil and the disturbance of soil structures. Mining activities can result in soil erosion, loss of fertility, and reduced agricultural productivity in affected regions. It is vital to implement land reclamation and rehabilitation programs to restore mined areas and promote sustainable land use practices. Engaging local communities in sustainable agriculture and land

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.253

management initiatives can help mitigate the impacts of soil degradation (Ghana Environmental Protection Agency, 2019).

Displacement and Resettlement Issues: Displacement and resettlement issues are significant challenges associated with mining activities. The acquisition of land and subsequent displacement of local communities can have profound social and economic consequences (World Bank, 2011). Resettlement programs aim to mitigate these impacts by providing alternative housing, livelihood options, and essential services (IFC, 2015). However, the effectiveness and adequacy of such programs vary, and ensuring the rights and well-being of affected communities remain important considerations (Cernea & McDowell, 2000).

Social Conflicts and Stakeholder Engagement: Mining operations often give rise to social conflicts among different stakeholders. Competing interests, land rights disputes, and environmental concerns contribute to conflicts that can hinder sustainable development (Hilson, 2012). Effective stakeholder engagement is crucial to managing and mitigating social conflicts. Engaging all relevant stakeholders, including affected communities, local authorities, NGOs, and mining companies, fosters dialogue and cooperation (Lacey & Rawlinson, 2011). Meaningful engagement ensures that diverse perspectives are considered in decision-making processes (Boutilier & Thomson, 2011).

Methodology

This paper aimed to examine galamsey as an asset and threat within the Ghanaian space economy through a review of the literature. The paper sought to examine the economic, social, and environmental impacts of the mining activity and make recommendations for policymakers, stakeholders, and researchers. The current research adopted the systematic literature review method in seeking and analyzing the relevant studies published in peer-reviewed journals, books, reports, and other credible sources. The review was conducted using a systematic and stringent process in an attempt to traverse extensive and multifaceted literature on the subject. Literature searching was performed against electronic databases including PubMed, Scopus, Web of Science, and Google Scholar.

The keywords used were variations on the words "mining," "Ghana," "economy," and ‘’impact of galamsey. The search was conducted only for English-language publications and was restricted to literature that had been published from 2000 to 2025 to reflect current circumstances. Studies chosen for inclusion were based on relevance to the research aim as well as quality. Peer-reviewed articles, books, and reports that had empirical data, theoretical frameworks, or analytical discussions on the impact of mining on the Ghanaian economy were utilized. Irrelevant studies, opinion pieces, and duplications were excluded. Relevant information from the selected studies was extracted, including principal findings, research design, and theoretical frameworks utilized. The data were synthesized thematically to identify emergent themes, patterns, and trends in the literature.

The analysis comprised categorizing the findings under themes and subthemes concerning economic growth, employment, revenue for the government, environmental sustainability, social implications, and the negative impacts of galamsey. The implications of the literature reviewed were analyzed and interpreted to understand holistically the effects of galamsey in the Ghanaian space economy. The synthesis included the development of emergent themes, determining the strengths and weaknesses of the literature, and making connections between the various studies to develop pertinent conclusions. The review's limitations were determined, including possible publication bias, weaknesses inherent in the studies chosen, and the extent of the literature search. The weaknesses were taken into account in the interpretation of the results. The paper concluded by recapitulating the principal findings from the literature reviewed, distilling the most prominent findings and implications for the effects of galamsey on the Ghanaian space economy. The reference list was given in the appropriate citation format to recognize the authors of the literature reviewed.

Contextual Focus on Ghana

Ghana lies between latitudes 4° and 11° north of the equator, on the west coast of Africa. It has an area of 238,535 square kilometers, about the same size as the British Isles or the State of Oregon in the USA (Aryee, 2001). Ghana has a vast array of mineral resources that contribute to its national economy, as shown in Figure 1. The most significant minerals produced include gold, bauxite, manganese, oil, and diamonds (Africa, 2024).

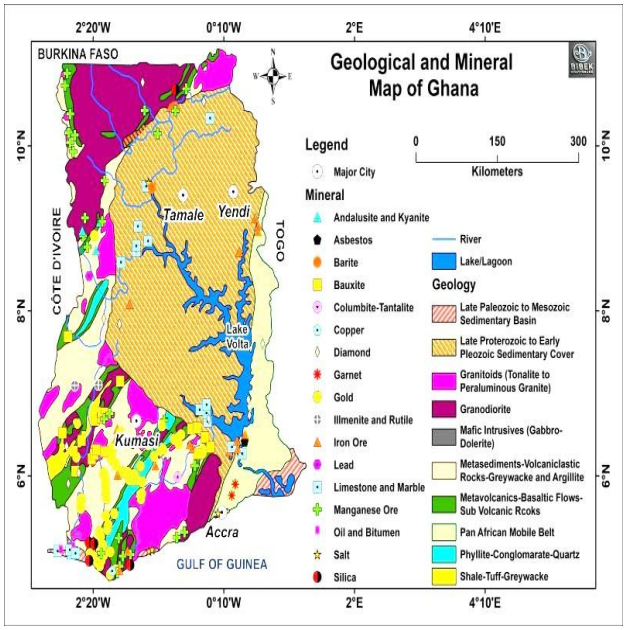

Figure 1: Geological and Mining Map of Ghana
Source: Bibek (2025)

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The mineral wealth of Ghana is of major importance to economic development. Bauxite, a key metal in aluminum production, generates revenue and jobs. The government wants to create an integrated alumina industry to attain optimal bauxite value (Ghana Chamber of Mines, 2021). Ghana also leads in manganese production, earning foreign exchange and employment, mostly in the west and north. Diamond mining is less significant than gold but contributes to West and East exports (Yeboah & Nyarkoh, 2022). Iron ore, limestone, salt, and granite are other minerals that aid construction and production. The oil and gas sector, specifically the Jubilee Field, was discovered in 2007, is a key revenue generator, drawing foreign investment and enhancing logistics and services. Limestone facilitates the production of cement and buildings, giving rise to employment. Coastal salt mining raises revenues and foreign exchange, which are vital for food processing and chemicals. These minerals drive economic diversification and infrastructure development, boosting Ghana's profile as a resource-rich nation (Yeboah & Nyarkoh, 2022).

Gold production remains a major economic impetus in Ghana, earning foreign exchange, employment, and government income in the form of royalties and taxes. Gold deposits occur primarily in the southwest, central, and northern regions. Historically, gold mining activities have been extensive in areas such as Tarkwa, Obuasi, Bibiani, and Prestea in the Western Region, as well as Dunkwa and Konongo in the Ashanti Region. These locations, designated as major gold mines in Figure 2, have been integral to the country's mining history Gbireh, 2009). Figure 2 delineates current gold-rich areas within Ghana, encompassing substantial portions of the Western, Ashanti, and Eastern Regions. The Western Region, which includes mining towns such as Tarkwa and Prestea, has served as a focal point for both large-scale and small-scale mining activities. Similarly, Obuasi in the Ashanti Region, renowned for its extensive underground mines, has historically been one of Africa's most prominent gold-producing locations. The Eastern Region, particularly the areas of Kibi and Koforidua, has also contributed to gold extraction, albeit on a smaller scale. Figure 3 shows artisanal gold mining areas in Ghana.

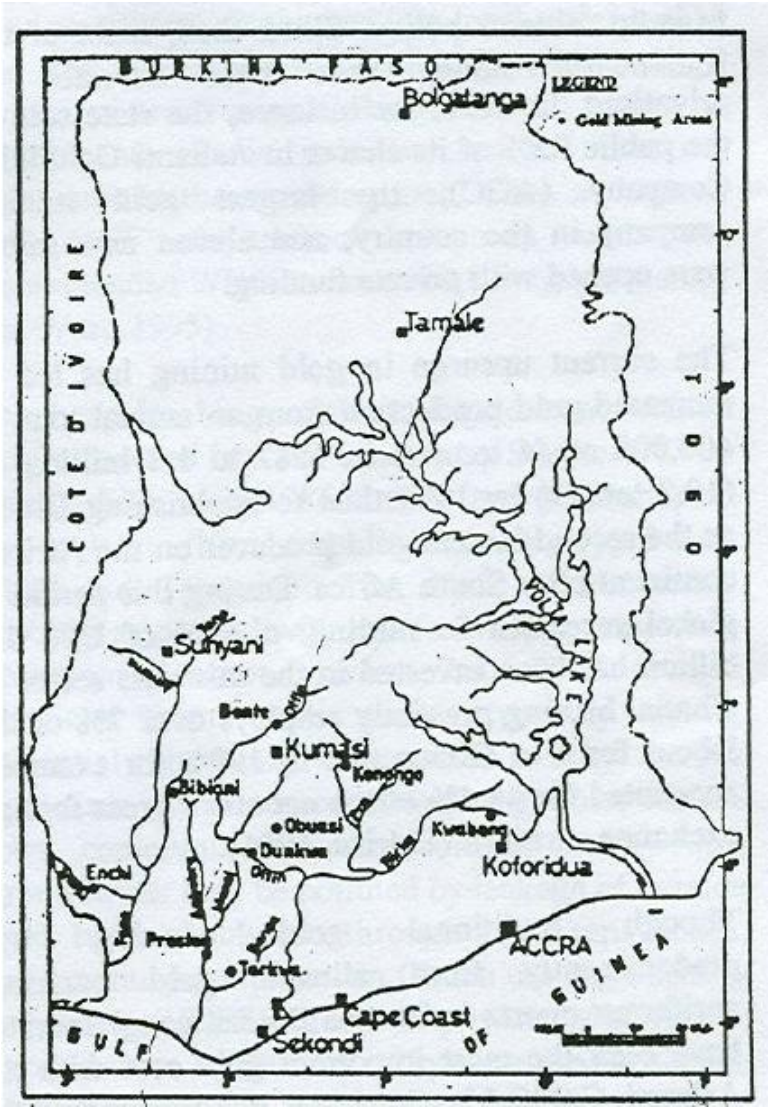

Figure 2: Map of Ghana showing the location of the major gold mines

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.253

Source: Gbireh (2009)

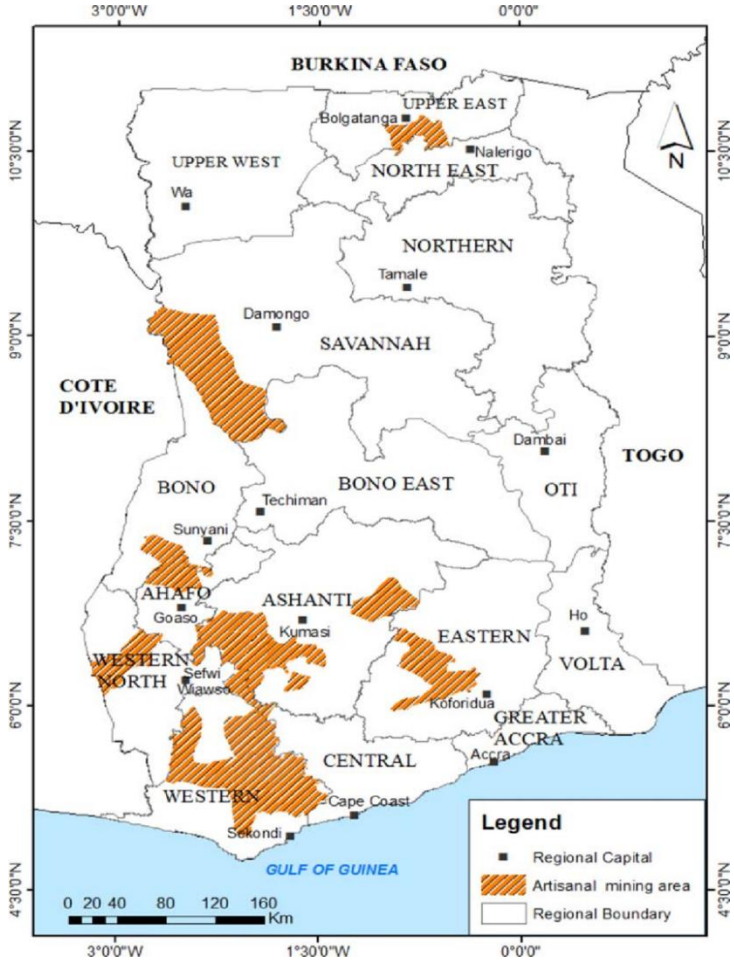

Figure 3: Artisanal gold mining areas in Ghana

Source: Takyi (2021)

Analysis and Discussion

From the rigorous search and appraisal, the scholarly articles found to be directly relevant to Galamsey as an asset and menace in the Ghanaian space economy are those summarized in Table 1. These studies form the empirical, theoretical, and conceptual foundation for the analysis and discussion that follow. With all this, they provide a contextualized understanding of the positive and adverse impacts of galamsey.

Table 1: Relevant Literature

Author	Publication Year	Objectives	Methodology	Key Findings	Relevance
Galamsey as an Asset					
Theme 1: Employment Generation					
Ghana Chamber of Mines	2020	Assess the role of mining in employment creation	Literature review and data analysis	Mining generates direct and indirect employment, benefiting transport, construction, and manufacturing sectors.	Highlights mining's role in poverty reduction and economic stability
World Bank	2020	Evaluate mining's role in job creation	Data analysis and policy review	Mining provides indirect employment through	Enhances local economies and

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				supply chains and service industries.	supports sustainable livelihoods
Theme 2: Government Revenue and Fiscal Management					
Ghana Extractive Industries Transparency Initiative	2021	Examine the fiscal contributions of mining	Policy analysis and revenue tracking	Taxes, royalties, and dividends from mining contribute significantly to government revenue.	Supports infrastructure development, social welfare, and fiscal stability
World Bank	2020	Assess mining's contribution to national revenue	Statistical review and economic impact analysis	Mining revenue plays a crucial role in economic development and public services.	Ensures long-term financial stability for the government
Theme 3: Contribution to GDP and foreign exchange earnings					
World Bank	2020	Evaluate mining's economic impact	Statistical analysis of mining revenue and GDP contribution	Mining is a major foreign exchange earner and supports industrialization	Essential for economic diversification and sustainable development
Aryee	2001	Investigate mining's role in economic growth	Literature review and historical analysis	Mining promotes industrial expansion and international trade	Strengthens Ghana's economic resilience and growth potential
Galamsey as a Menace					
Theme 1: Deforestation and land degradation					
Ghana Environmental Protection Agency	2019	Assess the environmental impact of mining	Field surveys and environmental assessments	Deforestation and biodiversity loss are severe in galamsey areas	Urgent need for reforestation programs
Theme 2: Water pollution and contamination					
World Bank	2020	Investigate water contamination due to mining	Case studies and water quality tests	Chemical pollutants from mining affect water sources, harming ecosystems and communities.	Calls for improved waste management and regulation
Theme 3: Respiratory diseases and lung conditions					
Fortin et al.	2010	Study health risks in mining communities	Medical examinations and epidemiological studies	Exposure to silica dust causes silicosis and respiratory infections	Necessitates improved occupational health policies
Banunle et al.	2018	Assess the impact of mining dust on health	Field study and medical assessments	High prevalence of respiratory diseases among miners	Calls for stricter occupational safety regulations
Wiafe et al.	2022	Investigate the effect of air pollution from mining	Environmental impact assessments	Airborne particles contribute to chronic lung diseases	Supports stronger environmental health policies
Sebiawu et al.	2020	Study occupational hazards in mining	Surveys and workplace health assessments	High levels of lung infections in miners	Encourages improved health and safety standards
Afriyie et al.	2023	Examine the health effects of heavy metal	Toxicology studies and health	Mercury and cyanide exposure lead to severe	Necessitates intervention for

		exposure	screenings	health complications	miners' health protection
Esdaile & Chalker	2018	Investigate the impact of toxic mining practices	Chemical analysis and policy review	Unsafe mining methods increase respiratory illnesses	Highlights the need for improved regulatory enforcement
Theme 4: Loss of livelihoods					
Gilbert & Albert	2016	Examine the impact of galamsey on agriculture	Surveys and economic impact analysis	Cocoa farmers are displaced, reducing food security	Galamsey threatens traditional livelihoods
Yen et al.	2012	Assess the socioeconomic effects of illegal mining	Field research and interviews	Loss of farming land affects rural incomes	Calls for alternative livelihood programs
Donkor et al.	2023	Study the impact of galamsey on food production	Economic impact assessments	Soil contamination reduces agricultural yields	Urges policy interventions to restore farmlands
Mensah & Darku	2021	Investigate displacement effects on farmers	Case studies and household surveys	Farmers struggle to find alternative employment	Highlights economic instability caused by illegal mining
Bessah et al.	2021	Assess climate change and mining's effects on farming	Interviews and climate modeling	Mining exacerbates environmental stress on agriculture	Suggests sustainable land-use policies
Owusu-Nimo et al.	2018	Study the effects of mining on rural economies	Spatial distribution analysis	Illegal mining disrupts local food markets	Supports rural development initiatives
Rajaee et al.	2015	Examine the ecological impact of galamsey	Environmental impact studies	Loss of biodiversity and soil depletion	Necessitates conservation strategies
Akyeampong & Xu	2023	Investigate the role of foreign mining technology	Case studies and field observations	Chinese technology has transformed mining, but displaced local economies	Advocates for balanced policy interventions
Theme 5: Soil erosion and degradation					
Ghana Environmental Protection Agency	2019	Assess soil degradation in mining areas	Field studies and soil quality analysis	Loss of fertile land affects agricultural productivity	Urges sustainable land reclamation efforts
Theme 6: Displacement and Resettlement Issues					
World Bank	2011	Analyze social displacement from mining	Case studies and stakeholder interviews	Communities are often displaced without adequate resettlement	Calls for better compensation and planning
IFC	2015	Investigate the impact of mining-induced resettlement	Socioeconomic studies and policy analysis	Relocated communities face long-term economic hardship	Suggests more inclusive relocation strategies
Cernea & McDowell	2000	Study global mining resettlement trends	Comparative analysis of case studies	Poorly managed resettlements increase poverty	Advocates for human-centered resettlement approaches
Theme 7: Social Conflicts and Stakeholder Engagement					

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Hilson	2012	Investigate mining-related social conflicts	Policy review and community engagement analysis	Land disputes and stakeholder conflicts hinder sustainable mining	Emphasizes the need for better stakeholder collaboration
Lacey & Rawlinson	2011	Study corporate-community relations in mining	Interviews and conflict resolution analysis	Lack of stakeholder engagement worsens tensions	Encourages inclusive decision-making
Boutilier & Thomson	2011	Analyze social license issues in resource extraction	Case studies and industry reports	Effective engagement reduces mining-related conflicts	Supports transparent stakeholder policies

Galamsey as an Asset

Employment Generation

The Ghana Chamber of Mines (2020) and the World Bank (2020) both acknowledge mining as an important employment industry, creating jobs in extraction and related services. They illustrate how both large-scale and small-scale mining (including galamsey) offer income for people, particularly in rural areas where alternative work is uncommon. In response, Banunle et al. (2018) and Wiafe et al. (2022) contend that although galamsey creates jobs, it does so in dangerous settings that expose employees to air pollution and dangerous chemicals. This jeopardizes Galamsey's long-term viability as an employment industry.

Government Revenue and Fiscal Management

The World Bank (2020) and the Ghana Extractive Industries Transparency Initiative (2021) concentrate on how royalties and taxes from the formal mining industry support government coffers. However, due to its informal nature and lack of regulation, galamsey does not provide a substantial contribution to government revenue. According to Akyeampong & Xu (2023), Galamsey stimulates local economies through direct spending, even though it does not pay official taxes. However, this economic contribution is still uncertain and does not support national development planning due to the absence of formal financial regulation.

Contribution to GDP and Foreign Exchange Earnings

Aryee (2001) presents a historical perspective, demonstrating how mining has played a significant role in Ghana's industrialization and GDP. The World Bank (2020) concurs but cautions that galamsey interferes with official mining activities, which lowers the industry's potential earnings. Donkor et al. (2023) provide a fresh perspective by demonstrating how environmental costs associated with Galamsey, like pollution and land degradation, lower agricultural productivity. By harming other productive industries, this subtly depresses the economy and negates any GDP gains from gold exports.

Galamsey as a Menace

Deforestation and Land Degradation

Strong evidence that galamsey causes significant deforestation, soil erosion, and biodiversity loss is provided by the Ghana Environmental Protection Agency (2019). Although Aryee (2001) concedes that mining contributes to economic expansion, he contends that mining and environmental sustainability can coexist under appropriate regulation. However, the harm is extensive in the context of Galamsey, where illicit activities frequently disregard environmental laws, rendering Aryee's (2001) viewpoint less relevant.

Water Pollution and Contamination

The World Bank (2020) and Fortin et al. (2010) confirm that illegal mining significantly contaminates water sources with mercury and cyanide, posing severe risks to human health and aquatic ecosystems. Banunle et al. (2018) argue that despite policy interventions, enforcement remains weak, allowing water pollution to persist. This highlights a governance gap that needs to be addressed if the environmental costs of galamsey are to be reduced.

Respiratory Diseases and Lung Conditions

According to all five sources, severe respiratory illnesses are caused by galamsey enterprises' poor working conditions, hazardous chemical exposure, and mining dust exposure. Long-term pulmonary disorders brought on by silica dust inhalation are highlighted by Fortin et al. (2010) and Banunle et al. (2018). According to Afriyie et al. (2023) and Sebiawu et al. (2020), the absence of protective gear among miners increases health hazards and increases the prevalence of respiratory illnesses in Galamsey villages. According to Wiafe et al. (2022), prolonged exposure to contaminants can still cause serious health problems despite safety precautions.

Loss of Livelihoods

The research by Gilbert & Albert (2016) and Yen et al. (2012) demonstrates how galamsey causes farmers to be displaced, which results in food insecurity and unstable economies in the impacted areas. According to Donkor et al. (2023), mining-related soil contamination lowers agricultural production and exacerbates the financial difficulties faced by displaced farmers. Illegal mining provides no organized alternatives for displaced people, in contrast to formal mining, which occasionally includes

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.253

compensation for impacted communities.

Soil Erosion and Degradation

According to the Ghana Environmental Protection Agency (2019), galamsey causes soil erosion, which makes land unusable for further farming. The report offers substantial proof of the lasting environmental damage brought on by illicit mining, but it does not attempt to refute any claims in support of Galamsey.

Displacement and Resettlement Issues

According to all three sources, economic suffering results from displacement brought on by mining. While the IFC (2015) promotes more inclusive relocation plans, the World Bank (2011) highlights the need for improved compensation systems. Poorly designed resettlements, according to Cernea & McDowell (2000), frequently make poverty worse rather than better, indicating that existing regulations are ineffective in protecting displaced communities.

Social Conflicts and Stakeholder Engagement

Boutilier & Thomson (2011), Lacey & Rawlinson (2011), and Hilson (2012) concur that ineffective communication between government officials, local communities, and mining firms leads to conflicts. Boutilier & Thomson (2011) contend that disputes continue because businesses put profits ahead of social responsibility, despite Hilson (2012)'s suggestion that more corporate-community interaction can ease tensions. This suggests that stronger regulatory frameworks are required and that voluntary corporate actions are insufficient.

Synthesis of Evidence

Galamsey, which is illegal mining, is a contentious topic in Ghana. It offers rural jobs but generates economic instability. The Ghana Chamber of Mines (2020) and World Bank (2020) document the creation of jobs in transport and supplies. Its informal nature, however, provides precarious employment, disrupted by government crackdowns. Mining increases government income through royalties and taxation, financing infrastructure and social services (Ghana Extractive Industries Transparency Initiative, 2021). Corruption and mismanagement, however, undermine public gains. Aryee (2001) warns that mining dependence is unsustainable due to environmental degradation.

Environmental degradation is a significant concern. The Ghana EPA (2019) names deforestation, land degradation, and loss of biodiversity. Mercury and cyanide water pollution threaten aquatic life and human health (World Bank, 2020; Afriyie et al., 2023). Health threats include respiratory illness and heavy metal poisoning (Fortin et al., 2010; Banunle et al., 2018). Galamsey negates cocoa farming and leads to social conflicts (Gilbert & Albert, 2016; Hilson, 2012). Foreign technology improves efficiency but endangers local jobs (Akyeampong & Xu, 2023). To solve these issues, there needs to be more regulation, health safeguards, and environmental alternatives.

Conclusion

Illegal small-scale mining, or galamsey, poses opportunities and threats to Ghana's economy. It generates employment and revenue but has significant environmental and social consequences. Galamsey results in deforestation, land degradation, water pollution, and health risks undermining sustainable development. The destruction of cocoa farms heightens food insecurity and economic instability, while the displacement of people leads to social conflicts.

These issues need strong policies that weigh economic gains and nature preservation. Tightening regulations and enforcement are imperative. Empowering institutions like the Minerals Commission and the EPA will improve law enforcement and compliance with sustainable mining. Legalizing small-scale mining by licensing and training will halt illicit activities and ensure responsible mining practices. Investment in reforestation, land reclamation, and water conservation restores degraded ecosystems. Vocational training, agricultural support, and microfinance for alternative livelihoods reduce galamsey dependence. Greater stakeholder engagement and governance ensure equitable resource distribution. Galamsey has implications for Ghana's economy, yet reforms are urgently needed. Promoting sustainability, enforcing legislation, and providing alternatives can lead to sustainable resource extraction and long-term sustainability.

Acknowledgments

We would like to express our appreciation to all those who engaged in this study.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Institutional Review Board Statement

Not applicable.

Informed Consent Statement

Not applicable.

Data Availability Statement

The original contributions presented in the study are included in the article/supplementary material; further inquiries can be directed to the corresponding author.

Statements and Declarations

No funding was received for conducting this study. The present study has no relevant financial or non-financial interests to disclose.

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Author Contributions

This work was carried out in collaboration among all authors. This project was conducted jointly by the authors. The authors reviewed and agreed to the final manuscript. All authors read and approved the final manuscript.

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References

Africa (2024). *"Ghana mining advantages include increased gold production and regulatory updates - Africa 2024 - Oxford Business Group". oxfordbusinessgroup.com.*

Afriyie, R. Z., Arthur, E. K., Gikunoo, E., Baah, D. S., & Dziafa, E. (2023). Potential health risk of heavy metals in some selected vegetable crops at an artisanal gold mining site: A case study at Moseaso in the Wassa Amenfi West District of Ghana. Journal of Trace Elements and Minerals, 100075. https://doi.org/10.1016/j.jtemin.2023.100075

Akyeampong, E., & Xu, L. (2023). Chinese technology and the transformation of the rural economy in Ghana: Evidence from Galamsey in the Ashanti and Savannah regions. African Affairs, 122(448), 329-351. https://doi.org/10.1093/afraf/adad023

Aryee, B. (2001). Ghana's mining sector: Its contribution to the national economy. *Resources Policy*, 44, 1 10. https://doi.org/10.1016/S0301-4207(00)00042-8

Bessah, E., Raji, A. O., Taiwo, O. J., Agodzo, S. K., Ololade, O. O., Strapasson, A., & Donkor, E. (2021). Gender-based variations in the perception of climate change impact, vulnerability, and adaptation strategies in the Pra River Basin of Ghana. *International Journal of Climate Change Strategies and Management*, 13(4/5), 435–462. https://www.emerald.com/insight/content/doi/10.1108/IJCCSM-02-2020 0018/full/html

Bibek (2025). Mineral Deposits of Ghana. https://www.linkedin.com/in/bibek-1993?lipi=urn%3Ali%3Apage%3Ad_flagship3_profile_view_base_contact_details%3BOZ4LymIcRduFO27GhtxBmQ%3D%3D

Boutilier, R. G., & Thomson, I. (2011). Social License and the Resource Sector. Journal of Business Ethics, 101(2), 243-267.

Bryceson, D. F., & Geenen, S. (2016). Artisanal frontier mining of gold in Africa: Labour transformation in Tanzania and the Democratic Republic of Congo. *African Affairs, 115(459),* 296-317.

Cernea, M. M., & McDowell, C. (2000). Risks and Reconstruction: Experiences of Resettlers and Refugees. *World Development,* 28(5), 827-849.

Donkor, P., Siabi, E. K., Frimpong, K., Mensah, S. K., Siabi, E. S., & Vuu, C. (2023). Socio demographic effects on role assignment and associated occupational health and safety issues in artisanal and small-scale gold mining in Amansie Central District, Ghana. *Heliyon*, 9(3). https://www.cell.com/heliyon/pdf/S2405-8440(23)00948-9.pdf

Esdaile, L. J., & Chalker, J. M. (2018). The Mercury Problem in Artisanal and Small-Scale Gold Mining. *Chemistry – A European Journal*, 24(27), 6905–6916. https://doi.org/10.1002/chem.201704840

Fortin, J.-L., Desmettre, T., Manzon, C., Judic-Peureux, V., Peugeot-Mortier, C., Giocanti, J.-P., Hachelaf, M., Grangeon, M., Hostalek, U., & Crouzet, J. (2010). Cyanide poisoning and cardiac disorders: 161 cases. The Journal of Emergency Medicine, 38(4), 467–476. https://doi.org/10.1016/j.jemermed.2009.09.028

Gbireh, A. B., Cobblah, A., & Suglo, R. S. (2009). Analysis of the trends of gold mining in Ghana. *Ghana Mining Journal, 9*(1), 38–49. https://doi.org/10.4314/gm.v9i1.42608

Ghana Chamber of Mines. (2021). *Annual report 2020: Performance of the mining sector*. Ghana Chamber of Mines. *"THE GHANA CHAMBER OF MINES 2021 MINING INDUSTRY STATISTICS AND DATA" (PDF).*

Ghana Environmental Protection Agency. (2019). Environmental performance rating and disclosure report for mining companies in Ghana. https://www.epa.gov.gh/

Ghana Extractive Industries Transparency Initiative. (2021). 2019 Mining sector report. https://gheiti.gov.gh/site/

Ghana Extractive Industries Transparency Initiative. (2021). *Annual report on mining revenue and governance challenges in Ghana*.

Gilbert, D., & Albert, O.-B. (2016). Illegal small-scale gold mining in Ghana: A threat to food security. *Journal of Food Security*, 4(5), 112–119. DOI:10.12691/jfs-4-5-2

Hilson, G. (2002). Small-scale mining and its socio-economic impact in developing countries. *Natural Resources Forum, 26(1),* 3-13.

Hilson, G. (2009). Small-scale mining, poverty and economic development in sub-Saharan Africa: An overview. *Resources Policy*, 34(1-2), 1-5. https://doi.org/10.1016/j.resourpol.2008.12.001

Hilson, G. (2012). The nature, impact and management of mining conflicts in Ghana. *Journal of Cleaner Production*, 29-30, 53-59.

Hilson, G., & Hilson, A. (2015). *Entrepreneurship, poverty and sustainability: Critical reflections on the formalisation of small-scale mining in Ghana.* International Growth Centre. Retrieved from https://www.theigc.org/sites/default/files/2015/04/Hilson-Hilson-2015-Working-Paper-1.pdf

Hilson, G., & Maconachie, R. (2020). Artisanal and small-scale mining governance in Ghana. *Journal of*

Mining Policy, 17(3), 101-120.

Hirons, M. (2020). How the sustainable development goals risk undermining efforts to address environmental issues in Sub-Saharan Africa. *World Development, 127,* 104-108.

Intergovernmental Forum on Mining. (2018). *Global trends in artisanal and small-scale mining: A review of key issues*. IGF. https://www.igfmining.org/global-trends-in-artisanal-and-small-scale-mining-a-review-of-key-issues/

International Finance Corporation (IFC). (2015). Performance Standards on Environmental and Social Sustainability.

Lacey, N., & Rawlinson, A. (2011). Securing the Social License to Operate: Cases in Global Mining. Corporate Social Responsibility and Environmental Management, 18(6), 343-354.

Mensah, E. O., & Darku, E. D. (2021). The impact of illegal mining on public health: A case study in kenyasi, the ahafo region in Ghana. Technium Soc. Sci. J., 23, 1. https://techniumscience.com/index.php/socialsciences/article/view/4503

Owusu, K. (2021). Land use transformation and spatial economy in Ghana: Challenges and prospects. *African Geographical Review*, 40(2), 223-240.

Owusu-Nimo, F., Mantey, S. D., Nyarko, K. B., Appiah-Effah, E., & Aubynn, A. (2018). The impact of Chinese involvement in small-scale mining in Ghana. *Resources Policy, 55,* 49-56.

Rajaee, M., Obiri, S., Green, A., Long, R. N., Cobbina, S. J., Nartey, V., Buck, D., Antwi, E., & Basu, N. (2015). Integrated assessment of artisanal and small-scale gold mining in Ghana—Part 2: Natural sciences review. *International Journal of Environmental Research and Public Health, 12*(8), 8971-9011. https://doi.org/10.3390/ijerph120808971

Reuters. (2024). *Gold mining in Ghana: Booms and environmental consequences*. Reuters News.

Sarpong, C. K., Dinye, R. D., & Elizabeth, S. (2025). Managing land use disputes in mining areas in Sub-Saharan Africa. Journal of Modern Social Sciences, 2(3), 215–225.

Sebiawu, G. E., Antwi-Akomeah, S., Mensah, N. J., & Abana, D. (2020). Heavy metal and bacteriological contamination of herbal medicines sold over the counter in the municipality of wa of the upper West Region-Ghana. International Journal of Scientific Research in Multidisciplinary Studies, 6(5), 15-23. https://www.isroset.org/journal/IJSRMS/full_paper_view.php?paper_id=1889#pare ntHorizontalTab3

Takyi, R., Hassan, R., El Mahrad, B., & Adade, R. (2021). Socio-ecological analysis of artisanal gold mining in West Africa: A case study of Ghana. *Journal of Sustainable Mining, 20*(3), Article 6. https://doi.org/10.46873/2300-3960.1322

Wiafe, S., Awuah Yeboah, E., Boakye, E., & Ofosu, S. (2022). Environmental risk assessment of heavy metals contamination in the catchment of small-scale mining enclave in Prestea Huni-Valley District, Ghana. *Sustainable Environment,* 8(1), 2062825. https://doi.org/10.1080/27658511.2022.2062825

World Bank. (2011). Involuntary Resettlement. Environmental and Social Framework.

World Bank. (2020). Ghana mining sector development and environment project. https://projects.worldbank.org/en/projects-operations/project-detail/P147862

World Bank. (2020). *Global trends in foreign direct investment in the mining sector*. World Bank Group.

World Gold Council. (2015). *The economic contribution of large-scale mining to Ghana's GDP and employment*. World Gold Council. https://www.gold.org/goldhub/research/economic-contribution-large-scale-gold-mining-ghanaWorld Gold Council. (2021). *The economic impact of gold mining: Global contributions and financial stability*. World Gold Council Reports.

Yeboah, S. A., & Nyarkoh, B. J. (2022). *The impact of mining on the Ghanaian economy: A comprehensive review (1992-2020). Munich Personal RePEc Archive (MPRA)*. https://mpra.ub.uni-muenchen.de/117502/

Yen, Y.-P., Tsai, K.-S., Chen, Y.-W., Huang, C.-F., Yang, R.-S., & Liu, S.-H. (2012). Arsenic induces apoptosis in myoblasts through a reactive oxygen species-induced endoplasmic reticulum stress and mitochondrial dysfunctio n pathway. Archives of Toxicology, 86(6), 923–933. https://doi.org/10.1007/s00204-012-0864-9

ATRI PRESS

Journal of Modern Social Sciences

Volume 2 Issue 4 , 2025

ISSN: 3078-4433 | eISSN: 3078-4441

The Impact of Regulatory Mechanisms in the Sharing Economy on Perceived Privacy Risk, Consumer Trust, and Continued Sharing Intention

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Abstract

The sharing economy represents a peer-to-peer exchange business model that enables the sharing or rental of goods and services through internet platforms. Despite its enormous development potential, the sharing economy has gradually exposed regulatory challenges, inadequate platform mechanisms, and weak community foundations. This study employs structural equation modeling to empirically examine the effects of sharing economy regulatory mechanisms on perceived privacy risk, consumer trust, and continuous sharing intention. Based on 406 valid questionnaires from users of mainstream Chinese sharing economy platforms, our findings reveal that government regulation significantly reduces perceived privacy risk, while industry self-regulation alone shows no significant negative impact. However, the interaction between government and industry self-regulation demonstrates significant negative effects on perceived privacy risk. Furthermore, perceived privacy risk negatively influences both consumer trust and continuous sharing intention, while consumer trust positively affects continuous sharing intention.

Keywords

sharing economy; government regulation; industry self-regulation; perceived privacy risk; consumer trust; continuous sharing intention

Suggested citation: Wen, H. (2025). The Impact of Regulatory Mechanisms in the Sharing Economy on Perceived Privacy Risk, Consumer Trust, and Continued Sharing Intention. *Journal of Modern Social Sciences*, 2(4), 257–268. https://doi.org/10.71113/JMSS.v2i4.368

Introduction

The rapid expansion of sharing economy platforms in China has fundamentally transformed how consumers access goods and services. From ride-sharing platforms like Didi to accommodation sharing through Xiaozhu, these platforms have created new economic opportunities while simultaneously raising significant regulatory and consumer protection concerns. The Chinese government and industry stakeholders face the challenge of balancing innovation promotion with adequate consumer protection, particularly regarding privacy and trust issues that are central to sharing economy success.

Previous research on sharing economy regulation has primarily focused on theoretical discussions, with limited empirical evidence on how different regulatory approaches affect consumer perceptions and behaviors (Cohen & Sundararajan, 2017). While scholars have recognized the importance of trust in sharing economy transactions (Möhlmann, 2015) and the significance of privacy concerns in digital platforms (Xu et al., 2012), few studies have systematically examined the relationships between regulatory mechanisms, perceived privacy risk, consumer trust, and continuous sharing intention within a unified analytical framework.

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.368

This research addresses this gap by investigating how government regulation and industry self-regulation, both individually and in combination, influence consumer perceptions of privacy risk and subsequent trust and behavioral intentions in China's sharing economy context. Our study contributes to the literature by providing empirical evidence on the effectiveness of different regulatory approaches and their implications for sustainable sharing economy development.

Literature Review and Hypothesis Development

Sharing Economy Research

Existing literature on sharing economy research follows two main research streams. The first focuses on consumer participation motivations and influencing factors. Consumer participation motivations can be categorized into three types (Bucher et al., 2016): instrumental motivations (such as convenience), normative motivations (such as sustainability tendencies and altruistic behavior), and social-hedonic motivations (such as enjoyment and community belonging).

Regarding factors influencing consumer participation willingness or behavior, research perspectives include single-dimensional approaches (distinguishing between supply and demand roles) and mixed approaches (without role differentiation). Under single-dimensional perspectives, factors affecting demand-side consumer participation include consumer de-ownership tendencies (Lindblom & Lindblom, 2017), supplier personal information and photos (Ert et al., 2016), familiarity (Möhlmann, 2015), perceived usefulness (Möhlmann, 2015), and platform security mechanisms (Keetels, 2013). Supply-side factors include emotional attachment to shared items and platform regulatory and security mechanisms (Keetels, 2013).

The second research stream examines the impact effects of sharing economy development. From the perspective of outcome variables explored in existing research, sharing economy impact effects mainly include macroeconomic development effects, social effects covering employment (Fang et al., 2016), urban transportation, traditional industries, social equity (Schor, 2017), and inclusiveness (Edelman et al., 2017), and environmental and sustainability effects (Martin, 2016).

Sharing Economy Regulation Research

Sharing economy regulation has become a highly concerning policy issue for governments worldwide. Compared to traditional industries, sharing economy lacks adequate regulation, making it necessary to explore the relationship between sharing economy and government regulation. Existing related research includes several aspects.

First, research on regulatory problems and challenges brought by sharing economy primarily explores regulatory difficulties from qualitative perspectives. Scholars point out that government regulatory departments should focus on resolving regulatory issues regarding contractual relationships between service providers and platforms, platform identity authentication, insurance, taxation, and negative externalities (Munkøe, 2017). Others argue that many sharing platforms operate in gray areas, creating uncertainty for sharing participants and third parties while presenting regulatory challenges for governments in insurance, taxation, employment, and civil rights (Cohen & Zehngebot, 2014).

Second, research on government, platform enterprises, and consumer responses and attitudes toward sharing economy regulation shows that government regulatory attitudes toward sharing economy development mainly include three types: regulation, incomplete regulation, and wait-and-see approaches (Das Acevedo, 2016). Generally, higher government levels tend to support sharing economy regulation (Hong & Lee, 2018). At the platform level, scholars suggest that sharing economy startups should actively cooperate with government regulatory actions (Cannon & Summers, 2014). At the consumer level, research finds that consumers recognize platform enterprise self-regulation and consumer community self-management (Hartl et al., 2015).

Third, research on sharing economy regulatory principles and countermeasures generally agrees that since sharing economy regulatory policies lack universality, local governments should formulate corresponding regulatory documents and systems based on subsidiarity and flexibility principles according to actual conditions (Murphy, 2016). Some scholars suggest adopting experimental regulation, encouraging local governments to take the lead in regulation and promoting successful experiences on a large scale (Posen, 2015).

Fourth, research on industry self-regulation in sharing economy recognizes that some problems faced by current sharing economy can be solved through industry self-regulation methods in addition to government regulation approaches. Black (2001) categorizes industry self-regulation into voluntary self-regulation, coerced self-regulation, sanctioned self-regulation, and mandated self-regulation. Research on sharing economy industry self-regulation is limited, mainly including successful elements of sharing economy self-regulation such as credible enforcement mechanisms, perception of legitimacy, and power of reputation (Cohen & Sundararajan, 2017).

Trust Research in Sharing Economy

In sharing economy models, any party in sharing transactions needs relatively high trust levels toward transaction counterparts and sharing platforms for successful transaction completion. Opportunistic behavior by transaction counterparts may cause serious consequences,

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.368

including shared item damage, illegal use of personal privacy information, and even personal safety threats. Therefore, trust is a key factor in overcoming uncertainty and reducing risks in sharing economy models.

Through analysis of existing literature on trust in sharing economy, research mainly falls into two categories. First, research on trust antecedent mechanisms explores factors influencing trust from sharing platform, service provider, and consumer perspectives. Platform-level factors include platform reputation (Möhlmann, 2017), reputation systems, reputation feedback, reputation indicators, and platform website quality (Teubner et al., 2017). Service provider factors include provider reputation (Ert et al., 2016), personal characteristics, information completeness, interaction experiences, and information verification. Consumer-level factors include risk-related concerns and trust propensity (Möhlmann, 2017).

Second, research on trust impact mechanisms focuses on trust effects on consumer participation willingness, decisions, and behaviors. Studies confirm that trust positively influences consumer rental intentions (Barnes & Mattsson, 2017), purchase choices and prices (Ert et al., 2016), and continuous sharing willingness (Möhlmann, 2015; Johnson & Mun, 2016).

Hypothesis Development

Effects of Sharing Economy Regulation on Perceived Privacy Risk

Generally, "regulation" refers to using legal means to achieve social and economic policy objectives. When market behavior leads to inefficient or unfair results (commonly called "market failure"), regulation can serve as a corrective measure to maintain market order. Regulation can be divided into government regulation and industry self-regulation. Government regulation mainly relies on government judicial institutions and legislative departments to protect personal privacy information, while industry self-regulation primarily uses industry codes of conduct, self-managing trade groups, and associations as privacy regulation means.

Sharing economy business models involve consumer data collection and generate and rely on large amounts of consumer personal information, financial records, and other personal resources during operations, thus raising serious consumer personal privacy and security risks. Previous research in e-commerce shows that consumer perception of inadequate regulation increases data privacy concern levels, and moderate regulation negatively affects perceived privacy risk. For example, Lwin et al. (2007) confirmed that individual consumer perception of regulatory levels is significantly negatively correlated with perceived risk levels in online activities. Xu et al. (2012) found that government regulation has significant negative effects on privacy concerns in specific contexts.

Some scholars also found that improving industry self-regulation mechanisms can effectively reduce enterprise opportunistic behavior and enhance consumer personal privacy information perception control and protection levels (Xu et al., 2012; Hui et al., 2007), thereby reducing perceived privacy risk. Accordingly, we propose the following hypotheses:

H1: Government regulation negatively affects perceived privacy risk.

H2: Industry self-regulation negatively affects perceived privacy risk.

Academic viewpoints widely indicate that for sharing economy as an emerging business model, single industry self-regulation or government regulation often cannot achieve effective results. Some scholars point out that mixed regulatory models combining government regulation and industry self-regulation are fundamental guarantees for ensuring healthy and orderly development of China's sharing economy. Consumer data privacy problem solutions require not only government departments supervising specific sharing economy industries but also involvement of multiple other institutions and departments. Taking "Didi" platform as an example, regulating this platform's operations requires cooperation among local government departments, legislative institutions, transportation management departments, traffic enforcement departments, public security departments, sharing companies or industry associations, and other multiple institutions. This shows that government regulation and industry self-regulation have positive complementary relationships with interactive combination effects.

Similarly, international scholar Xu et al. (2012) confirmed positive interactive combination effects between government regulation and industry self-regulation, and their combination effects can significantly reduce consumer privacy concern levels in specific contexts. Accordingly, we propose the following hypothesis:

H3: The interaction between government regulation and industry self-regulation negatively affects perceived privacy risk.

Effects of Perceived Privacy Risk on Consumer Trust and Continuous Sharing Intention

Perceived privacy risk refers to individual consumer risk perception regarding their data privacy and security, while consumer trust refers to consumer belief that sharing platforms will not abuse or illegally disseminate their personal privacy data information. Some scholars believe that the key factor in reducing consumer perceived transaction risk is trust (Grabner-Kräuter & Faullant, 2008). In other words, only by improving consumer trust in sharing

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.368

platforms and making consumers believe that sharing platforms can correctly and legally use their privacy information can consumer perceived privacy risk be reduced.

Many previous studies in marketing have focused on relationships between perceived privacy risk and trust. For example, Liu et al. (2004) found through privacy-trust-behavioral intention model empirical research that consumer privacy perception has significant negative effects on consumer trust. Other scholars confirmed that privacy violations have significant negative effects on consumer trust (Martin, 2018). Accordingly, we propose the following hypothesis:

H4: Perceived privacy risk negatively affects consumer trust.

When consumers perceive privacy risks, they may adopt various protective behaviors, such as resisting adoption of new technologies that challenge personal privacy, submitting false data, refusing platform registration, requesting data deletion, and/or requesting more information provision. Although consumer behavioral response methods to perceived privacy risk differ, numerous studies confirm that consumer perceived privacy risk has direct significant negative effects on consumer behavioral intentions (Liu et al., 2004; Martin et al., 2017; Gupta et al., 2010). Accordingly, we propose the following hypothesis:

H5: Perceived privacy risk negatively affects consumer continuous sharing intention.

Effects of Consumer Trust on Continuous Sharing Intention

Relationships between consumer trust and behavioral intentions or attitudes have been confirmed by academia. For example, Kim et al. (2008) showed that consumer trust has significant positive effects on consumer purchase intentions. Chong (2013) confirmed that trust has the greatest impact on consumer continuous mobile commerce use intentions. Similarly, sharing economy research confirms that consumer trust positively influences consumer continuous use intentions (Möhlmann, 2015) and repurchase intentions (Liang et al., 2018).

When consumers believe that sharing platforms can provide reliable, secure sharing transaction environments and prioritize consumer interests, consumer continuous sharing intentions become stronger. Accordingly, we propose the following hypothesis:

H6: Consumer trust positively affects consumer continuous sharing intention.

Based on the above analysis, we develop our research model as shown in Figure 1.

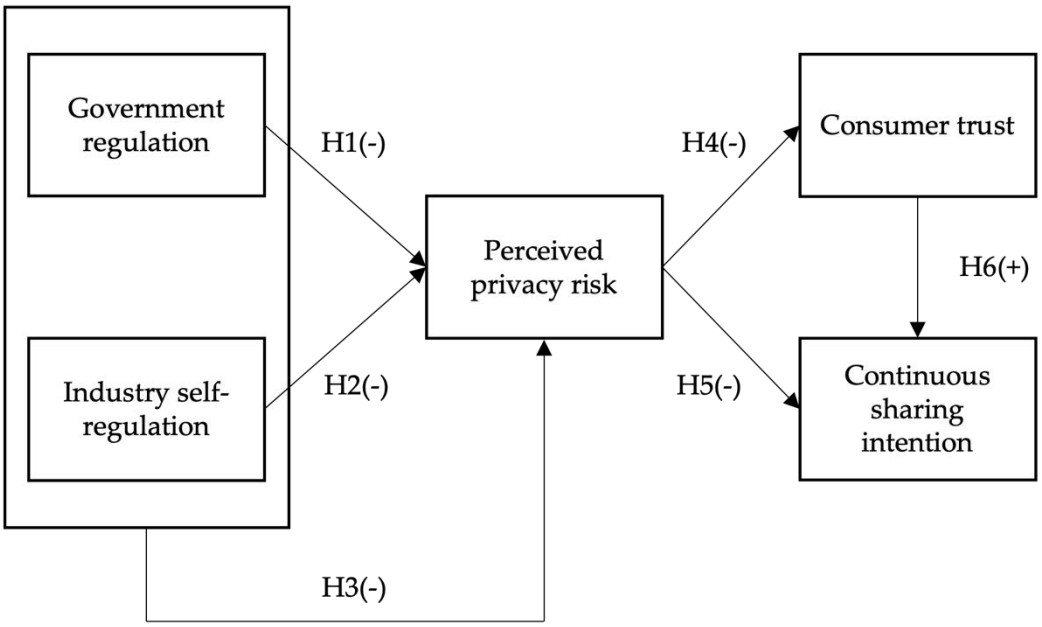

Figure 1 research model

Research Design

Data Sources

We collected data through online questionnaire surveys targeting consumers who have used mainstream domestic sharing economy platforms (such as Didi, Xiaozhu Short-term Rental, etc.). To ensure research scientificity and

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.368

validity, before distributing questionnaires, we randomly invited 50 ordinary consumers who have used or are currently using mainstream domestic sharing platforms for pre-testing. We examined structural validity and reliability of effective questionnaires recovered from pre-testing and found that questionnaire measurement items' reliability and validity met research design requirements, ensuring our research survey's scientificity and validity.

The formal survey recovered 482 questionnaires, with 406 valid questionnaires, achieving a total effective rate of 84.23%. Sample descriptive statistics show that among mainstream domestic sharing platform users, males numbered 214 (approximately 52.71%) and females 152 (47.29%). Consumer age levels concentrated in the 20-35 range (82.3%). Regarding education, undergraduate and above education accounted for 51.18%. In the past year, approximately 48% used sharing economy platform services less than 10 times, and about 35% used them less than 20 times. This indicates that domestic sharing economy service user groups have characteristics of youth and high education levels.

Variable Measurement

Government Regulation (GR)

This study referenced Lwin et al. (2007) research, using 3 items for measurement. Government regulation reflects the degree to which consumers perceive government and legal level policy formulation to protect consumer personal privacy information. We designed the following items: "The Chinese government has issued relevant laws and regulations to protect consumer personal privacy information from being abused or illegally disseminated by platform enterprises in sharing economy models"; "The Chinese government has taken sufficient measures to ensure consumers are protected from online privacy violations in sharing economy models"; "The Chinese government strictly follows international laws to protect consumer personal privacy information in sharing economy environments." Scale design used Likert 7-point scoring method.

Industry Self-Regulation (ISR)

For industry self-regulation measurement, previous scholars mostly used experimental methods for testing. Unlike previous research, this study mainly examines from consumer perception perspectives. Therefore, we comprehensively referenced Xu et al. (2012) and Listokin (2017) research, evaluating industry self-regulation efficiency and effectiveness through the following items: "Sharing economy platform website privacy and security protection mechanisms can effectively protect consumer data privacy from leakage"; "Sharing economy platform privacy policies are professionally certified and obtain corresponding privacy seals"; "Industry associations to which sharing economy platforms belong have taken sufficient measures to protect consumer personal privacy information security."

Perceived Privacy Risk (PR)

This study adaptively modified the perceived privacy risk scale used by Zhou (2012) to better suit our research needs. Specific items include: "Providing my personal information to sharing platforms involves many unexpected problems"; "Providing personal information to sharing economy platforms is risky"; "Disclosing my personal information to sharing economy platforms would result in significant potential losses."

Consumer Trust (CT)

Consumer trust in this study mainly refers to consumer trust toward sharing economy platforms. By referencing sharing economy research by Möhlmann (2015), we used the following 3 items to measure consumer trust: "Sharing economy platforms give me the impression of frequently keeping promises to consumers"; "Sharing economy platforms provide robust, secure environments where I can confidently use sharing services on platforms"; "Overall, sharing economy platforms are trustworthy."

Continuous Sharing Intention (BI)

By referencing sharing economy research by Möhlmann (2015) and Hamari et al. (2016), we used the following 3 items to measure consumer trust: "Through thorough consideration, I will frequently use sharing economy platforms to enjoy sharing services in the future"; "I can confirm that I will use sharing economy platforms more frequently to enjoy sharing services in the future"; "I will continue using sharing economy platforms in the future."

Control Variables

Existing research shows that consumer perceived privacy risk, consumer trust, and continuous sharing intention are also influenced by demographic characteristics such as age, gender, and education level. However, these factors are not the focus of this study, so we controlled for their possible influences. Additionally, our research model introduced trust propensity and past privacy experience as two control variables. Trust propensity control variables referenced Pavlou and Gefen (2004) research using 3 items for measurement, while past privacy experience referenced Smith et al. (1996) research using 3 items for measurement.

Common Method Variance Testing

We used Harman single-factor testing method to examine common method variance. First, we conducted Harman single-factor testing on all questionnaire items through exploratory factor analysis. Results showed that the first unrotated common factor extraction explained 24.47%, with no single factor domination found, indicating our research has no common method variance problems.

Reliability and Validity Testing

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.368

After examining scale reliability and validity, results showed that each variable's Cronbach's α values ranged from 0.861 to 0.952, all greater than 0.7, indicating measurement indicators have good internal consistency and scale reliability testing passed. Each measurement item's factor loadings were all greater than 0.6, and all factors' AVE values ranged from 0.670 to 0.767, all higher than 0.5, indicating the scale has good structural validity. Additionally, each variable's AVE value square roots were all greater than correlation coefficients between that variable and other variables, indicating good discriminant validity of the scale. Table 1 presents the results of the reliability and validity analysis.

Table 1 Reliability and Validity Analysis Results

Variable	Factor Loading	AVE	Cronbach's α	Correlation coefficient matrix						
				GR	ISR	PR	CT	TP	PPE	CSI
GR	GR1: 0.833 GR2: 0.892 GR3: 0.881	0.755	0.911	0.869						
ISR	ISR1: 0.781 ISR2: 0.802 ISR3: 0.896	0.685	0.952	0.420	0.828					
PR	PR1: 0.812 PR2: 0.838 PR3: 0.806	0.670	0.854	-0.210	-0.030	0.819				
CT	CT1: 0.831 CT2: 0.892 CT3: 0.902	0.767	0.883	0.480	0.050	-0.230	0.876			
TP	TP1: 0.839 TP2: 0.822 TP3: 0.856	0.704	0.861	0.130	0.110	-0.200	0.020	0.839		
PPE	PPE1: 0.870 PPE2: 0.834 PPE3: 0.786	0.690	0.832	0.050	0.160	-0.220	0.560	0.050	0.831	
CSI	CSI1: 0.855 CSI2: 0.912 CSI3: 0.846	0.760	0.892	0.460	0.510	-0.310	0.410	0.520	0.280	0.872

Note: GR=Government Regulation, ISR=Industry Self-Regulation, PR=Perceived Privacy Risk, TP=Trust Propensity, PE=Past Privacy Experience, CSI=Continuous Sharing Intention

Empirical Analysis

Path Analysis and Hypothesis Testing

We first used AMOS structural equation software to analyze model fit. Model fit analysis results were as follows: $\chi^2/df=2.634$, GFI=0.913, AGFI=0.861, CFI=0.937, NFI=0.918, RMSEA=0.074. These fit indicators were all at acceptable levels, indicating our research model has good overall fit and can proceed to the next step of path analysis.

We then continued using AMOS for path coefficient analysis. Analysis results are shown in Figure 2 and Table 2. From Figure 2 output results, we can see that the explained variance proportions for perceived privacy risk, consumer trust, and continuous sharing intention were 51.2%, 40.3%, and 38.7% respectively, all exceeding the 10% benchmark, indicating our research model has good explanatory power.

From Figure 2, government regulation negatively affects perceived privacy risk (β_1 =-0.252, $p<0.05$), industry self-regulation's negative impact on perceived privacy risk is not significant (β_2 =-0.091, $p>0.1$), while the interaction between government regulation and industry self-regulation has significant negative effects on perceived privacy risk (β_3 =-0.198, $p<0.05$). Therefore, hypotheses H1 and H3 are supported, while H2 failed hypothesis testing.

Perceived privacy risk has significant negative effects on

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.368

consumer trust (β_4 =-0.382, p<0.01), therefore hypothesis H4 is supported. Perceived privacy risk has significant negative effects on continuous sharing intention (β_5 =-0.169, p<0.05), so hypothesis H5 passed hypothesis testing. Consumer trust has significant positive effects on continuous sharing intention (β_6 =0.583, p<0.01), indicating H6 also passed hypothesis testing.

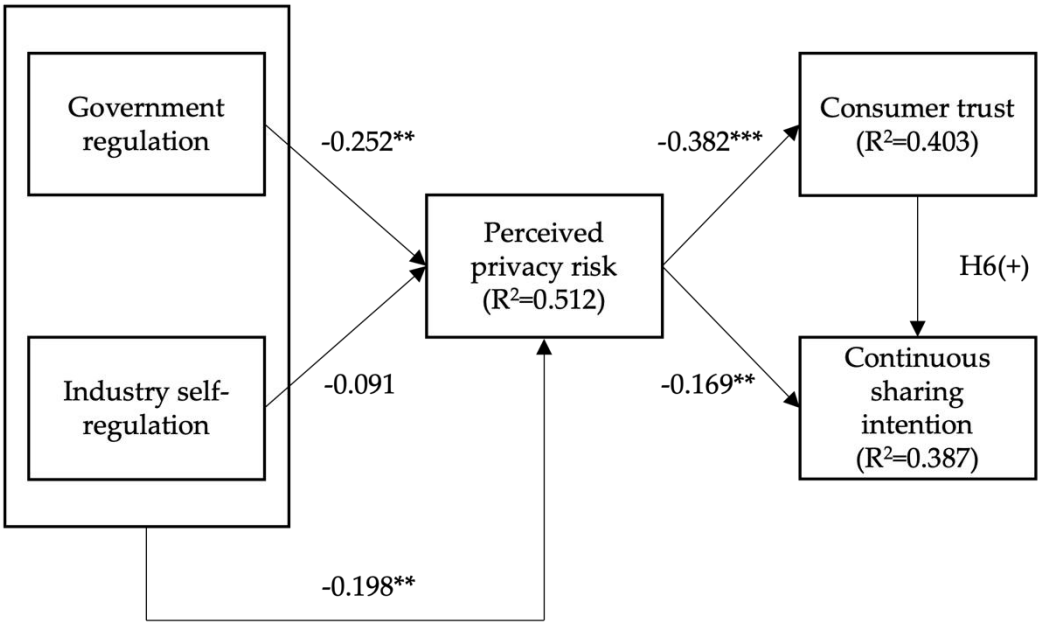

Figure 2 Analysis Results

Table 2: Hypothesis Testing Results (N=406)

Path	Path Coefficient	T-value	P-value	Result
H1: GR → PR	-0.252	-3.451	**	Supported
H2: ISR → PR	-0.091	-1.028	NS	Not Supported
H3: GR × ISR → PR	-0.198	-2.896	**	Supported
H4: PR → CT	-0.382	-5.239	***	Supported
H5: PR → CSI	-0.169	-4.291	**	Supported
H6: CT → CSI	0.583	11.253	***	Supported

*Note: *** indicates p<0.01; ** indicates p<0.05; * indicates p<0.1; NS indicates not significant. GR=Government Regulation, ISR=Industry Self-Regulation, PR=Perceived Privacy Risk, TP=Trust Propensity, PE=Past Privacy Experience, CSI=Continuous Sharing Intention*

Alternative Model Testing

Our research model is a complete mediation model where perceived privacy risk mediates the effect of regulatory mechanisms (government regulation, industry self-regulation, and their interaction) on consumer trust. Although this mediation is not the primary focus, it is both theoretically grounded and empirically tested.

Drawing on Miltgen and Smith's (2015) finding that perceived regulation can directly influence trust, we tested two alternative models. The direct effect model, which adds direct paths from the three regulatory variables to trust, showed significant effects but poorer fit (χ^2/df = 1.234, GFI = 0.813, AGFI = 0.801, CFI = 0.837, NFI = 0.908, RMSEA = 0.054).

The partial mediation model, including both direct and indirect paths, achieved acceptable fit (χ^2/df = 2.601, GFI = 0.915, AGFI = 0.868, CFI = 0.922, NFI = 0.911, RMSEA = 0.069) but did not outperform our model in terms of simplicity or explanatory power.

Overall, these results confirm that our proposed model offers superior fit and clearer theoretical insight into the role of perceived privacy risk in shaping consumer trust.

Results Discussion

First, analysis results confirmed the important role of government regulation in reducing consumer perceived

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.368

privacy risk, strongly supporting Lwin et al. (2007) conclusion that "consumer perception of policymaker regulation can reduce consumer privacy concerns." We also found that single industry self-regulation has no obvious effect on alleviating consumer perceived privacy risk, which contradicts previous research conclusions (Hui et al., 2007) but also demonstrates sharing economy industry specificity. On one hand, since China's sharing economy development is still in its infancy, industry mechanisms are still incomplete and non-standardized, relying solely on industry self-regulation cannot yet build convincing regulatory environments or possess capabilities to protect consumer privacy. On the other hand, specific implementation of regulatory policies largely depends on government policy capabilities, especially for emerging forms like sharing economy. Therefore, consumers may believe that industry self-regulation institutions generally lack enforcement power, and when consumer personal information is abused or illegally disseminated, industry self-regulation institutions or industry associations may lack practical measures to force sharing platform enterprises to take protective actions according to platform privacy policies.

Second, this study examined the effects of the interaction between government regulation and industry self-regulation, finding that their combination significantly reduces perceived privacy risk. This supports prior research (Xu et al., 2012) and aligns with domestic scholars' calls for mixed regulatory approaches (e.g., Tang, 2015). Notably, our findings show that while government regulation alone is effective, industry self-regulation on its own has no significant effect—likely due to China’s early-stage institutional environment in the sharing economy.

However, this does not imply that industry self-regulation is entirely ineffective. In practice, several Chinese sharing economy platforms have implemented self-regulatory mechanisms, though often as supplements to governmental oversight. For example, Didi Chuxing has introduced a dedicated “Privacy Control Center” allowing users to manage personal data visibility and deletion. Similarly, Xiaozhu has adopted certified privacy seals on its platform and joined industry-wide data protection agreements promoted by the Sharing Economy Association of China (SEAC). These examples demonstrate that although the regulatory power of industry bodies alone may be limited, self-regulatory practices, when coordinated with government policies, can help establish transparent and privacy-conscious digital environments.

Third, in China's sharing economy context, perceived privacy risk has significant negative effects on both consumer trust and continuous sharing intention, strongly supporting Liu et al. (2004) conclusions in e-commerce contexts. We believe that like traditional e-commerce online transaction contexts, sharing economy is also a business model developed based on information technology and networks, with success highly dependent on consumer data as the main value source for obtaining advertising revenue and ensuring business performance. Meanwhile, current consumer trust in China's sharing economy is mainly based on online feedback and reputation evaluation mechanisms. As more consumers participate in feedback and evaluation, their personal online privacy and security also face challenges. Therefore, how to effectively protect consumer data privacy and security to win more consumer trust and participation is one of the main problems that current Chinese local governments and emerging sharing platforms urgently need to solve.

Research Conclusions and Implications

Research Conclusions

Although China's sharing economy business model is still in its initial stage, sharing economy market scale and value have grown rapidly in recent years. Sharing economy provides Chinese consumers with innovative, diversified products and services, continuously improving Chinese consumer welfare levels with lower prices and higher quality shared products and services. However, behind rapid sharing economy development, a series of practical problems have emerged, making sharing economy regulation a policy issue of high concern for Chinese governments at all levels.

Therefore, this study explored the impact mechanism of China's sharing economy regulation on consumers, conducting empirical analysis with 406 valid questionnaires. We found: (1) Single government regulation has significant negative effects on consumer perceived privacy risk, while single industry self-regulation has no obvious negative effects on perceived privacy risk. Meanwhile, interaction combination effects exist between government regulation and industry self-regulation, with significant negative effects on perceived privacy risk. (2) Perceived privacy risk directly reduces consumer trust levels toward sharing platforms and indirectly reduces positive effects of regulatory levels on consumer trust levels. Perceived privacy risk also obviously weakens consumer continuous sharing intentions. (3) Consumer trust positively affects continuous sharing intention and indirectly reduces negative effects of perceived privacy risk on continuous sharing intention.

Research conclusions reveal the impact effects of sharing economy regulation on consumer perceived privacy risk, consumer trust, and continuous sharing intention.

Theoretical Implications

This research makes several important theoretical contributions to the sharing economy literature. First, unlike previous studies that relied primarily on theoretical discussions, this study provides empirical evidence on sharing economy regulatory mechanisms, enhancing the reliability and applicability of research conclusions in Chinese contexts.

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.368

Second, our findings reveal differential effects of government regulation and industry self-regulation on consumer perceptions. While confirming some aspects of Xu et al. (2012) conclusions about regulatory proxy control, we discovered that industry self-regulation shows no significant impact on perceived privacy risk in sharing economy contexts, highlighting the unique characteristics of this emerging industry. The significant interaction effect between government and industry regulation addresses previous research limitations that examined these regulatory approaches in isolation.

Third, by integrating consumer trust as a mediating variable, this study provides a unified analytical framework that connects government, industry institutions, sharing platforms, and consumers. This extends previous work on trust mechanisms by Xie and Shi (2016) and Cheng et al. (2021), offering new insights into how regulatory approaches influence consumer trust formation and continuous sharing intentions.

Practical Implications

Our findings provide actionable insights for both policymakers and platform operators. For government regulators, the results suggest that while government regulation effectively reduces consumer privacy concerns, industry self-regulation alone is insufficient in China's current sharing economy environment. This indicates the need for mixed regulatory approaches that combine government oversight with industry standards. Policymakers should develop responsive regulatory strategies that balance innovation encouragement with consumer protection, particularly through progressive and experimental regulatory methods.

For sharing economy platforms, the critical importance of consumer trust and privacy protection demands strategic prioritization of institutional mechanism development. Platform enterprises should invest in robust privacy protection systems, transparent trust mechanisms, and reliable feedback systems. The significant relationship between consumer trust and continuous sharing intention underscores the business value of building trustworthy platform environments that can sustain long-term user engagement and platform growth.

In addition, platform operators can strengthen self-regulation by proactively joining industry alliances that issue privacy standards or by adopting voluntary certification systems. Such practices not only improve data handling transparency but also enhance platform credibility. As observed in cases like Didi and Xiaozhu, visible commitment to user privacy can foster trust and mitigate perceived risk—even in the absence of strong external enforcement. These initiatives suggest that effective industry self-regulation, especially when recognized by official institutions, can play a supportive role in enhancing user confidence.

Research Limitations and Prospects

Due to limited research energy and space, this study only discussed relationships between sharing economy regulatory mechanisms and consumer perceived privacy risk, consumer trust, and continuous sharing intention. Future research can further explore other factors influencing consumer trust and continuous sharing intention from other perspectives. For example, based on consumer perception perspectives, exploring effects of sharing platform sustainability and sharing platform institutional mechanism effectiveness on consumer trust and participation intentions, revealing consumer trust formation mechanisms and participation intention influence mechanisms from sharing platform levels.

Additionally, consumer trust and participation intentions are also influenced by other environmental factors such as cultural and economic factors, but this study has not yet considered external environment change factors. Future research can focus on impacts of these external environmental factors under China's sharing economy contexts.

Finally, this study was conducted from demand-side consumer perspectives. In fact, in sharing economy environments, service providers often face greater privacy and security risks than demand-side consumers and need to overcome trust barriers more. Therefore, future research should pay more attention to service provider perspective research, ensuring effective supply and quality assurance of goods and services in China's sharing economy markets.

Acknowledgments

Grateful to the scholars, editors, and reviewers for their valuable contributions and feedback.

Institutional Review Board Statement

Not applicable.

Informed Consent Statement

Not applicable.

Data Availability Statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Statements and Declarations

No funding was received for conducting this study. The present study has no relevant financial or non-financial interests to disclose.

Publisher's Note

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.368

Author Contributions

This work was carried out in collaboration among all authors. This project was conducted jointly by the authors. The authors reviewed and agreed to the final manuscript. All authors read and approved the final manuscript.

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References

Barnes, S. J., & Mattsson, J. (2017). Understanding collaborative consumption: Test of a theoretical model. Technological Forecasting & Social Change, 118, 281-292. DOI: 10.1016/j.techfore.2017.02.029.

Black, J. (2001). Decentring regulation: Understanding the role of regulation and self-regulation in a "post-regulatory" world. Current Legal Problems, 54(1), 103-146. DOI: 10.1093/clp/54.1.103.

Bucher, E., Fieseler, C., & Lutz, C. (2016). What's mine is yours (for a nominal fee)—exploring the spectrum of utilitarian to altruistic motives for internet-mediated sharing. Computers in Human Behavior, 62, 316-326. DOI: 10.1016/j.chb.2016.04.002.

Cannon, S., & Summers, L. H. (2014). How Uber and the sharing economy can win over regulators. Harvard Business Review, 13(10), 24-28.

Cheng, X., Fu, S., & de Vreede, G. J. (2021). Trust in the ride hailing service of the sharing economy: The roles of legitimacy and process transparency. Journal of Organizational and End User Computing, 33(6), 1-21. DOI: 10.4018/JOEUC.20211101.oa10.

Chong, A. Y. L. (2013). Understanding mobile commerce continuance intentions: An empirical analysis of Chinese consumers. Data Processor for Better Business Education, 53(4), 22-30. DOI: 10.1080/08874417.2013.11645647.

Cohen, M., & Sundararajan, A. (2017). Self-regulation and innovation in the peer-to-peer sharing economy. University of Chicago Law Review Online, 82(1), 116-133.

Cohen, M., & Zehngebot, C. (2014). What's old becomes new: Regulating the sharing economy. Boston Bar Journal. Retrieved from http://bostonbarjournal.com/2014/04/01/whats-old-becomes-new-regulating-the-sharing-economy

Das Acevedo, D. (2016). Regulating employment relationships in the sharing economy. Employee Rights and Employment Policy Journal, 20(1), 1-35.

Edelman, B., Luca, M., & Svirsky, D. (2017). Racial discrimination in the sharing economy: Evidence from a field experiment. American Economic Journal-Applied Economics, 9(2), 1-22. DOI: 10.1257/app.20160213.

Ert, E., Fleischer, A., & Magen, N. (2016). Trust and reputation in the sharing economy: The role of personal photos in Airbnb. Tourism Management, 55, 62-73. DOI: 10.1016/j.tourman.2016.01.013.

Fang, B., Ye, Q., & Law, R. (2016). Effect of sharing economy on tourism industry employment. Annals of Tourism Research, 57, 264-267. DOI: 10.1016/j.annals.2015.11.018.

Grabner-Kräuter, S., & Faullant, R. (2008). Consumer acceptance of internet banking: The influence of internet trust. International Journal of Bank Marketing, 26(7), 483-504. DOI: 10.1108/02652320810913855.

Gupta, B., Iyer, L. S., & Weisskirch, R. S. (2010). Facilitating global e-commerce: A comparison of consumers' willingness to disclose personal information online in the U.S. and in India. Journal of Electronic Commerce Research, 11(1), 231-243.

Hamari, J., Sjöklint, M., & Ukkonen, A. (2016). The sharing economy: Why people participate in collaborative consumption. Journal of the Association for Information Science and Technology, 67(9), 2047-2059. DOI: 10.1002/asi.23552.

Hartl, B., Hofmann, E., & Kirchler, E. (2015). Do we need rules for "what's mine is yours"? Governance in collaborative consumption communities. Journal of Business Research, 69(8), 2756-2763. DOI: 10.1016/j.jbusres.2015.11.011.

Hong, S., & Lee, S. (2018). Adaptive governance and decentralization: Evidence from regulation of the sharing economy in multi-level governance.

Government Information Quarterly, 35(2), 299-305. DOI: 10.1016/j.giq.2017.08.002.

Hui, K. L., Teo, H. H., & Lee, S. Y. T. (2007). The value of privacy assurance: An exploratory field experiment. MIS Quarterly, 31(1), 19-33. DOI: 10.2307/25148779.

Johnson, K. K., & Mun, J. M. (2016). Antecedents to internet use to collaboratively consume apparel. Journal of Fashion Marketing and Management: An International Journal, 20(4), 370-382. DOI: 10.1108/JFMM-12-2015-0092.

Keetels, L. (2013). Collaborative consumption: The influence of trust on sustainable peer-to-peer product-service systems [Doctoral dissertation]. Utrecht University.

Kim, D. J., Ferrin, D. L., & Rao, H. R. (2008). A trust-based consumer decision-making model in electronic commerce: The role of trust, perceived risk, and their antecedents. Decision Support Systems, 44(2), 544-564. DOI: 10.1016/j.dss.2007.07.001.

Liang, L. J., Choi, H. C., & Joppe, M. (2018). Exploring the relationship between satisfaction, trust and switching intention, repurchase intention in the context of Airbnb. International Journal of Hospitality Management, 69, 41-48. DOI: 10.1016/j.ijhm.2017.10.015.

Lindblom, A., & Lindblom, T. (2017). De-ownership orientation and collaborative consumption during turbulent economic times. International Journal of Consumer Studies, 41, 431-438. DOI: 10.1111/ijcs.12336.

Listokin, S. (2017). Does industry self-regulation of consumer data privacy work? IEEE Security & Privacy, 15(2), 92-95. DOI: 10.1109/MSP.2017.38.

Liu, C., Marchewka, J. T., Lu, J., & Yu, C. S. (2004). Beyond concern—a privacy-trust-behavioral intention model of electronic commerce. Information and Management, 42(2), 289-304. DOI: 10.1016/j.im.2004.01.003.

Lwin, M., Wirtz, J., & Williams, J. D. (2007). Consumer online privacy concerns and responses: A power-responsibility equilibrium perspective. Journal of the Academy of Marketing Science, 35(4), 572-585. DOI: 10.1007/s11747-006-0003-3.

Martin, C. J. (2016). The sharing economy: A pathway to sustainability or a nightmarish form of neoliberal capitalism? Ecological Economics, 121, 149-159. DOI: 10.1016/j.ecolecon.2015.11.027.

Martin, K. (2018). The penalty for privacy violations: How privacy violations impact trust online. Journal of Business Research, 82, 103-116. DOI: 10.1016/j.jbusres.2017.08.034.

Martin, K. D., Borah, A., & Palmatier, R. W. (2017). Data privacy: Effects on customer and firm performance. Journal of Marketing, 81(1), 36-58. DOI: 10.1509/jm.15.0497.

Miltgen, C. L., & Smith, H. J. (2015). Exploring information privacy regulation, risks, trust, and behavior. Information & Management, 52(6), 741-759. DOI: 10.1016/j.im.2015.06.006.

Möhlmann, M. (2015). Collaborative consumption: Determinants of satisfaction and the likelihood of using a sharing economy option again. Journal of Consumer Behaviour, 14(3), 193-207. DOI: 10.1002/cb.1512.

Möhlmann, M. (2017). Digital trust and peer-to-peer collaborative consumption platforms: A mediation analysis. DOI: 10.2139/ssrn.2813367.

Munkøe, M. M. (2017). Regulating the European sharing economy: State of play and challenges. Intereconomics, 52(1), 38-44. DOI: 10.1007/s10272-017-0641-3.

Murphy, M. (2016). Cities as the original sharing platform: Regulation of the new "sharing" economy. Journal of Business & Technology Law, 12(1), 127-149.

National Information Center. (2018). China Sharing Economy Development Report (2018). Retrieved from http://www.sic.gov.cn/News/568/8873.htm

Pavlou, P. A., & Gefen, D. (2004). Building effective online marketplaces with institution-based trust. Information Systems Research, 15(1), 37-59. DOI: 10.1287/isre.1040.0015.

Posen, H. A. (2015). Ridesharing in the sharing economy: Should regulators impose Uber regulations on Uber? Iowa Law Review, 101(1), 405-433.

Schor, J. B. (2017). Does the sharing economy increase inequality within the eighty percent?: Findings from a qualitative study of platform providers. Cambridge Journal of Regions, Economy and Society, 10(2), 263-279. DOI: 10.1093/cjres/rsw047.

Smith, H. J., Milberg, S. J., & Burke, S. J. (1996). Information privacy: Measuring individuals' concerns about organizational practices. MIS Quarterly, 20(2), 167-196. DOI: 10.2307/249477.

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.368

Tang, Q. L. (2015). Regulatory path of "ride-sharing" sharing economy. China Legal Science, (4), 286-302.

Teubner, T., Hawlitschek, F., & Dann, D. (2017). Price determinants on Airbnb: How reputation pays off in the sharing economy. Journal of Self-Governance and Management Economics, 5(4), 53-80. DOI: 10.22381/JSME5420174.

Xie, X. M., & Shi, J. J. (2016). Empirical research on consumer trust formation mechanism in sharing economy. Technology Economics, 35(10), 122-127. DOI: 10.3969/j.issn.1002-980X.2016.10.017.

Xu, H., Teo, H. H., Tan, B. C. Y., & Agarwal, R. (2012). Effects of individual self-protection, industry self-regulation, and government regulation on privacy concerns: A study of location-based services. Information Systems Research, 23(4), 1342-1363. DOI: 10.1287/isre.1120.0416.

Zhou, T. (2012). Examining location-based services usage from the perspectives of unified theory of acceptance and use of technology and privacy risk. Journal of Electronic Commerce Research, 13(2), 135-144.

ATRI PRESS

Journal of Modern Social Sciences

Volume 2 Issue 4 , 2025

ISSN: 3078-4433 | eISSN: 3078-4441

A Study on the Audience of Cantonese Short-Form Video Content from the Perspective of Place Identity Theory

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Abstract

Dialect is a carrier for spreading local culture, an iconic symbol for recognising local groups, and it is the foundation for the construction of place identity. Nowadays, Short videos have penetrated people's daily lives due to the development of new media technologies. As the most spoken unofficial language in China, Cantonese (also known as Yue Chinese) also has a special status in Chinese short video platforms. This study investigates Cantonese Short-form video audiences from the perspective of place identity theory, aiming to explore the relationship between Cantonese Short-form video content and the construction of place identity. Focusing on this theme, this study conducted semi-structured interviews with 19 Cantonese Short-form video content audiences and non-participatory observation on the short video platform Douyin to obtain qualitative data. The collected data were summarised using the thematic analysis method, and finally, three main themes were identified: the construction of boundaries, inheritance anxiety, and cultural integration. The study examines the paths and influences on the construction of place identity by audiences in the process of consuming Cantonese Short-form video content.

Keywords

Place Identity, Local Culture, New Media, Short-form Video, Audience

Suggested citation: Liu, Z. (2025). A Study on the Audience of Cantonese Short-Form Video Contentfrom the Perspective of Place Identity Theory . *Journal of Modern Social Sciences*, 2(4),269–280.https://doi.org/10.71113/JMSS.v2i4.389

Introduction

In contemporary society, where globalisation and urbanisation are accelerating, the survival of dialects presents a complex situation. From a global perspective, dialects such as the Alsatian dialect in Texas, USA, which has disappeared from people's lives, serve as examples of the process from decline to death of a dialect (Roesch, 2012). In contrast, the surviving Galilean dialect has played an important role in the development of modern Hebrew (Bar-Adon, 1979). While in the local context of China, Cantonese, as the core carrier of Lingnan culture, is facing the challenges of intergenerational transmission breaks and cultural identity dilution. From a socio-cultural perspective, China's policy of popularising Mandarin since the end of the 20th century and large-scale population movements have gradually weakened the social functions of dialects (Peng & Ge, 2016). This change in language ecology reflects the anxiety of cultural assimilation that is common in the process of China's modernisation, where dialects are not only a communication tool but also an important symbolic system for the construction of regional group identities.

Dialect as a carrier of information, its transmission path changes with the development of information technology. Previously, dialects existed in interpersonal communication, later in television programs, and now they are widely present in short videos. In this context, the rise of short video technology provides a new path for the development of dialect culture. The popularity of mobile internet has lowered the threshold of content production, and the algorithmic recommendation mechanism has reconstructed the underlying logic of cultural communication. Cantonese

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.389

Short-form video embeds the traditional dialect into the framework of cultural expression in the new media era through the narrative strategy of life. Through dialect talk shows and short dramas, the creators not only continue the unique beauty of the Cantonese language but also give it online cultural features.

Since the concept of place identity was formally introduced by Proshansky in 1978, it has become one of the core concepts in environmental psychology. 'Place' not only has a geographical meaning but also has humanistic and psychosocial connotations. According to human geographer Tuan (1977), the main function of 'place' is to promote people's sense of belonging and attachment. A related concept to 'place' is 'space', which can be precisely expressed through vectors and refers specifically to geographic location and physical form (Sack, 1997). Previous research has focused on three dimensions of the physical environment: the house, the neighbourhood and the city. However, the definition of 'place' suggests that there is a great deal of flexibility in what can be referred to as place, especially in the new media era, where virtual cyberspace has expanded the meaning of place. Short videos are not merely a virtual space but also a 'third space' that represents a deep integration of the virtual and the real.

The synergy between technological development and social demand has made the Cantonese Short-form video audience an important sample for observing the evolution of cultural ecology. It not only reflects the creators' creative transformation of traditional culture but also reveals how new media technology reconfigures the spatial distribution of dialects. This phenomenon of dialect mediatisation provides a unique research perspective for exploring the mechanism of place identity in the new media era.

Literature Review

The Research Status of Place and Place Identity Theory

Human geographer Tuan proposed the concept of 'place' in 1977, and 'identity' is an internal, subjective self-concept of an individual. Tajfel proposed social identity theory in 1982, pointing out that identity is an individual's sense of belonging to a particular social group, as well as the emotions and values that an individual feels as a member of a certain group.

Proshansky conceptually defines place identity based on the cognitive connection between the self and the physical environment. According to him, place identity is a part of the self, a personal identity related to the physical environment determined through the complex interaction of ideas, beliefs, preferences, emotions, values, goals, behavioural tendencies, and skills present in people's conscious and unconscious minds. In 1983, Proshansky added that place identity is a functional component of a person's self-identity, a 'physical world socialisation of the self'. Korpela argued that people's place identity is a product of positive self-regulation, self-identity increases self-esteem, and place identity, as part of self-identity, also has the effect of increasing self-esteem. It can be seen that place identity is concerned with how people relate to places on a cognitive level.

Other researchers have concluded that place identity refers to the symbolic importance of a place, storing emotions and relationships, and giving meaning and purpose to people's lives. They argue that people's use of places represents their sense of identity with them, and thus their emotional connection to these places (Williams & Roggenbuck, 1989), while Dixon and Durrheim suggest that place identity can be described as an implicit psychological construct. The importance of place identity is often ignored in daily life, but when people change or transition, the bond between people and places is threatened, and place identity becomes apparent. Residence facilitates the development of personal social relations in the local context, and therefore, long-term residence in a place strengthens place identity. Moreover, people relate their place of residence to significant life events (Fleury-Bahi et al., 2008). In addition, in recent years, research on 'placeless-ness' and 'non-place' has also emerged, expanding the scope of research, and most scholars apply Relph's explanation to the definition of placeless-ness. Relph's explanation, placeless-ness is the place where identity becomes weakened; and non-place can be summarised as the mobile space that people move through.

Research Status of Cantonese Short-Form Video Audience

At present, there are fewer studies on Cantonese short-form videos, and some scholars have studied the content of Cantonese short-form videos. For example, He elaborates on the cultural communication power of Cantonese short-form videos from the creative characteristics and development dilemmas of Cantonese short-form videos, and prospects for future development. Yan analyses the content of Cantonese short-form videos from the perspective of audience needs, and explores the diversified needs for programmes to satisfy the audience's needs of entertainment and recreation, local culture, emotional catharsis, as well as cognitive learning. Zhao considers the Cantonese short-form video audience as a group of fans, and researches the characteristics and motivations of their participation behaviours from the perspective of participatory culture, analysing the organisational characteristics, participation behaviours, and cultural constructs of this group.

Among the existing studies, for the time being, there is no previous research on the audience behaviour of Cantonese short-form videos from the perspective of place identity, which means that this study will create a brand new perspective in the research related to Cantonese short-form videos. Based on the place identity theory, this paper will study the process of constructing place identity by Cantonese short-form video audiences, and from the perspective of place identity, it will focus on the aesthetic

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.389

and cultural connotations of the content of Cantonese short-form videos, as well as on studying the position of Cantonese short-form videos in the construction of culture and exploring the correlation and influence of these factors on the society.

Methodology

This study uses Netnography and Semi-structured Interviews as methods for collecting qualitative data, and conducts Thematic Analysis on the data.

Ethnography is a research method proposed by the anthropologist Malinowski, in which a group of people is taken as the object of study, and the unique culture, values and behavioural patterns of the group are observed, to achieve the purpose of cognition of the group and related cultural patterns. The 'netnography' is proposed by Kozinets, who argues that cyber ethnography is based on traditional ethnographic methods, focusing on the qualitative analysis of the content and form of members' online interactions, and aiming to study the subcultures, interactional processes, and group behavioural characteristics presented by online groups. This study conducts non-participatory observations primarily on the Douyin platform, and selectively records the audience's behaviours such as commenting and liking, to explore the embodiment of the place identity theory in the audience's behaviours and its influence on the audience's behaviours. Contents from other short-form video platforms are also used as data sources where necessary. At the same time, the study will also explore the relationship between the algorithmic recommendation mechanisms of video platforms and the construction of place identity.

The in-depth interview method is a common research method in qualitative research, and the semi-structured interview is a form of interview between unstructured and full-structured interviews, which is a form of interview in which open-ended questions are asked according to a predefined thematic framework. In this study, the interviewees are all long-term audiences of Cantonese short-form video content. As previously mentioned, the audiences are all from the Pearl River Delta region, but due to the development of the society and the use of Mandarin as the official and common language in China, their mother tongue from Cantonese-speaking regions is not always Cantonese, and so the interviewees will be tagged as either native or non-native, and in general, natives can use Cantonese proficiently, and non-natives Generally speaking, natives can use Cantonese proficiently, while non-natives are unable to use Cantonese proficiently, which is manifested in the fact that they can understand but not able to speak Cantonese. Adding tags to the interviewee is not only conducive to obtaining rich qualitative data but also facilitates more in-depth and detailed conclusions in the subsequent data analysis process.

To explore the impact of Cantonese short-form videos on the audience's place identity, this paper uses the snowball sampling method to find interviewees. First, one Cantonese short-form video audience, each of whom can proficiently use Cantonese and those who can only understand Cantonese, is selected from the researcher's social network, and then 2-3 additional Cantonese short-form video audiences are co-opted through the further recommendation of the first batch of interviewees, and so on. Finally, 19 Cantonese short-form video audiences were interviewed in an official semi-structured interview. By interpreting the psychological origins of place identity through their self-reports, it can understand what they gained as Cantonese short-form video audiences and what kind of content shaped their place identity.

Table 1: Interviewee's basic information

Number	Gender	Age	Native place
A1	M	25	Henan
A2	M	27	Guangdong
B1	M	25	Henan
B2	F	30	Shandong
B3	M	27	Guangdong
B4	F	24	Guangdong
B5	M	25	Guangdong
C1	M	33	Hunan
C2	F	31	Shandong
C3	M	54	Guangdong
C4	F	54	Guangdong
C5	F	24	Guangdong
C6	M	25	Guangdong
D1	M	62	Guangdong
D2	M	50	Guangdong
D3	M	25	Guangdong
E1	F	59	Guangdong
E2	F	46	Guangdong
E3	F	21	Guangdong

The data collected either using netnography or semi-structured interviews were read over and over again, coded and generalised according to the six-step method of thematic analysis (Clarke & Braun, 2006), i.e. Familiarisation - Coding - Theme generation - Review of themes - Defining and naming themes - Write up. Themes

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.389

were not set in advance but were identified after the initial reading of the data.

For the data obtained through in-depth interviews, in order to more accurately represent the respondents' views, after identifying the themes and sub-themes, those categorised discourses are confirmed by the respondents who published them to ensure the consistency of the discourses with the meaning of the themes. Finally, persuasive, compelling and representative examples were selected to represent each theme.

Local Circles: Constructing Geographic Boundaries in Place Identity

Exclusivity of Cantonese Characters

As the written carrier of the Cantonese dialect, Cantonese characters contain unique dialectal vocabulary, grammatical structures and ideograms. In short video communication, text often appears as the title of the video, the cover, the content of the creative effect elements (such as special effect words, additional description of the clip), which can not only provide a complementary description of the video content, but also improve the efficiency of information transfer and enhance the expression of emotions. Cantonese characters are widely used in Cantonese short-form video content, where short-form video creators combine traditional Cantonese slang with internet buzzwords to form communication symbols that mix the traditional and the modern. For example, the Cantonese short-form video content creator ‘Cantonese Know One or Two’ adapts the Cantonese two-part allegorical saying into short-form video lines, which not only retains the original meaning but also increases the comedic effect, attracting a large number of audiences to imitate and spread the video.

Nowadays, short-form video platforms accurately push short-form video content to specific users based on user labels, such as geographical and linguistic preferences, such as Douyin's ‘collaborative filtering algorithm’, which enables Cantonese content to quickly reach Cantonese-speaking communities in the Guangdong-Hong Kong-Macao Greater Bay Area and overseas (Li & Huang, 2019). This provides a broad communication space for Cantonese characters in short-form video platforms, and Cantonese short-form videos not only realise the modern transformation of the dialect but also become an important medium for place identity in the Lingnan region.

The Formation of Reading Barriers

Cantonese has long existed as a spoken language, and the lack of a written standard set by an authoritative body has led to a high level of freedom in folk writing. To restore the ‘original flavour’ of the dialect, Cantonese characters are often used to express their pronunciation directly using characters with similar pronunciation, resulting in a writing habit that gives priority to transliteration over ideograms. This is the result of a combination of the existence of the need to write in spoken dialects and the lack of standardisation. This phenomenon is a direct reflection of the fact that non-Cantonese speakers can read Chinese characters but not Cantonese characters.

Figure 1. The same passage written in Cantonese script is different from that written in standardised Chinese

Audience Attitudes Towards Cantonese Characters

Users of Cantonese characters hold complex and diverse attitudes towards its dissemination on the internet, encompassing recognition of the positive promotion of cultural inheritance, as well as concerns and reflections on cultural dissemination.

Interviewee (D3 – native) said:

I don't care whether other viewers can understand it or not.

Interviewee (C6 – native) thinks that for the target audience, Cantonese characters are conducive to creating a sense of familiarity, but Cantonese characters are not beneficial to the dissemination of short-form videos.

Another Interviewee (B1 - non-native) considered that Cantonese characters were helpful for outsiders who were interested in Cantonese to learn Cantonese, but he also considered that Cantonese characters were not beneficial to the dissemination of Cantonese short-form videos.

Internally, Cantonese characters are a cultural code for place identity, reinforcing community cohesion through symbols of exclusivity, but externally, they are an obstacle to cross-cultural dialogue, exacerbating the risk of marginalisation of regional cultures. Sebba argues that spelling can be an ‘ideal site of struggle and resistance for ideologies of all sorts’ because orthography is often seen as a virtually unchanging linguistic system with a high degree of standardisation and strict normality. Using graffiti, Jamaican Creole writing and communication as examples, he demonstrates how users blatantly refuse to conform to authorised spelling norms, and how spelling mistakes are symbolically used to construct identities in opposition to the mainstream (Sebba, 2003). The difference in opinions among the interviewees reflects the contradiction that arises in the process of seeking a dynamic balance between cultural purity and communication efficacy in dialect

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.389

communication, and they hope that Cantonese will not lose its authenticity in the wave of digitisation while integrating into the multi-cultural ecology.

Cultural Superiority and Regional Identity

Guangdong is one of China's most economically developed provinces, and the region's customs and culture are highly visible on the internet, with Cantonese people often comparing outsiders to themselves as two subjects. Douyin's famous Cantonese video creators ‘Guo Jiafeng’ and ‘Noisy Boy KC’ have a large number of videos comparing and interpreting the concepts and living habits of Cantonese people with those of outsiders. The videos are full of regional stereotypes and generalisations. For example, sending red envelopes, a traditional Chinese New Year custom, contrasts the small sum of red packets in Guangdong with the large sum of red packets in other provinces; and the lower wedding bride price of Cantonese people is often contrasted with the much higher bride price in other provinces. This reflects the superiority of Cantonese short-form video creators and their audiences over the cultural practices of their environment.

Figure 2. ‘Guo Jiafeng’ and ‘Noisy Boy KC’

Regarding the existence of stereotypical content in Cantonese short-form videos, the interviewee (B4 - native) said:

Although I know it is a stereotypical reflection, I still find it funny and would share it with my friends due to the creators' humorous interpretation of these things.

The interviewee (C1 - native) said:

In my personal opinion, the existence of stereotypes is not necessarily all bad. For example, when it comes to ‘Cantonese’, there are a lot of positive stereotypes, such as ‘low-profile’, ‘no face-saving’, and so on. When talking to people from other provinces, I can quickly and easily portray my own personal image to others by telling them that I am from Guangdong.

It has been experimentally shown that simply assigning an arbitrary label to research participants activates a sense of group identity, even if they do not recognise others in their group (Tajfel et al., 1971). The construction and dissemination of regional stereotypes in Cantonese short-form videos is the result of the intertwined evolution of cultural identity and local economic status. By selectively reinforcing the ‘reasonableness’ of local practices, such as the ‘pragmatic’ label of low red packets and the ‘civilised’ narrative of simplified marriage customs. Short-form video creators sublimate local customs into a kind of progressive cultural capital, and when audiences consume this kind of content, they not only implicitly judge the customs of others but also realise a ritualised confirmation of their traditions, and through the entertaining expression of short-form videos, they simplify complex cultural differences into communicable symbols of comparison. When Cantonese features are repeatedly packaged as synonymous with greater efficiency and enlightenment, the act of watching becomes an unconscious authentication of group identity, and what the viewers consolidate in their laughter is not only place identity but also an implicit notion of cultural hierarchy, i.e., ‘our customs’ are naturally adapted to the operating logic of modern society.

Exploring the Loopholes and Solutions of Content Regulation

In the practice of content regulation on short-form video platforms, a phenomenon arising from language differences is occurring: a large amount of video content produced in Cantonese is systematically circumventing the platform's vetting mechanism due to the significant difference between the sound characteristics of Cantonese and Mandarin. Take the Cantonese radio programme creator ‘Macau Crazy Radio’ as an example, the creator's videos contain a lot of vulgar language and sexually suggestive content narrated in Cantonese, which would have been impossible to pass the vetting process if the content had been produced in Mandarin. However, Cantonese short-form video audiences have long been accustomed to the above situation, and most of the interviewees do not oppose this situation, and even welcome it.

An interviewee (C5 - native) thinks that as long as the content does not break the law, it could exist. Interviewee (A2 - native) considered this an interesting type of content:

Existence is reasonable it is quite interesting to have this kind of content once in a while, and the existence of this kind of content does not create any serious problems, and it is a kind of content that only those of us who understand Cantonese can understand.

Interviewee (D3 - native) expressed a fondness for this kind of content:

I'm happy that Cantonese can say what Mandarin is not able to say.

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.389

However, there are also people who are against the existence of this phenomenon, the interviewee (E3 - native) said:

Any vulgar content should not pass the vetting process, which is not conducive to the harmonious development of society and is also disrespectful to the audience. Moreover, the use of Cantonese in the production of relevant content will be harmful to the development of our cultural image.

When linguistic difference becomes a technical barrier to circumvent content regulation, Cantonese exists not only as a cultural carrier but also as a subcultural symbol. Taboo expressions that are inevitably filtered in the Mandarin system are transmitted through the dialect's phonetic encryption, and this linguistic privilege objectively builds up an exclusive subcultural space. In the process of decoding these 'exclusive contents', the audience not only enjoys the satisfaction of breaking through the discipline of the mainstream discourse, but also completes the double confirmation of the group identity by sharing the 'understandable taboos': the audience is a co-conspirator who fights against the censorship mechanism together with the creators, also a defender of the dialect's cultural strongholds.

The regulatory dilemma of Cantonese short-form videos is essentially a collision between technology and localisation. The ideal solution should not be limited to blocking loopholes, but also to construct a flexible governance framework that can intercept truly harmful information through technical means, while preserving breathing space for the innovative expression of dialect culture, so that dialect short-form videos can truly become a carrier of inherited culture in the digital era.

Generational Inheritance: Highlighting Inheritance Anxiety in Place Identity

The Inheritance Anxiety Brought to the Audience by Cantonese Short-form Video

Language is an important part of the environment, an important carrier of culture, and an important factor influencing people's place identity. China has a wide area, and there are many Chinese dialects. Chinese dialects are an important criterion for people to identify 'fellow countrymen' or 'outsiders' (Jiang, 2006), which reflects the speaker's regional identity. Since China's reform and opening up, there has been an influx of outsiders into Cantonese-speaking areas, which has contributed to the rapid economic development of Guangdong Province. At the same time, Mandarin has been quickly promoted along with this wave, and to this day, speaking Cantonese is no longer a necessary skill for living in the Pearl River Delta region, with more than half of the Guangzhou population being pessimistic about the future of Cantonese (Shan & Li, 2018), and the vitality of Cantonese is on a downward trend. Faced with the phenomenon of the new generation gradually ceasing to speak Cantonese, the vast majority of interviewee expressed their unacceptability.

The interviewee (D3 - native) said:

It is absolutely unacceptable to me that in the future, my next generation will not be able to speak Cantonese.

The interviewee (E1 - native) said:

It is too far for people who have grown up in the local community not to be able to speak the local language.

The interviewee (A1 - non-native) said:

If you don't speak Cantonese, you can never really integrate into this place.

When Cantonese as a language that sustains the cultural community in the Pearl River Delta is faced with a shrinking number of speakers and intergenerational linguistic faults, Cantonese has transformed from an essential skill of daily life to an optional dialect, and the value of the community memory and emotional connection it carries is gradually diminishing, so Cantonese speakers have developed an anxiety about their cultural inheritance. This anxiety stems not only from the decline of the pragmatic value of the language and the decline of the younger generation's mastery of Cantonese but also points to the irreversible loss of the cultural subjectivity originally possessed by the Cantonese language in the intergenerational transition.

Cantonese Short-form Video Reinforces the Audience's Inheritance Anxiety

From May to August 2010, Guangzhou witnessed a 'Support Cantonese event'. It was a social conflict triggered by the language issue, with a large number of participants, a wide range of influence, and a great impact never seen before (Zhu, 2011). The incident caused extensive discussions in the academic community and drew scholars' attention to the problems between dialect protection and the promotion of Mandarin. At the same time, the matter of 'protecting Cantonese' appeared in the public eye and attracted widespread attention.

To this day, 'Protecting Cantonese' remains one of the most frequently discussed topics in Cantonese short-form video content. The videos under the topic #ProtectCantonese on Douyin have been viewed 1.21 billion times, and most of the content under this topic contains negative and anxious sentiments, such as the video of Guangdong TV football commentator Chen Kaidong, who urges people to speak Cantonese with confidence. You can also see a video of the creator 'Dada has a class of small Cantonese cakes' who often teaches Cantonese songs to children, with netizens commenting: 'Cantonese inheritance cannot be delayed, there is a long way to go.' The author's videos have also been reprinted by celebrity Nicholas Tse.

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Figure 3. The creator teaching kids Cantonese songs

Regarding the fact that many Cantonese short-form video contents spread anxiety to the audience in the process of promoting Cantonese, the interviewee (C4 - native) said:

Many Cantonese short-form videos are calling for the promotion and transmission of Cantonese, and I agree very much with the views of these authors. At the same time, I also think of the increasing number of children around me who do not speak Cantonese, which triggers my concern about the failure to transmit Cantonese.

The interviewee (B1 - non-native) said:

Even though some of the views in these videos are rather radical, I can understand the inheritance anxiety of these authors as well as the natives. Although I seldom speak Cantonese in my life, since I left Guangzhou to work abroad, I would feel very familiar when I hear Cantonese over here (outside of Guangzhou), and in the future, I would feel uncomfortable if I come back home (Guangzhou) with no one around me to speak Cantonese.

When Cantonese speakers' anxiety about language inheritance spreads to the Internet, short-form video platforms become the amplifier and memory of collective anxiety, and while these contents evoke group empathy, they also construct a cultural crisis narrative about the survival of the Cantonese language. This anxiety, when transmitted through the media, creates an emotional mobilisation that reinforces the cultural self-consciousness of the Cantonese-speaking community and triggers their traumatic imaginings of intergenerational linguistic fault lines. The transition from offline social movement to online resistance reflects that when the proportion of Cantonese in daily communication continues to decrease in reality, the virtual space is transformed into a position for defending cultural identity, and ultimately, these videos form a special spiritual consumer product that sustains place identity.

Local Culture Needs Tolerance and Support

According to a survey conducted by the Hong Kong University of Science and Technology (Guangzhou) in 2024 in the Guangzhou area, the usage rate of Cantonese in Guangzhou households is 83%, but the usage rate of Cantonese among young people is lower than that of older people. The decreasing usage scenario of Cantonese in the process of social development is not only caused by a large number of outsiders entering Cantonese-speaking areas, but also the decreasing number of Cantonese speakers among the new generation of the local population is one of the important reasons. Some interviewees believed that the emergence of the intergenerational fault lines in Cantonese is strongly linked to basic education.

This interviewee (D3 - native) considered that the new generation was gradually detached from the Cantonese environment since primary school:

Children who grow up in Cantonese-speaking families may speak Cantonese before they go to school, but after they go to primary school, most of the teachers do not speak Cantonese, and the language used in lessons is always Mandarin.

Interviewee (C4 - native) thinks that this is not only related to school education, but home education should be more responsible for this:

There is no way to change the fact that students need to speak Mandarin when they go to school, but parents can control the language they use when they go home after school.

The current situation of the basic education system being dominated by a standardised official language has objectively squeezed the survival space of Cantonese in intergenerational transmission, while the cultural nurturing function of the family has not been effectively complemented, both of which together have led to the tendency of Cantonese cultural inheritance to break down. The sustainability of language transmission depends not only on the tolerance of the external cultural environment but also on the institutional adjustment of the education system to ensure the survival of cultural diversity. School education needs to make allowance for local languages within the framework of knowledge dissemination, while family education needs to be more proactive in fostering cultural self-awareness in the next generation. Only when school education and family education complement each other can we build a complete ecology for the inheritance of dialects, so that the cultural vitality of languages can be balanced in intergenerational succession.

The strength of Mandarin is an undeniable fact, and without human intervention, Mandarin will be widely used because of its universality. At the same time, the promotion of Mandarin and the protection of Cantonese are not a set of contradictory concepts. On the premise that Mandarin is prevalent throughout the country, the proper development of

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.389

Cantonese may lead to a freer pathway for the development of cultures in different places, and it is also complementary and enriching to the mainstream culture, which can better serve the development of society and culture.

Mainstream Culture: Exploring Integration Challenges in Place Identity

Challenges Faced by Cantonese Short-Form Video in Integrating into Mainstream Culture

Mainstream short-form video platforms are centred on algorithmic recommendation, and their flow distribution mechanism naturally favours Mandarin content with a wide audience reach and high interaction rate. The platform algorithm divides the content into different circles through user profiles, and Cantonese short-form videos are often categorised as 'regional niche content' due to the concentration of users' geographical distribution, which makes it difficult to break through the geographical restrictions and enter the national flow pool. This algorithmic logic creates a vicious circle, i.e., the more obvious the geographical labelling, the more the platform restricts the scope of its recommendation, resulting in quality content being trapped in the local flow pool.

The extrusion of flow logic is also reflected in the commercial realisation level. When advertisers choose to broadcast short-form videos, they generally require the content to be in Mandarin in order to cover a wider range of people. For example, when famous car creator 'Yuan Qicong' accepts advertisement placement, his videos containing advertisements are all produced in Mandarin. The ecosystem for Cantonese short-form videos continues to shrink under the combined effect of the platform's recommendation mechanism and the pressure on creators to survive.

Figure 4. Creator 'Yuan Qicong'

Limitations from Audience Size

As mentioned earlier, as the core carrier of Lingnan culture, Cantonese is facing a crisis of declining frequency of use among the younger generation. This language fault line directly leads to the narrowing of the audience base for Cantonese short-form videos. Coupled with the marginalisation of Cantonese teaching in the education system, young creators' sense of cultural identity with Cantonese is fading, further weakening the incentive for content creation, as the Interviewee (B4 - native) also realized:

If a creator wants to be at the top of the platform, he has to make videos in Mandarin.

Comparable exploratory food creators in the Guangzhou area have many more followers for Mandarin-speaking creators than Cantonese-speaking creators, given similar content quality.

Figure 5. Comparison of Mandarin and Cantonese creators' homepages on Douyin

Cantonese short-form videos have a limited radius of content dissemination due to the shrinking potential user base, which is in turn undermined by the lack of creative incentives. Reduced exposure of content inversely inhibits user growth, while stagnant user scale further undermines creative sustainability, resulting in the development of Cantonese short-form videos being caught in a vicious circle. How to open up a sustainable communication space for dialect content in a media environment dominated by a common language is a key challenge for the survival of cultural diversity in the digital era.

Audience and Cantonese Short-form Video Content Develop in Mutual Compromise

While using Cantonese to make videos can accurately appeal to the dialectal user group, it may also form a language barrier that affects the willingness of non-Cantonese speaking audiences to watch. In order to broaden the scope of potential audiences and increase video exposure, creators of Cantonese short-form videos have started to include Mandarin content in their videos, as evidenced by the presence of both Mandarin and Cantonese in a single video.

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.389

At the same time, some creators maintain the original production rhythm of Cantonese short-form videos, while at the same time attracting non-Cantonese speakers to click on their videos in a different way. For example, the leading automotive media company 'Da Jia Cars' has established a matrix of sub-accounts, with several of its media accounts being used to publish Cantonese short-form video content, to achieve an accurate match between the type of content and the language carrier. This approach significantly increases the cost of creation, but it also increases the frequency of content output, ensuring the loyalty of the core audience and expanding the potential user base through differentiated content.

Figure 6. Sub-account matrix for 'Da Jia Cars'

The audience's tolerant attitude towards mixed languages not only supports the development of Cantonese short-form videos but also demonstrates their desire for Cantonese culture to be promoted. Cantonese short-form video audiences realise that in a media environment where Mandarin is absolutely dominant, a moderate compromise can buy breathing space for Cantonese culture. When Cantonese tones are intertwined with Mandarin pronunciation in the videos, language survival is no longer obsessed with the defence of purity, but rather, by lowering the threshold of comprehension, local culture can continue to live on in fluid communication.

Conclusion

Cantonese Short-form Video Content Constructs Place Identity

This study argues that Cantonese short-form video audiences construct their own place identity through the use of Cantonese language and Cantonese characters, consumption of subcultural content, and selective consumption.

By considering Cantonese and Cantonese characters as a symbol to distinguish local and non-local cultural content, audiences feel their exclusivity during the dissemination of these contents, constructing virtual geographical boundaries and reinforcing the cultural cohesion of the audience groups. The majority of the audience agrees that Cantonese characters, although they can bring a sense of familiarity, are not conducive to the dissemination of local cultural content, and considers Cantonese characters as an artificially created reading barrier. At the same time, there is a small portion of the audience who do not care whether local culture can be popularised or not. The majority of the audience who consume Cantonese short-form video content show a tolerant or even positive attitude towards vulgar content that appears due to poor platform regulation, and hope that this type of content will remain on the internet. They enjoy the privileges that language affords them and, in the process, construct a space of exclusivity. A small portion of the audience believes that this type of content will affect the positive image of local culture and reinforce their own cultural identity in their concerns about local cultural dissemination and image building. Regardless of which side of the opinion the audience subscribes to, they complete the identification of their own group identity by consuming or being exposed to this type of subcultural content. Finally, audiences demonstrate their preference for Cantonese short-form videos through selective consumption, delineating their identity boundaries and further reinforcing their place identity.

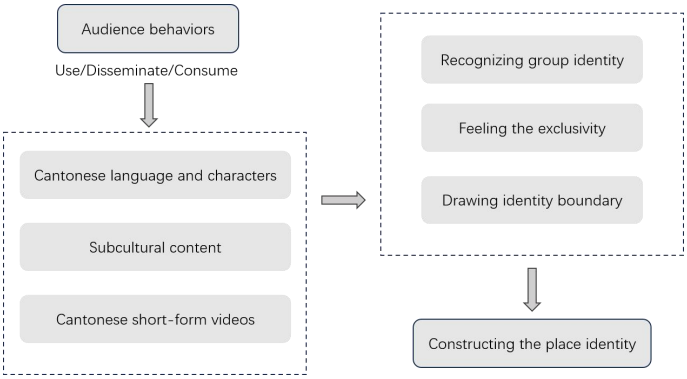

Figure 7. The process of audience construction of place identity

Differences Between Native and Non-native Audiences in the Construction of Place Identity

This study used semi-structured interviews as one of the methods to collect qualitative data and categorised the interviewees into natives and non-natives. The data show that the process of constructing place identity is roughly the same for native and non-native Cantonese short-form video audiences, with the main difference being in the degree of anxiety about cultural inheritance. In the process of constructing place identity, native audiences show a strong need for cultural identity and cultural inheritance anxiety, they are dissatisfied with and protest against the current

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.389

social environment that is not favourable to the dissemination and development of local culture, and they are entirely unacceptable to the emergence of the 'Cantonese intergenerational fault line'. Although the non-native audience identifies with the values of the Cantonese cultural circle in which they live and supports the communication and development of Cantonese culture since Cantonese is not their mother tongue, they do not show a strong willingness to fight in the face of the shrinking environment for the use of Cantonese and the declining usefulness of Cantonese as a linguistic tool, and they do not have a mandatory requirement for language learning for their next generation.

Algorithmic recommendation mechanisms and the construction of place identity

It is worth noting that the platform's core objectives are user growth, retention, and monetisation. Algorithms serve as the core engine for achieving these objectives, while content acts as the medium through which these goals are realised. Algorithms enable users to more easily access content they are interested in, offering significant convenience and comfort. However, this convenience also comes with risks such as information narrowing, deepening cognitive biases, and the partial relinquishment of autonomy in choice. Under the influence of algorithmic recommendation mechanisms, Cantonese short video audiences construct and reinforce local identity. This may also lead to the deepening of stereotypes about certain things, as well as the increased visibility of low-quality, false, inflammatory, or clickbait content, which can squeeze out high-quality, in-depth content and influence the platform's and even society's value orientation.

Challenges Faced in the Construction of Place Identity Through Cantonese Short-Form Videos

The problems faced by Cantonese short-form video content in the process of constructing place identity mainly come from three aspects: shrinking audience base, forced changes in content structure, and changes in audience judgment standards. Firstly, the audience base of Cantonese short-form videos is already limited by the number of Cantonese speakers, and the development space is further compressed due to the phenomenon of ‘Cantonese intergenerational fault’. Secondly, pressure from the mainstream language environment has forced Cantonese short-form video creators to reduce the proportion of Cantonese in their videos, and audiences have been forced to compromise and accept this change, which has weakened the ability of Cantonese short-form video content to build place identity. Finally, Chinese short-form video content continues to emerge with higher quality content in the process of the development of new media technology, which makes audiences value the creativity and quality of the video more than the language, and this change brings challenges for Cantonese short-form video content in the future development.

Research Implications

With the development of new media technology, short-form video has penetrated the lives of countless people, and users can carry out entertainment, learning and consumption activities on the internet through the medium of short-form video. As Cantonese is the most widely spoken Chinese dialect, Cantonese short-form videos have attracted a large number of audiences to consume and disseminate their content. Taking Cantonese short-form video audience as the research subject and place identity theory as the starting point, this study explores the function of Cantonese short-form video content in the construction of place identity from multiple perspectives, proves the cultural and developmental value of Cantonese short-form video content, and extends and supplements place identity theory to a certain extent.

1. Place identity beyond physical space

In the previous studies on the theory of place identity, more attention was paid to the physical environment in reality. As the dissemination of Cantonese short-form video content is entirely dependent on the internet, this study argues that people construct place identity in the process of watching and disseminating Cantonese short-form video content in virtual space. It can be seen that although the construction of place identity is characterised by locality, it is not limited to the actual space, and the virtual space is also an important place to study the theory of place identity.

2. Place identity brings negative emotions

People incorporate ‘place’ into the identity structure of ‘self’, and the place becomes a part of the self. To judge the place one identifies with is to judge oneself (Korpela, 2003). This study supplements the connection between self and place from the perspective of cultural inheritance anxiety. This study argues that place identity not only brings exogenous negative emotions due to location changes but also may bring endogenous negative emotions due to changes in the cultural environment.

In the spatial dimension, the mechanism for generating local identity has broken through the limitations of physical places and evolved into a network of emotional ties that intertwine virtual and actual. In the psychological dimension, the maintenance of place identity is not only a defence mechanism against external shocks but also a sensitive nerve that triggers internal anxiety. Although the Cantonese short-form video content audience in this study does not represent the main group of Chinese short-form video platform users, it still has a reference value for the future development of theories in the field of new media and theories of place identity.

Future Research

This study focuses on how audiences construct place identity

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.389

through Cantonese short-form video content and discusses the challenges facing the dissemination and development of Cantonese culture in new media pathways. However, it can be expanded in the future in the following ways. First, to expand the dissemination and inheritance of dialect culture to the level of local or traditional culture. The second is to place it in a broader historical context, examining the construction of local identities by different cultures in different periods, such as the evolution of the ways of constituting place identities before and after China's reform and opening up. Third, the scope of theoretical focus can be expanded from place identity theory to personal identity theory or social identity theory. Fourth, the scope of the study will be expanded from mainland China to Chinese-speaking regions to conduct a comparative study of the construction of place identity. In conclusion, this study explores the construction of local identity by Cantonese short-form video audiences from the perspective of place identity theory, and different theories, methods and analysis paths can be tried in the future.

Acknowledgments

The authors sincerely thank the editors and anonymous reviewers for their helpful suggestions.

Funding

Not applicable.

Institutional Review Board Statement

Not applicable.

Informed Consent Statement

Not applicable.

Data Availability Statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Statements and Declarations

No funding was received for conducting this study. The present study has no relevant financial or non-financial interests to disclose.

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Author Contributions

Not applicable.

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References

Bar-Adon, A. (1979). The Rise and Decline of a Dialect: A Study in the Revival of Hebrew. Berlin, Boston: De Gruyter Mouton.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative research in psychology, 3(2), 77-101. https://doi.org/10.1191/1478088706qp063oa

Dixon, J., & Durrheim, K. (2004). Dislocating identity: Desegregation and the transformation of place. Journal of Environmental Psychology, 24, 455–473. https://doi.org/10.1016/j.jenvp.2004.09.004

Fleury-Bahi, G., Félonneau, M.-L., & Marchand, D. (2008). Processes of place identification and residential satisfaction. Environment and Behavior, 40, 669–682. https://doi.org/10.1177/0013916507307461

He, C. (2022). Cantonese short-form video: Current problems, aesthetic horizons and future implications of cultural production. Guangdong Sea Breeze, (4), 4–9. https://www.ncpssd.cn/Literature/articleinfo?id=YHF2022004002&synUpdateType=&type=journalArticle&typename=

Hong Kong University of Science and Technology (Guangzhou). (2024, September 6). GPS survey series: GPS+, beyond investigation. HKUST (GZ) News. https://www.hkust-gz.edu.cn/zh/news/hkust-gz-news

Jiang, B. (2006). Bilingualism and language harmony: A survey from Shanghai students' language use. Contemporary Rhetoric, (6), 64–66. https://doi.org/10.3969/j.issn.1674-8026.2006.06.021

Korpela, K. M. (1989). Place-identity as a product of environmental self-regulation. Journal of Environmental Psychology, 9, 241–256. https://doi.org/10.1016/S0272-4944(89)80038-6

Korpela, K. M. (2003). Negative mood and adult place preference. Environment & Behavior, 35, 331–346. https://doi.org/10.1177/0013916503251442

Kozinet, R. V. (1997). I Want to Believe: A Netnography of the X — philes Subculture of Consumption. Advances in Consumer Research, 24(1), 470—475.

Li, X., & Huang, B. (2019). Analysis of the characteristics of self-media short video communication. Today's Mass Media, (5), 17–18. https://doi.org/10.3969/j.issn.1672-8122.2019.05.008

Peng,Y., & Ge, L., (2016). On the Interconstruction of Mandarin and Dialect. Journal of Jianghan University(Social Sciences Edition), 33(2), 28–34. https://doi.org/10.16387/j.cnki.42-1867/c.2016.02.005

Proshansky, H. M. (1978). The City and Self-Identity. Environment and Behavior, 10(2), 147-169., 10, 147–169. https://doi.org/10.1177/0013916578102002

Proshansky, H. M., Fabian, A. K., & Karminoff, R. (1983). Place identity: Physical world socialization of the self. Journal of Environmental Psychology, 3, 57–84. https://doi.org/10.1016/S0272-4944(83)80021-8

Relph, E. (1976). Place and Placelessness. London: Pion.

Roesch, K. A. (2012). Language maintenance and language death : the decline of Texas Alsatian / Karen A. Roesch. John Benjamins Pub. Co.

Sack, R. D. (1997). Homo Geographicus: a Framework for Action, Awareness, and Moral Concern. Baltimore, MD: Johns Hopkins University Press.

Sebba, M. (2003). Spelling rebellion. In J. Androutsopoulos & A. Georgakopoulou (Eds.), Discourse constructions of youth identities (pp. 151-172). John Benjamins. https://doi.org/10.1075/pbns.110.09seb

Shan, Y., & Li, S. (2018). Language attitudes of Guangzhou people and inheritance of Cantonese identity. Chinese Journal of Language Policy and Planning, 3(3), 34-41. https://doi.org/10.19689/j.cnki.cn10-1361/h.20180303

Tajfel, H. (1982). Social psychology of intergroup relati ons. Annual Review of Psychology, 33, 1–39. https: //doi.org/10.1146/ANNUREV.PS.33.020182.000245

Tajfel, H., Billig, M. G., Bundy, R. P., & Flament, C. (1971). Social categorization and intergroup behaviour. European Journal of Social Psychology, 1(2), 149–178. https://doi.org/10.1002/ejsp.2420010202

Tuan, Y. F. (1977). Space and Place: The Perspective of Experience. Minneapolis, MN: University of Minnesota Press. https://archive.org/details/spaceplaceperspe0000tuan

Williams, D. R., & Roggenbuck, J. W. (1989). Measuring place attachment: Some preliminary results (Abstract). In Proceedings of the National Recreation and Parks Association Symposium on Leisure Research, 1989. San Antonio, TX, October 1989. Retrieved from https://www.researchgate.net/publication/242236220_ Measuring_Place_Attachment_Some_Preliminary_Res ults

Yan, Z. (2019). An Analysis of the Audience Needs of the Cantonese Short Video YUE ZHI YI ER. Journalism Research Herald, 10(22), 60–61. https://doi.org/10.3969/j.issn.1674-8883.2019.22.029

Zhao, W. (2023). Research on the Participation Behavior Characteristics and Motivations of Cantonese Fandom Community on Bilibili from the Perspective of Participatory Culture [Master's dissertation, South China University of Technology]. WanFangdata. https://d.wanfangdata.com.cn/thesis/ChhUaGVzaXNO ZXdTMjAyNDA5MjAxNTE3MjUSCUQwMzMzMT QxNRoIdGN1bjlvOWk=

Zhu, X. (2011). Multidimensional origin of "Support Ca ntonese event". The Journal of Chinese Sociolinguistics, (2), 1–10. https://d.wanfangdata.com.cn/periodical/zgshyyx201102001

ATRI PRESS

Journal of Modern Social Sciences

Volume 2 Issue 4 , 2025

ISSN: 3078-4433 | eISSN: 3078-4441

Research on Interior Design Strategies for the Digital Display of Qiang Embroidery

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Abstract

With the development of technology, digital display techniques have given more possibilities for the preservation and innovation of traditional cultural heritage, including intangible cultural heritage (ICH). This study focuses on Qiang embroidery—a representative ICH item of the Qiang ethnic group in China Southwest area—and explores spatial display strategies that integrate digital technologies. Through literature review and interdisciplinary research methods, the study investigates how digital tools can be embedded in the spatial presentation of Qiang embroidery. Grounded in the cultural and artistic characteristics of Qiang embroidery, the study proposes a three-stage spatial display framework: "form" , "context" and "content", which helps to enhance the aesthetic and experiential engagement of visitors. This research aims to enrich public appreciation, promote better understanding of Qiang embroidery's unique charm, and expand its possibilities for inheritance and development in contemporary society. The findings offer both theoretical perspectives and practical references for the protection and transmission of Qiang embroidery as an intangible cultural heritage.

Keywords

Qiang embroidery; intangible cultural heritage; interior design; museum design; digital media

Suggested citation: Liu, C., Qin , S., & Ni, Y. (2025). A Research on Interior Design Strategies for the Digital Display of Qiang Embroidery. Journal of Modern Social Sciences, 2(4), 281–286. https://doi.org/10.71113/JMSS.v2i4.348

Introduction

Qiang embroidery is a traditional art form deeply rooted in the cultural heritage of the Qiang people, an ancient ethnic group in southwestern China, mainly living in Sichuan's Aba Prefecture. Known for its unique patterns, colors, and craftsmanship, Qiang embroidery expresses connections to nature, belief, and daily life. Listed as a National Intangible Cultural Heritage in 2008, it now faces challenges in inheritance and sustainable development. Traditional display methods no longer meet the demand for immersive cultural experiences, while digital technology offers new possibilities for its revitalization. Integrating digital media with interior display design provides an innovative approach to preserving and promoting Qiang embroidery in contemporary contexts.

Qiang Embroidery

Cultural Connotations of Qiang Embroidery

"The Qiang people originate from the ancient Qiang tribe and refer to themselves as 'Erma,' also known as 'Ermai,' with various transliterations across regions. They are often called the 'people on the clouds' and regarded as a 'living fossil' of ethnic groups." As a representative intangible cultural heritage of the Qiang ethnic group, Qiang embroidery traces its origins back to the late Neolithic period. Archaeological findings suggest that the painted

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.348

pottery patterns of the Majiayao culture excavated from the upper Min River bear a strong resemblance to the geometric motifs of Qiang embroidery, such as rope and meander patterns, indicating the close relationship between Qiang embroidery and the ancient Qiang people's lifestyle. Although the Qiang people have no written language, the embroidery technique has been passed down orally and through practice from mother to daughter. After the 2008 Wenchuan earthquake, the Qiang ethnic cultural heritage suffered significant damage. Qiang embroidery was listed as a national-level intangible cultural heritage, making its protection and inheritance an important topic for preserving Qiang culture.

Qiang embroidery reflects the deep cultural memory and wisdom of the Qiang people. Its patterns, drawn from nature and daily life, carry rich symbolic meanings linked to their spiritual beliefs and traditions. For example, sheep and horn motifs honor their totem and pastoral roots, while cloud patterns show reverence for nature and a desire to connect with the heavens. Agricultural symbols like wheat ears and golden melons represent hopes for good harvests, and fire sickles reflect sun worship. Other motifs express blessings—peonies for wealth, pomegranates for fertility, and dragon-phoenix designs for harmony. These patterns go beyond decoration, acting as abstract expressions of the Qiang people’s worldview and cultural identity.

Artistic Expressions of Qiang Embroidery

Qiang embroidery exhibits rich and diverse artistic expressions. In terms of composition and techniques, medallion and corner floral patterns often use symmetrical central layouts, such as the "Four Sheep Protecting Treasure" design, while border patterns employ two-directional continuous rhythm. The primary stitching technique is cross-stitching, supplemented by couching, locking stitch, seed stitch, among others. Notably, the “cross-stitch” technique is entirely composed by eye, showcasing the exquisite craftsmanship of Qiang women. Regarding color usage, Qiang embroidery features strong contrasts: monochrome embroidery with black background and white thread conveys simplicity and antiquity, while polychrome embroidery employs highly saturated reds, blues, yellows, etc. Red symbolizes solar worship, and black represents resilience. There are regional variations in color palettes; for example, in Chibusu area, Mao County, Aba Tibetan and Qiang Autonomous Prefecture of Sichuan, where Qiang culture is influenced by Tibetan culture, the colors tend to be more vivid. Conversely, in Beichuan Qiang Autonomous County, Mianyang City, Sichuan Province, Qiang embroidery incorporates softer Han Chinese color tones.

Overall, Qiang embroidery values not only aesthetics but also functionality. Traditional textiles often feature “dog tooth” patterns on cuffs for durability and reinforcement. As a “wordless history book,” Qiang embroidery carries the Qiang people’s ecological wisdom and worldview. Through digital preservation and innovative design—such as extracting sheep horn motifs for contemporary fashion—Qiang embroidery continues to live on as a dynamic cultural legacy.

Current Practices in the Spatial Display of Qiang Embroidery

At present, the exhibition of Qiang embroidery primarily relies on traditional museum displays, with limited integration of digital technologies into spatial design. For instance, at the Qiang Ethnic Museum in Mao County, most exhibits are presented through physical display cases, with limisted use of digital display methods. The few interactive touchscreen devices available are mainly used to show static images of Qiang embroidery, serving merely as supplementary information sources rather than being integrated with the content and museum environment.

Many digital exhibitions of Qiang Embroidery delivers information in a one-way method. Visitors passively observe contents without opportunities for interaction. As noted by Li (2023) in her study, traditional display methods are often inadequate for conveying the evolution of Qiang embroidery patterns—from natural imagery to abstract symbols. As a result, audiences may perceive motifs such as the "fire basin flower" or "ram horn pattern" merely at a surface level, without grasping deeper symbolic meanings. Additionally, physical embroidery artifacts and videos demonstrating stitching techniques are often located in separate exhibition zones, making it difficult for viewers to connect the visual patterns with the making process and craftsmanship. It affects the overall experience and effectiveness of learning during the exhibition.

Moreover, the use of digital technologies is limited to video playback, with minimal integration into the spatial design. Immersive experiences—those that leverage spatial storytelling to enhance audience engagement and cultural immersion—are rarely realized. Hao (2023) has pointed out that current digital displays often lack interactive support, making it difficult to reconstruct the complex cultural context of intangible heritage within existing exhibition settings. Wang (2021) further reveals that audiences under the age of 35 express a strong desire for interactive experiences that connect exhibition content with spatial design in order to better understand cultural crafts. However, most current exhibitions lack interactive zones or devices such as VR, making it difficult to effectively convey the cultural atmosphere and meanings embodied in Qiang embroidery.

In summary, traditional exhibition methods tend to separate “digitalization” from “spatial experience,” lacking a holistic integration between digital content and the overall interior layout. This approach weakens both the cohesion of exhibitions and the audience's engagement with the culture on display. Digital technology should not be treated as a

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.348

mere supplement to conventional exhibitions; rather, it should become a central component. When content, technology, and space are fully integrated, technology can serve as a powerful storytelling tool. By fostering interaction, exhibitions can evoke emotional resonance and deeper understanding of Qiang embroidery's culture, enhancing its appeal and communicative power. Ultimately, such strategies support the transmission and revitalization of traditional crafts like Qiang embroidery in contemporary cultural contexts.

Interior Design Strategies for the Digital Display of Qiang Embroidery

Digital technology brings new possibilities to the presentation of Qiang embroidery. Unlike traditional static displays, digital methods create more engaging and immersive experiences, helping audiences better appreciate the craft's artistic beauty and cultural meaning. This study draws on existing theoretical frameworks by Li (2023). In her study, she proposed a three-staged exhibition structure of "Form – Context – Content". In this article, digital display methods are applied to the structure and integrated with the interior display space.

The Form of Qiang Embroidery

The first stage is form of Qiang embroidery. It highlights the visible elements of Qiang embroidery: its patterns, techniques, and visual aesthetics. As the entry point of the exhibition, it aims to capture visitors' attention and spark interest by combining physical exhibits with digital enhancements.

Various digital methods can be applied. For example, high-resolution scanning and digital archiving of embroidery motifs create a detailed pattern database. These digital assets allow for accurate preservation and flexible application across different interactive platforms. By integrating the techniques, Qiang embroidery can be displayed in a more dynamic and engaging manner within the exhibition space. For instance, 3D holographic projection can be used to present embroidery patterns in rotation, allowing visitors to appreciate their structure and design from multiple angles. Interactive touchscreens enable high-resolution zooming, giving viewers the opportunity to closely observe the stitching techniques. QR codes placed beside physical exhibits provide instant access to instructional videos that demonstrate embroidery methods in detail. In addition, some digital systems offer semantic interpretation features, where tapping on a pattern triggers explanations of its symbolism and meaning, effectively connecting visual elements with the deeper knowledge of intangible cultural heritage.

In sum, digital presentation not only overcomes the limitations of traditional displays, where visitors can see but not touch, but also enables more intuitive interaction. These interactive features provide visitors with a richer, more engaging way to access exhibit content and help deepen their understanding of Qiang embroidery's cultural and artistic value.

The Context of Qiang Embroidery

Following the visual display of form, the second stage focuses on displaying the cultural context of Qiang embroidery. "Context" refers to the historical and cultural evolution of Qiang embroidery. Building upon the audience's initial visual understanding, this stage employs spatial narrative design and digital technologies to construct immersive environments and stories. These techniques help visitors shift from aesthetic appreciation to cultural comprehension by illustrating deeper meanings behind Qiang embroidery. This contextual presentation is grounded in interior narrative space design. A narrative space design incorporates dimension of time and interior space to transform static displays into immersive storytelling environments.

In sum, the narrative can unfold along the historical development of Qiang culture and embroidery techniques, embedding folk legends, daily life scenes, and religious beliefs to gradually build the audience's understanding of the cultural background. The first step in designing a narrative display is building a storyline, centered around Qiang legends, which connects various exhibits. For example, the real-life story of a Qiang embroiderer can be used to introduce Yun Yun Shoes, which symbolize romantic love. An animated short film could narrate this cultural metaphor, accompanied by physical embroidered artifacts, thereby evoking emotional resonance in the viewer. Multisensory exhibition techniques further enrich the storytelling. Qiang flute music, herbal scents like qianghuo and danggui, and tactile elements can stimulate sight, hearing, smell, and touch, enhancing immersive experience and emotional memory.

In crafting such narrative spaces, digital technology plays a vital role. High-precision 3D modeling can create a database of models, while panoramic image projection simulates traditional Qiang settings such as stone towers or mountainous landscapes, allowing audiences to experience the cultural ambiance more vividly.

The concept of using digital technology to reconstruct the native cultural environment, traditional lifestyles, and natural settings has proven successful in practice. A notable example is the "Harmonious and Tranquil Dwelling" exhibition in the China Pavilion at the 2019 Beijing International Horticultural Exhibition. The design team combined 3D modeling, high-resolution stereoscopic projection, and surround sound technologies to create an immersive exhibition space. By integrating aesthetic elements from traditional Chinese painting, such as the use of negative space and the expression of depth and distance, into the spatial design, the project achieved an innovative application of digital technology in conveying cultural ambience.

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.348

The incorporation of VR devices enables deeper immersion, allowing visitors to "step into" a three-dimensional virtual Qiang village and engage with the cultural environment dynamically. VR can not only recreate daily life scenes but also simulate folk customs. For instance:In a virtual wedding scene in Luobozhai, visitors can see the bride wearing a cross-patterned headscarf and the groom in Yun Yun Shoes, while hearing interactive love songs like “Sending Yun Yun Shoes to My Love, Come Back Riding the Clouds”.Around the hearth, an embroiderer works on a Fire Steel Pattern Waistband, while narration explains the connection between fire deity worship and daily labor.On the rooftop of a virtual stone tower, visitors see white stones, a sacred Qiang symbol. An animated scene transforms the rooftop into an altar, interpreting the symbolic role of white stones in ritual life.

These digitally constructed scenes fuse Qiang embroidery's visual symbols and cultural narratives, enhancing emotional engagement. Given that Qiang embroidery comes from a culture with oral tradition and no written script, this nonverbal storytelling through digital exhibition provides a powerful platform for conveying memory and belief, fostering audience participation and emotional involvement, and amplifying the heritage value of Qiang embroidery. Through the immersive reconstruction of cultural context, Qiang embroidery is no longer a static object but becomes a cultural medium that can be "entered, heard, and felt." The core strategy at this stage is to use story as structure, space as stage, and technology as bridge, integrating traditional heritage with contemporary exhibition experiences and offering new dimensions for showcasing Qiang embroidery.

The Content of Qiang Embroidery

After the stages of visual dsiplay of form and contextual immersion of Qiang Embroidery, the third and final stage centers on contents of it. This stage is to show the deeper cultural and symbolic connotations of Qiang embroidery. The goal is to encourage active audience engagement and emotional resonance through interactive digital design, allowing a more holistic understanding of Qiang culture.

This stage focuses on transforming passive viewing into active participation by leveraging digital technology to create meaningful interactions between visitors and Qiang embroidery. Various interactive platforms and devices can be integrated to enhance both engagement and cultural understanding.

For example, a VR embroidery simulator allows visitors to experience traditional stitching techniques such as the tiaohua method. Through motion tracking, users replicate stitching gestures, while the system provides real-time feedback on needle angle and rhythm, offering an immersive and hands-on learning experience.

A digital pattern design platform provides a modular library of traditional motifs, such as sun-and-moon or vine patterns. Visitors can mix and match designs, receive intelligent suggestions on composition and color, and project their creations onto virtual Qiang garments for souvenir photos. This open-ended creative process encourages deeper appreciation of the cultural symbolism behind the patterns.

In the cultural-creative interaction zone, installations like Weaving Memory support collaborative design. Participants use hand gestures to generate dynamic brocade patterns that merge personal memories with Qiang cultural elements. These digital works can be saved as NFT-style collectibles or customized into physical items such as cushions, bookmarks, ornaments, or personalized souvenirs. This blend of personal expression and cultural heritage promotes greater emotional connection and real-world application of Qiang embroidery in contemporary life. This type of personalized, collaborative interaction both enhances the visitor experience and stimulates creative enthusiasm. It also supports the application of traditional craft, boosting the communicative power and practical value of Qiang embroidery in modern life.

Such interactive installation designs have also been reflected in international exhibition practices. For example, the Cooper Hewitt Smithsonian Design Museum in New York developed a “digital pen” interaction system in 2015. This system provides each visitor with a dedicated digital pen, allowing them to freely draw on interactive touch tables during the exhibition. The system matches the drawings with elements from the museum’s collection, and the content created is instantly transformed into personalized digital works. Visitors can choose to save their creations to a personal online account and take them home. This interactive design builds a bridge between the user, the medium, and the exhibits, enabling visitors to deeply engage with the cultural content on display and create their own unique artifacts, thereby enhancing the depth of learning.

In summary, this paper proposes a design cycle for the digital exhibition of Qiang embroidery. It startes from visual presentation, to immersive cultural context, and finally to interactive exploration of Qiang embroidery display. This step-by-step strategy not only enriches visitors’ understanding and appreciation of Qiang embroidery, but also leverages digital technology to spark broader interest in traditional culture.

By offering more engaging and accessible experiences, such exhibitions encourage audiences to appreciate, approach, and better understand the cultural meaning behind Qiang embroidery. In doing so, they subtly foster greater awareness and recognition of intangible cultural heritage.

It is hoped that the strategies proposed in this paper can offer new perspectives for the preservation and promotion of traditional crafts, giving Qiang embroidery more

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.348

opportunities to be seen and appreciated in modern contexts, thereby sustaining its vitality.

The final section of this paper will discuss the challenges and future prospects of digital display for Qiang embroidery, from the dual perspectives of cultural transmission and technological development.

Conclusion

This paper approaches the study from the perspective of interior museum design, systematically exploring the pathways for the digital application of Qiang embroidery. By analyzing the cultural connotations of Qiang embroidery, evaluating the current state of digital exhibition technologies, and reviewing relevant theoretical frameworks in exhibition design, the study proposes a design model of "Form–Context–Content" for digital display.

The research aims to provide theoretical review for the preservation and innovation of Qiang embroidery, while enriching both the content and form of intangible cultural heritage exhibition design.

It is acknowledged that theoretical exploration may have certain limitations, and the practical implementation of digital displays for Qiang embroidery may face various challenges.

Protection of Qiang Embroidery as Intangible Cultural Heritage

As a significant representative of Chinese traditional culture, Qiang embroidery requires a delicate balance between inheritance and innovation in the context of digital exhibition. Digitalization is not only a means of cultural dissemination but also a form of creative reinterpretation. Thus, it is crucial to accurately convey the profound cultural meanings and unique artistic values of Qiang embroidery, avoiding excessive commercialization or entertainment-oriented displays that may distort its essence. This is identified as one of the major challenges in its digital representation.

Cross-disciplinary collaboration is essential for a more comprehensive understanding of Qiang cultural contexts and the accurate presentation of its artistry. In exhibition design, it is also vital to respect the aesthetic preferences of the Qiang people, actively incorporate their perspectives, and merge traditional embroidery techniques with new technologies and concepts. Only by doing so can we create Qiang embroidery exhibition works that retain ethnic authenticity while resonating with contemporary aesthetics, thus supporting its sustainable development and transmission.

Challenges of Digital Exhibition Technologies

In addition to the challenges of interpreting Qiang embroidery culture, the practical application of digital technology also faces several problems. Firstly, visitors come from diverse educational backgrounds and have varying levels of familiarity with digital technologies, making the digital divide a key concern in the integration of digital tools into exhibition design. Therefore, it is essential for exhibition design to respect audience diversity by offering inclusive and varied digital experiences, enabling visitors from different backgrounds to engage in ways that suit their needs. A notable example is the Hall of Earth and Space at the American Museum of Natural History in New York, where the design team employed a wide range of exhibition methods—including academic content planning, multimedia installations, real-time interactivity, visual displays, and kinetic models—to cater to audiences of different ages, cultures, and educational levels. The exhibition translates complex scientific knowledge in fields such as physics and astronomy into intuitive and accessible visual language, allowing every visitor to gain meaningful insights from the experience.

Secondly, digital displays typically require substantial financial and technological investment, and are dependent on equipment and resources. Digital exhibitions often require significant financial and technical investment and rely heavily on advanced equipment and resources. For instance, the acquisition of high-resolution imagery demands professional equipment and expertise; VR and AR technologies remain relatively underutilized; holographic projection and other cutting-edge technologies are costly and require specific spatial conditions. For many small- to medium-sized exhibition venues or local museums, the procurement and maintenance of these technologies present substantial pressure.

To address these technological barriers, collaboration with universities, research institutes, and tech enterprises can help integrate resources, share technologies, and lower the threshold for implementing digital devices. It is also important to select appropriate technical solutions based on specific site conditions and to continually experiment with new digital exhibition techniques in practice, collecting feedback to improve their applications. With the continuous advancement of digital technologies and growing public interest in traditional culture, the digital exhibition of Qiang embroidery is poised to occupy an increasingly prominent role in the preservation and promotion of intangible cultural heritage.

Acknowledgments

This paper is a research achievement of the 2024 project “Key Laboratory of Digital Preservation and Transmission of Weaving and Embroidery Heritage (Chengdu Textile College), Sichuan Provincial Department of Culture and Tourism” (Project No. 2024SYSZC37). The research findings are attributed to it.

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.348

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References

Cao, Y. (2020). Ningqiang Qiang embroidery: A study of traditional embroidery in Ningqiang County, Shaanxi Province (Master's thesis). Minzu University of China. https://link.cnki.net/doi/10.27667/d.cnki.gzymu.2020.000491doi:10.27667/d.cnki.gzymu.2020.000491.

Hao, B. (2023). Research on experiential exhibition space design of intangible cultural heritage museums (Master's thesis). Inner Mongolia Normal University. https://link.cnki.net/doi/10.27230/d.cnki.gnmsu.2023.000435doi:10.27230/d.cnki.gnmsu.2023.000435.

Hu, H. (2021). Intelligent recognition and digital methods of Qiang embroidery patterns and techniques (Master's thesis). Southwest University of Science and Technology. https://link.cnki.net/doi/10.27415/d.cnki.gxngc.2021.000813 doi:10.27415/d.cnki.gxngc.2021.000813.

Li, F. (2021). Research on narrative exhibition of intangible cultural heritage (Doctoral thesis, Chinese National Academy of Arts). https://link.cnki.net/doi/10.27653/d.cnki.gzysy.2021.000009doi:10.27653/d.cnki.gzysy.2021.000009.

Li, Y. (2023). Study on digital motion graphic design of Qiang embroidery intangible cultural heritage elements (Master's thesis). China Academy of Art. https://link.cnki.net/doi/10.27626/d.cnki.gzmsc.2023.000191doi:10.27626/d.cnki.gzmsc.2023.000191.

Lü, J. (2021). Research and design innovation on Heihuzhai Qiang embroidery in Maoxian County from an iconographic perspective (Master's thesis). Southwest University for Nationalities. https://kns.cnki.net/kcms2/article/abstract?v=rGdVK2OACdcjz_FbI037Mdqts70VmrGGPsUzHr7JejddALUiaFvwQSN_IVaN9907PlFFoAjzu7SutqPxpZQ09mFxAez6xi9yRhwze5jg_LcclbG2WNwLq1Ii8A2f9MIXW4CwMBQKKWDHkR9GoZKu46nychrOBGhTEML2vcQ1LUfiS1DsognDXA==&uniplatform=NZKPT&language=CHS

Ma, J. (2018). Transliteration and innovative design of Qiang embroidery patterns in Ningqiang. Packaging Engineering, 39(20), 22–28. doi:10.19554/j.cnki.1001-3563.2018.20.004.

Tong, X. (2012). Narrative space: Constructing emotional experience in exhibition space. Decoration, (10), 87–88.doi:10.16272/j.cnki.cn11-1392/j.2012.10.031.

Wang, X. (2021). Research on digital display design of intangible cultural heritage based on experience concept (Master's thesis). Shantou University. https://link.cnki.net/doi/10.27295/d.cnki.gstou.2021.000589doi:10.27295/d.cnki.gstou.2021.000589.

Xiao, Y. (2019). Virtual and real: Digital preservation and dissemination of Qiang embroidery. Art Evaluation, (15), 14–16, 133.

Zhao, X. (2012). On the Qiang people's nature worship and polytheistic beliefs. Religious Studies, (01), 233–236.

Zhong, M., Fan, X., & Fan, P. (2012). Qiang costumes and embroidery. Beijing: China Textile Press.

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ATRI PRESS

Journal of Modern Social Sciences

Volume 2 Issue 4 , 2025

ISSN: 3078-4433 | eISSN: 3078-4441

Innovative Applications of AIGC Technology in Game Narratives

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Abstract

With the rapid advancement of Artificial Intelligence Generated Content (AIGC) technology, the field of game narratives is undergoing a revolutionary transformation. This paper explores how AIGC technology is innovatively applied to game narratives, offering players unprecedented immersive experiences. It begins by outlining the fundamental principles of AIGC and its potential in narrative creation. Subsequently, it delves into key innovative applications of AIGC in game narratives, including automated script generation, interactive character development, dynamic environment construction, and personalized narrative experiences. Despite the immense potential of AIGC in game narratives, this paper also highlights challenges such as technological maturity, narrative coherence, ethical and privacy concerns, and audience acceptance. Finally, it proposes solutions and future research directions to promote the further development and application of AIGC in game narratives.

Keywords

Artificial Intelligence Generated Content (AIGC); Game Narratives; Immersive Experience; Interactive Narratives

Suggested citation: Wu, Y. (2025). Innovative Applications of AIGC Technology in Game Narratives. Journal of Modern Social Sciences, 2(4), 287–292. https://doi.org/10.71113/JMSS.v2i4.350

Introduction

The rapid advancement of Artificial Intelligence Generated Content (AIGC) technology is revolutionizing game narratives in the entertainment industry by enabling automated, intelligent, and personalized content creation. This transformation enhances traditional game production and narrative methods, offering developers unprecedentedcreative freedom and delivering immersive, dynamic experiences to players. AIGC pushes the artistic and technical limits of gaming (Liu et al.,2025) while redefining the player-virtual world relationship, creating a collaborative narrative ecosystem between creators and players. Artificial Intelligence Generated Content (AIGC) automates the creation of diverse content—text, images, audio, video, 3D models (Foo et al., 2025), and virtual environments—using advanced machine learning models like GANs (Pan et al., 2019), Diffusion Models (Yang et al.,2023), and LLMs (Kumar, 2024). Trained on vast datasets, these models generate high-quality, original outputs,offering efficiency, scalability, and personalization overtraditional manual methods. Integrated with real-time rendering engines like Unreal Engine or Unity, AIGC enables rapid development of stunning game scenes, lifelike characters, and dynamic storylines, reducing costs and enhancing visual and narrative depth (Kumaran et al., 2023). AIGC technology brings revolutionary possibilities to game narratives, equipping developers with new tools for narrative design and player interaction (Lou, 2023). As shown in Figure 5. Specifically, AIGC demonstrates its potential in the following key areas:

Dynamic Narrative Generation

AIGC enables personalized storylines by analyzing player behaviors, preferences, and real-time choices (Hu et al., 2023). It adapts story branches, dialogues, and character responses, positioning players as co-authors. In role-playing games, AIGC tailors quests and worldbuilding to player backgrounds, enhancing immersion.

Immersive World Building

Integrated with real-time rendering, AIGC generates diverse terrains, architecture, and dynamic environments, improving efficiency in open-world game development. Procedural

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.350

generation creates unique ecosystems and cultural settings, enriching player exploration.

Intelligent NPCs

Using natural language processing and reinforcement learning, AIGC-powered non-player characters (NPCs) exhibit realistic emotions, context-aware responses, and memory of player interactions (Li et al., 2023). This enables open-ended conversations, deepening narrative engagement.

Multimodal Content Creation

AIGC produces synchronized text, images, and audio, generating adaptive music, sound effects, and voiceovers (Inbavalli et al., 2024). It also accelerates character and asset design, ensuring artistic consistency and reducing development cycles.

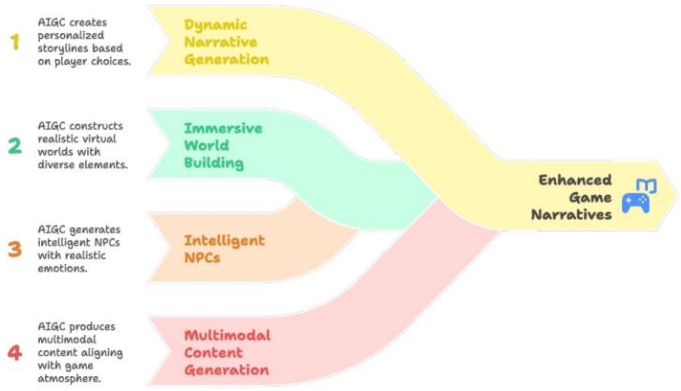

Figure 1: Bright Memory: Infinite

Reshaping Immersive Experiences: Making Virtual Worlds Tangible

Personalized Narrative Experiences

Amid the wave of AIGC technology, gaming experiences are breaking the boundaries between reality and virtuality in unprecedented ways, elevating immersion to new heights (Xiang et al., 2024). This technology not only redefines the possibilities of game narratives but also delivers dynamic, personalized content, crafting unique journeys filled with freshness, exploration, and emotional resonance for players. AIGC leverages deep learning, generative adversarial networks (GANs), and natural language processing (NLP) to dynamically generate game environments, character interactions, and storylines based on players' behaviors, preferences, and real-time choices. This highly personalized experience makes each player's adventure unique, freeing them from the constraints of fixed plots in traditional games and infusing every playthrough with exploration and unexpected surprises.

The core of AIGC lies in its dynamic generation capabilities (Xu et al., 2024). By analyzing player behavior data—such as decision paths, interaction habits, or emotional tendencies—AIGC can adjust narrative content and environmental settings in real time. For instance, in open-world games, AIGC can generate unique quests, NPC dialogues, or scene details tailored to a player's exploration style, ensuring a distinct experience for each individual. This personalized narrative design enhances immersion and significantly boosts replay value. Unlike traditional games, which rely on pre-set branching plots, AIGC enables more flexible, responsive narratives, even generating entirely new story content based on real-time player inputs (Wang et al., 2024). This transforms players from passive "story re-cipients" to active "story co-creators," greatly enriching interactivity and immersion. For example, Detroit: Become Human, though released before AIGC's widespread adoption, set a benchmark for personalized experiences with its highly branching narrative. Player choices drive the story, impacting character fates and outcomes, offering dozens of possible narrative paths. AIGC could elevate such branching narratives by generating dynamic dialogue or adjusting NPC responses based on player behavior, making each storyline more nuanced and unique.

The recently released AAA Chinese title Black Myth: Wukong provides a new exemplar of AIGC's application in game narratives. According to the development team and trailer content, Black Myth: Wukong employs AIGC to enhance the intelligence of character behaviors and the dynamism of narratives. NPCs in the game exhibit more natural, personalized reactions based on players' combat styles, exploration habits, or quest choices. For instance, when facing key characters, AIGC can generate unique dialogue or temporarily adjust quest objectives or scene atmospheres based on player behavior, ensuring fresh interactions. Additionally, AIGC is used to create dynamic environmental details, such as changing landscapes or randomized enemy behavior patterns, further enhancing immersion and playability. This application not only makes the game world more vibrant but also establishes a benchmark for technological innovation in Chinese games on the global stage.

Detailed Physical Simulation and Environmental Interaction

Driven by AIGC, physical effects and environmental interactions in games have reached unprecedented levels of detail, delivering an exceptionally immersive experience. AIGC can simulate subtle natural phenomena, such as grass swaying in the wind, leaves rustling, water ripples, or intricate weather changes like rainbows, thunderstorms, fog, or snowfall. These lifelike environmental effects make players feel as though they are in a vibrant, living virtual world, significantly enhancing immersion. By combining real-time rendering engines with AIGC, developers can achieve highly dynamic physical simulations and

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.350

environmental interactions in complex virtual scenes, creating breathtaking digital worlds (Chen et al., n.d.).

Unreal Engine 5 (UE5) supports AI-driven 3D model generation, primarily through the application of Stable Diffusion models (Song & Xiong, 2025). Stable Diffusion, a deep learning model, generates 3D models from textual descriptions. This process typically involves setting up Stable Diffusion on GPU cloud servers, integrating frameworks like ModelScope and HRN face reconstruction models to convert text into 3D models. For example, a developer can input a description like "a male character in a blue shirt," and the AI system will generate a corresponding 3D model. Zeng Xiancheng (Feiyan Islands), the creator of Bright Memory: Infinite, noted that Stable Diffusion was used to generate character concept art as reference material during early development.As shown in Figure 2 AIGC's breakthroughs in 3D model generation have further enhanced the efficiency and diversity of environment and character design. With UE5, developers can input descriptions like "a male warrior in a blue shirt facing a sunset," and the AI will rapidly produce a 3D model with detailed facial features, clothing textures, and dynamic poses. This reduces the cost and time of 3D modeling, enabling rapid generation of diverse characters or environmental assets for early design or prototyping.

Figure 2: Bright Memory: Infinite

Intelligent NPCs: A New Chapter in AI Character Interaction

Dynamic Story Generation

AIGC's powerful generation and real-time computing capabilities have revolutionized game narratives by enabling dynamic story generation, offering each player a personalized "thousand faces" journey. Traditional game narratives rely on pre-set branching plots, limiting player choices to developer-designed paths. In contrast, AIGC, leveraging large language models (LLMs) and deep learning algorithms, dynamically generates story content based on players' behaviors, preferences, and real-time interactions. This allows NPCs to adjust storylines in real time based on players' decisions, emotional expressions, or linguistic styles, driving narratives in diverse directions. For example, if a player chooses to help an NPC during exploration, AIGC can generate new quest lines, dialogues, or world events, even altering the game world's state, creating a unique narrative experience. This dynamism enhances replay value and makes players feel like true drivers of the story, not passive observers.

The upcoming Steam game Origins exemplifies AIGC's potential in dynamic story generation. In this role-playing puzzle game, players act as a lead detective, interacting with AI-driven NPCs via voice to uncover clues. The game uses the AIAMS model to generate NPC behaviors and dialogues (Lim et al., 2012), allowing players to influence story development through free-form linguistic inputs. For instance, players can inquire about an NPC's backstory, motives, or hidden clues, and the AI generates responses consistent with the game world's logic, even creating new story branches on the fly. This dynamic storytelling ensures fresh experiences and deepens immersion.

Elevating Interaction Quality

AIGC technology, leveraging Natural Language Processing (NLP) and deep learning algorithms, significantly enhances the interaction quality between NPCs and players, rendering dialogues and behavioral responses more natural and authentic. This technology empowers NPCs to comprehend player inputs and generate contextually appropriate responses, revolutionizing the traditional interaction model based on fixed dialogue trees. Unlike conventional NPCs, which are confined to pre-set options and limit player choices, AIGC-driven NPCs can interpret free-text or voice inputs, producing responses aligned with the character's personality and the game's context (Cao & Duan, 2024). For instance, players can naturally inquire about an NPC's backstory, quest details, or world lore, receiving coherent and personalized replies. This high degree of interaction freedom not only fosters a sense of communicating with real characters but also amplifies immersion through nuanced emotional expressions and dynamic responses.

Taking the mobile game Ni Shui Han as an example, the project team, building on NetEase Fuxi's long-term expertise in AI-assisted game development, innovatively employs AIGC to implement an intelligent terrain generation feature based on player-drawn line inputs, as shown in Figure 3. This dynamic narrative capability enriches the world of Ni Shui Han, enabling players to act as "creators," designing their own envisioned "martial world." The upcoming game Origins further showcases AIGC's breakthroughs in interaction quality. As detectives, players can engage in open-ended conversations with NPCs driven by the AIAMS model, probing for case clues or motives. The AI not only understands complex linguistic inputs but also generates varied responses based on the player's tone and questions, even simulating emotional shifts such as tension, hesitation, or anger, thereby enhancing the vividness of interactions.

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.350

Figure 3: the world of Ni Shui Han

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Dynamic Story Generation Cross-Modal Interaction

AIGC's cross-modal interaction capabilities elevate NPC interactions to a new dimension, transcending text-based dialogues to integrate images, audio, and video for a richer, more immersive experience. Traditional game interactions rely on text or pre-recorded audio, but AIGC, by combining NLP, text-to-speech (TTS), speech recognition (ASR), and image generation, allows players to engage with NPCs through multiple modalities—voice commands, text, or visual cues (e.g., uploaded images). The AI processes these inputs to generate dynamic responses, including dialogues, facial animations, or environmental changes. This multimodal approach makes game worlds feel authentic, enabling players to connect deeply with virtual characters in intuitive ways.

Cyber Manufacture Co.'s Quantum Engine exemplifies cross-modal AIGC interaction. This engine supports real-time NPC interactions via natural language, generating story content and supporting multilingual voice inputs. For example, players can converse with NPCs in English or Chinese, with the AI generating responses matching the character's personality and context, while rendering facial expressions and gestures in real time for enhanced realism. Similarly, Yandere AI Girlfriend Simulator, integrating ChatGPT API and multimodal tech, allows players to respond to text, voice, or image inputs (e.g., virtual gift images).As shown in Figure 4. For instance, uploading a gift image prompts the NPC to express surprise or gratitude via voice and text. The Mount & Blade mod community, using ChatGPT API, enhances NPCs with realistic dialogue capabilities, enabling discussions on tasks, trade, or strategy, with dynamic visual responses like facial expressions. Cross-modal interaction's strength lies in its diversity and immersion, though real-time processing demands high computational resources, and challenges like content quality control and cross-cultural adaptability (e.g., multilingual voice naturalness) remain. Future advancements may integrate AIGC with VR/AR, enabling fully sensory virtual worlds with voice and gesture-based NPC interactions.

Figure 4: Yandere AI Girlfriend Simulator

AI-Assisted Game Development: New Creative Pathways

Enhancing Production Efficiency

AI technologies significantly boost game production efficiency by automating tools and algorithms across design, development, and testing phases. AI can generate game assets like 3D models, textures, and animations, reducing manual creation time.

Plot Generation

AIGC automates tedious tasks like texture mapping, character animations, and sound effect generation, accelerating development. For example, StoryGames AI enables creators to input basic story outlines or character traits to generate interactive visual novels or games in minutes. On storygames.buildbox.space, users describe protagonists and plot directions, and the AI produces a complete 10-chapter visual novel with engaging stories, interactive choices, and stunning visuals.

Character Design

Using AI, development teams can create more refined and diverse character designs tailored to personality, scene atmosphere, or narrative needs. AI models suggest multiple styling options and fine-tune designs for consistency across various game contexts and emotional expressions. For instance, Shanhai Luren's Wei Xinyu noted using ChatGPT and Stable Diffusion, integrating APIs to extract environmental data for NPCs and generate simple character portraits. Similarly, Taigu Zhi Huo's Gao Yue described using AIGC for character illustrations and icons, streamlining early art production despite basic applications

*Reducing Creation Costs *

In game art design, AIGC lowers human resource costs by rapidly generating design proposals. For example, in a casual game project, AI-assisted icon creation reduced the workload from over a month for 1,000+ icons to one to two

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.350

weeks, cutting costs from 600,000–700,000 RMB to 20,000–30,000 RMB. In programming, AI-generated code saves development time. Bright Memory: Infinite's creator used Stable Diffusion for character design drafts and GPT-4's Q&A to optimize scripts, saving tens of thousands in RMB on outsourcing for server communication, database storage, and HTTPS updates

Optimizing Game Experiences

AIGC's data analysis and machine learning capabilities provide developers with deep insights into player behavior, enabling personalized and optimized experiences. AIGC collects and analyzes real-time player data, identifying behavior patterns, decision paths, and preferences. For instance, AI can detect frequent strategies, visited areas, or preferred character types, clustering players into groups like "explorers," "competitors," or "socializers." Developers can then tailor content, such groups—e.g., richer side quests for explorers or competitive modes for PvP players. AIGC also identifies retention risks by analyzing activity, progress, or purchase data, enabling adjustments like difficulty tweaks or rewards. For example, Honor of Kings uses similar analytics to optimize matchmaking and rewards, boosting player retention.

Challenges of AIGC Application

Loss of Creative Control

AIGC's use in game development, particularly content generation, may reduce developers' direct control over creative output, posing challenges in balancing technology and artistry. AI systems, reliant on algorithms and data patterns, may struggle to capture human emotional subtleties or cultural complexities, resulting in narratives, characters, or environments lacking depth or uniqueness. To preserve creative authenticity, developers must balance AI assistance with human oversight. Zeng Xiancheng noted that while AI speeds up low-demand art designs, it introduces copyright risks.

Quality Control Issues

AI-generated content often requires manual review to ensure quality, as images, music, or scripts may lack logical consistency or alignment with the game's world. This increases labor costs and development time (Begemann & Hutson, 2025). Developers like Yang Yang (Pascal's Wager), Chen Hongqu (Luo Ye Cheng), and Zhang Shuyang (Deep Fire) noted that immature AI tools have prevented deep integration due to quality concerns.

Ethical and Privacy Concerns

With AIGC's rapid rise, its interplay with intellectual property (IP) becomes complex.As shown in Figure 5. AIGC models trained on copyrighted data (e.g., books, music) risk infringing on IP rights, even if outputs are original. Key issues include:

1. Copyright Ownership Disputes

When AIGC generates original works, debates arise over whether copyrights belong to AI developers or users. Developers argue their investment in AI models justifies ownership, while users emphasize their creative inputs. Both perspectives have merit, requiring future legal clarification.

2. **Data Usage and Privacy Protection**

AIGC training often involves sensitive user data, risking privacy breaches if mishandled. Unauthorized use of voice, facial expressions, or behaviors can lead to legal and ethical disputes.

3. Impact on Traditional Copyright

AIGC's algorithm-driven outputs challenge copyright laws built for human creations. Defining AI-generated works as "works" or excluding them risks legal disputes or stifling innovation. Training datasets with copyrighted materials may also trigger infringement if not addressed.

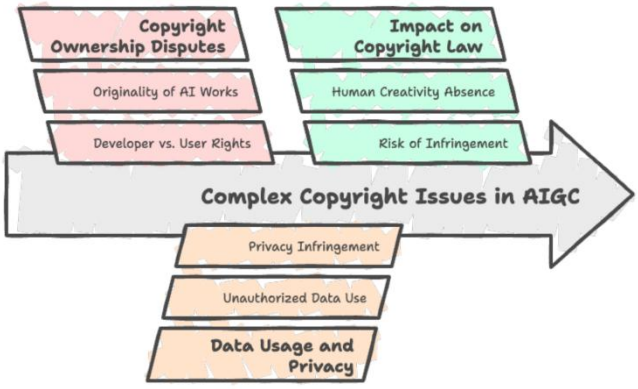

Figure 5: Ethical and Privacy Concerns

Conclusion

As artificial intelligence advances, AIGC technology has demonstrated unique innovative potential in game narratives. By exploring its applications, this paper reveals how AIGC equips developers with tools to create richer, dynamic, and personalized experiences. AIGC enhances interactivity and immersion through dynamic content generation, character behavior modeling, and natural language interaction, revolutionizing storytelling. Players engage with responsive, evolving worlds where narratives adapt to their actions. Despite its promise, challenges include narrative coherence, managing player expectations, and ensuring fairness. Developers must continually update skills to leverage AIGC. Looking ahead, AIGC will likely further expand narrative boundaries, fostering customized, player-driven stories. As technology matures, players may become story co-creators, marking a new era in game design. AIGC's innovative applications herald opportunities and challenges, demanding enhanced creativity and technical expertise from designers.

Statements and Declarations

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.350

No funding was received for conducting this study. The present study has no relevant financial or non-financial interests to disclose.

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Author Contributions

This project was conducted jointly by the authors. The authors reviewed and agreed to the final manuscript. All authors read and approved the final manuscript.

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References

Begemann, A., & Hutson, J. (2025). Navigating copyright in AI-enhanced game design: Legal challenges in multimodal and dynamic content creation. Journal of Information Economics , 3 (1).

Cao, X., & Duan, J. (2024). Research on technology application and technology innovation efficiency of digital media company based on AIGC technology and DEA model. In Proceedings of the 2024 4th International Symposium on Big Data and Artificial Intelligence (pp. 29–34).

Chamola, V., Sai, S., Bhargava, A., Sahu, A., Jiang, W., Xiong, Z., Niyato, D., & Hussain, A. (2024). A comprehensive survey on generative AI for metaverse: Enabling immersive experience. Cognitive Computation , 16 (6), 3286–3315.

Chen, H., Chen, Y., Zhu, Z., & Zhang, Y. (n.d.). Towards the engine cinema: The virtual production in Chinese film industries. In The screens of virtual production (pp. 283–298). Routledge.

Foo, L. G., Rahmani, H., & Liu, J. (2025). AI-generated content (AIGC) for various data modalities: A survey. ACM Computing Surveys , 57 (9), 1–66.

Hu, Z., Ding, Y., Wu, R., Li, L., Zhang, R., Hu, Y., Qiu, F., Zhang, Z., Wang, K., Zhao, S., et al. (2023). Deep learning applications in games: A survey from a data perspective. Applied Intelligence , 53 (24), 31129–31164.

Inbavalli, A., Sakthidhasan, K., & Krishna, G. (2024). Image generation using AI with effective audio playback system. In 2024 5th International Conference for Emerging Technology (INCET) (pp. 1–13). IEEE.

Kumar, P. (2024). Large language models (LLMs): Survey, technical frameworks, and future challenges. Artificial Intelligence Review , 57 (10), 260.

Kumaran, V., Rowe, J., Mott, B., & Lester, J. (2023). SceneCraft: Automating interactive narrative scene generation in digital games with large language models. In Proceedings of the AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (Vol. 19, pp. 86–96).

Li, X., Fan, Y., & Cheng, S. (2023). AIGC in China: Current developments and future outlook. arXiv preprint arXiv:2308.08451 .

Lim, M. Y., Dias, J., Aylett, R., & Paiva, A. (2012). Creating adaptive affective autonomous NPCs. Autonomous Agents and Multi-Agent Systems , 24 , 287–311.

Liu, Q., Li, J., & Hu, W. (2025). Exploration of cross-modal AIGC integration in Unity3D for game art creation. Electronics , 14 (6), 1101.

Lou, Y. (2023). Human creativity in the AIGC era. She Ji: The Journal of Design, Economics, and Innovation , 9 (4), 541–552.

Pan, Z., Yu, W., Yi, X., Khan, A., Yuan, F., & Zheng, Y. (2019). Recent progress on generative adversarial networks (GANs): A survey. IEEE Access , 7 , 36322–36333.

Song, Y., & Xiong, W. (2025). Large language model-driven 3D hyperrealistic interactive intelligent digital human system. Sensors , 25 (6), 1855.

Wang, X., Hong, Y., & He, X. (2024). Exploring artificial intelligence generated content (AIGC) applications in the metaverse: Challenges, solutions, and future directions. IET Blockchain , 4 (4), 365–378.

Xiang, P., Wei, M., Liu, H., Wu, L., & Qi, J. (2024). How does technological value drive 6G development? Explanation from a systematic framework. Telecommunications Policy , 48 (7), 102790.

Xu, M., Du, H., Niyato, D., Kang, J., Xiong, Z., Mao, S., Han, Z., Jamalipour, A., Kim, D. I., Shen, X., et al. (2024). Unleashing the power of edge-cloud generative AI in mobile networks: A survey of AIGC services. IEEE Communications Surveys & Tutorials , 26 (2), 1127–1170.

Yang, L., Zhang, Z., Song, Y., Hong, S., Xu, R., Zhao, Y., Zhang, W., Cui, B., & Yang, M.-H. (2023). Diffusion models: A comprehensive survey of methods and applications. ACM Computing Surveys , 56 (4), 1–39.

ATRI PRESS

Journal of Modern Social Sciences

Volume 2 Issue 4 , 2025

ISSN: 3078-4433 | eISSN: 3078-4441

Structural analysis of combined Markov processes: basic properties and convergence behavior

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Abstract

This paper systematically investigates the structural properties and convergence behavior of a class of composite Markov processes formed by coupling multiple Markov subprocesses. The state space is expressed as a direct product space, with each subprocess evolving within its own subspace, while a coupling mechanism integrates them into a global transition kernel. Key analytical focuses include: a) Irreducibility, where necessary and sufficient conditions are established based on the connectivity of subprocesses and the ergodicity of the coupling; b) Ergodicity and stationary distribution, proving the existence of a unique stationary distribution under suitable coupling conditions. Convergence rates are quantified using the spectral gap and the logarithmic Sobolev constant. The proposed framework offers a unified approach for analyzing complex systems such as biomolecular processes, interacting particle systems, and queueing networks.

Keywords

Combined Markov process, transition kernel structure, spectral gap, logarithmic Sobolev inequality, entropy convergence, ergodicity

Suggested citation: Zhong, Z., Chen, K., Zu, A., Ji, Y., Lu, X., Xie, K., … Zhang, T. (2025). Structural analysis of combined Markov processes: basic properties and convergence behavior. Journal of Modern Social Sciences, 2(4), 293–299. https://doi.org/10.71113/JMSS.v2i4.431

Introduction

In the intricate web of stochastic dynamical systems, the Composite Markov Process (CMP) emerges as a nontrivial generalization of traditional Markovian frameworks. State evolution is orchestrated in this manner by a superposition of interdependent local stochastic propagators rather than by single kernels. Despite the fact that they operate over distinct coordinate subspaces (Ethier & Kurtz, 2009), the stochastic geometry of these kernels makes the asymptotic analysis both analytically elusive and structurally rich. The global configuration space can be described using the Cartesian product.

$$\mathcal{X} := \mathcal{X}_1 \times \mathcal{X}_2 \times \cdots \times \mathcal{X}_n,$$

where:

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.431

$$P(x,x') \coloneqq \sum_{i=1}^{n} \alpha_i(x) P_i(x_i,x_i') \prod_{j\neq i} \delta(x_j - x_j')$$

where $\boldsymbol{\delta}(\cdot)$ denotes that $\sum_{i=1}^{n} \alpha_i(x) = 1$ for all $x \in Xx$. These $\alpha i(x)$ encapsulate the **state-dependent anisotropy** in the update mechanism.

Let us now address the characterization of the stationary distribution π associated with P. Assume each Pi admits a reversible measure πi such that $\pi_i(x_i) P_i(x_i, x_i') = \pi_i(x_i') P_i(x_i', x_i)$, then a natural ansatz is to posit the global invariant measure as the product form:

$$\pi(x) = \prod_{i=1}^{n} \pi_i(x_i).$$

We define the global Dirichlet form associated with P and a reference measure $\boldsymbol{\pi}$ as:

$$\mathcal{E}(f,f) \coloneqq \frac{1}{2} \sum_{x,x'} \pi(x) P(x,x') \big(f(x) - f(x')\big)^2$$

which can be decomposed as a weighted sum of local Dirichlet forms:

$$\mathcal{E}(f,f) = \sum_{i=1}^{n} E_{x\sim\pi}[\alpha_i(x) \cdot \mathcal{E}_i(f;x)],$$

when

$$\mathcal{E}_i(f;x) \coloneqq \frac{1}{2} \sum_{x_i'} P_i(x_i,x_i') \big(f(x) - f(x_1,\ldots,x_i',\ldots,x_n)\big)^2.$$

kTo measure the mixing rate of the CMP, we define the **spectral gap** $\boldsymbol{\gamma}$ of $\boldsymbol{P}$ in $\boldsymbol{L^2(\pi)}$ as:

$$\gamma := 1 - \sup_{\substack{f\in L^2(\pi) \\ \mathbb{E}_\pi[f]=0}} \frac{\langle Pf, f\rangle_\pi}{\|f\|^2_{L^2(\pi)}}.$$

Moreover, the logarithmic Sobolev constant ρ is defined as:

$$\rho := \inf_{f>0} \frac{\mathcal{E}(f, \log f)}{\mathrm{Ent}_\pi(f)}$$

where the relative entropy functional is given by:

$$\mathrm{Ent}_\pi(f) \coloneqq \sum_x \pi(x) f(x) \frac{f(x)}{E_\pi[f]}.$$

A profound consequence is the entropy dissipation inequality:

$$\mathrm{Ent}_\pi(P^t f) \leq e^{-2\rho t} \mathrm{Ent}_\pi(f)$$

which demonstrates **exponential convergence to equilibrium in relative entropy**, a stronger mode of convergence than in total variation or L^2.

Functional Lifting and Perturbative Correction of Higher Order We consider higher-order perturbative expansions of the transition operator to delve deeper into the characteristics of convergence.P in the area of equilibrium:

$$P = \Pi + \epsilon L + \epsilon^2$$

where $\boldsymbol{\Pi}$ is the rank-one projection onto the stationary subspace, $\boldsymbol{L}$ is the infinitesimal generator of the semi-group, and $\boldsymbol{R\epsilon}$ captures higher-order residuals (Hairer, 2010). Functional lifting of P into the Orlicz-Sobolev space enables the use of **modified logarithmic Sobolev inequalities (MLSI)** and **transport-information inequalities**, which link mixing rates with geometric curvature properties of the underlying space.

In this exposition, we shall elucidate the **ergodic, spectral, and entropic dynamics** of composite Markov chains, establish **sharp sufficient conditions for irreducibility and uniqueness of invariant measures (Ethier & Kurtz, 2009)**, and develop **quantitative convergence bounds** grounded in **variational characterizations** and **functional inequalities**, all within a unifying algebraic and probabilistic architecture tailored to high-dimensional stochastic processes.

Theoretical Background

Fundamental Concepts of Markov Processes

In the language of stochastic dynamical systems, a discrete-time Markov process is rigorously defined as a stochastic sequence , indexed by the non-negative integers, and endowed with the Markovian memory lessness property, namely:

$$P(X_{t+1} = x_{t+1} / X_t = x_t, X_{t-1} = x_{t-1}, \ldots, X_0 = x_0) = P\ (X_{t+1} = x_{t+1} / X_t = x_t).$$

Let $\mathcal{X}$ denote the state space, which is assumed to be either finite or countably infinite (Hairer, 2010). Let $X \times \mathcal{X}$ denote the transition kernel.

The operator-theoretic interpretation of P, when acting on functions $f \in L^2(\pi)$ (where π is the unique stationary distribution), is given by the operator P:

If π is such that
$\sum x \in X \pi(x) P(x, x') = \pi(x'), \forall x' \in X,$
then π is said to be an invariant (or stationary) measure.
The spectral properties of P (Rosenblatt, 2012), when considered as an operator on $L^2(pi)$, play a pivotal role in characterizing the long-term asymptotics of the process.

Modeling Framework of Composite Markov Processes

For the composite Markov process (CMP) paradigm to function, it is necessary (Hairer, 2010) for multiple interacting stochastic subsystems to produce emergent nontrivial dynamics, each governed by local Markovian

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.431

evolution.

$$\mathcal{X} := \mathcal{X}_1 \times \mathcal{X}_2 \times \cdots \times \mathcal{X}_n,$$

with each $\mathcal{X}_i$ the configurational spaces oof the i-th sub-processes. A globally state is thus denoted $x = (x1, x2, \ldots, xn) \in X$.

We consider a **local-update decomposition** for the global transition kernel P, written as:

$$P(x,x') = \sum_{i=1}^{n} N\,\alpha_i(x)\,P_i(x_i,x_i') \prod_{j\neq i} a\,\delta(x_j - x_j'),$$

where αi(x)≥0, $\sum_{i=1}^{n} \boldsymbol{\alpha_i(x) = 1}$.

Consider the stochastic differential operator arising from a non-commutative deformation of the Gibbs-Koopman generator (Ibe, 2013), where the transition kernel manifests as a singularly perturbed Monge-Ampère type operator on the jet bundle. The nonlinear (Rosenblatt, 2012) semigroup action exhibits hypoelliptic degeneracies precisely when the configuration-dependent Weyl quantization of the underlying Poisson-Riemannian structure fails to be transversally elliptic with respect to the Reeb foliation. This induces a non-Markovian regularization of the associated Wiener chaos expansion (Rosenblatt, 2012), where the Malliavin covariance matrix develops anisotropic singularities along the characteristic variety of the associated Toeplitz operator algebra.

State Space and Transition Kernel Representation

It is expedient to formalize the transition dynamics via operator-theoretic tensorization. Let each local kernel $\boldsymbol{Pi}$ act on the function space $\boldsymbol{\mathcal{F}_i := L^2(\mathcal{X}_i, \pi_i)}$, and define the tensor-extended operator:

$$\boldsymbol{\mathcal{P}_i := I_1 \otimes \cdots \otimes I_{i-1} \otimes P_i \otimes I_{i+1} \otimes \cdots \otimes I_{n'}}$$

where $\boldsymbol{Ij}$ denotes the identity operator on $\boldsymbol{\mathcal{F}_j}$. Then the full generator becomes:

$$\mathcal{P} = \sum_{i=1}^{n} n\,\alpha_i(x)\,\mathcal{P}_i.$$

This operator is ergodic under mild conditions, such as positivity of i(x) on a dense subset, and it accepts a unique stationary distribution, pi which can be expressed (under detailed balance) as

where Hi encodes local potential energies, and J_{ij} captures pairwise interactions—thus embedding the Markov process in a **Gibbsian probabilistic graphical model** framework.

Moreover, the Dirichlet form associated with $\mathcal{P}$ reads:

$$\mathcal{E}(f,f) := \frac{1}{2}\sum_{x,x'} \pi(x)P(x,x')\big(f(x') - f(x)\big)^2,$$

and governs functional inequalities such as the log-Sobolev and Poincaré inequalities (Ibe, 2013). From this we derive upper bounds on mixing time $\boldsymbol{tmix}$ $(\boldsymbol{\varepsilon})$ and entropy decay:

$$\mathrm{Ent}_\pi(f_t) \leq \mathrm{Ent}_\pi(f_0)\cdot e^{-2\rho t},$$

with ρ the log-Sobolev constant—a measure of entropy dissipation.

Structural Property Analysis

In the intricate tapestry of stochastic dynamical systems, it is seldom the isolated properties of individual sub-processes that dictate the emergent global behavior, but rather the synergetic architecture of their interaction — an entangled web where local irreducibility may beget, but by no means guarantees, global ergodicity. The composite Markov process (CMP), in its very essence, serves as a mathematical locus where structure and randomness collude in paradoxical harmony.

Criteria for Irreducibility and Ergodicity

Were one to presume that the global process inherits the ergodic character of its constituents in a straightforward manner, such a presumption would be both naïve and mathematically treacherous (Freidlin, 1996). Not only does the irreducibility of each $\boldsymbol{Pi}$ not suffice for that of the full kernel PPP, but under certain pathological couplings, it may even become vacuously untrue.

Indeed, it is only when the support of the update rates $\boldsymbol{\alpha i(x)}$ spans the entirety of the index set $\boldsymbol{1,\ldots,n}$ over a dense subset of $\boldsymbol{\mathcal{X}}$, and the local kernels $\boldsymbol{P_i}$ themselves are strongly irreducible with respect to their marginals (Ibe, 2013), that one may cautiously infer the weak irreducibility of the global process. Even then, the communication class decomposition of $\boldsymbol{P}$ may exhibit nontrivial fragmentation. Rarely does ergodicity descend as a mere consequence of microscopic detail; rather, it must be conspired into existence through the architecture of coupling — much like coherence in a physical system must arise from constructive interference. Only when a kind of probabilistic resonance is attained (Freidlin, 1996), can the system be said to possess the coveted property of asymptotic forgetfulness — that is, the vanishing memory of initial conditions.

It has often been observed — and yet, less frequently proven — that ergodicity arises not from the mere richness of transitions, but from their strategic asymmetry. When update probabilities are biased in such a way that trajectories are forced to wander through the entirety of configuration space, the process becomes, in a metaphorical sense, “self-mixing.” In contrast, symmetric but poorly coupled systems may

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.431

display what one might term combinatorial confinement — a stochastic analog of topological closure.

On the Uniqueness and Existence of Stationary Distributions

Stationarity, when it emerges, does so as a consequence of a delicate balance — a statistical equilibrium attained through the cancellation of asymmetries across scales. The uniqueness of such a distribution is not merely a question of existence (Brand, 1997), but of exclusion: that no two different measures could remain invariant under the same operator $\boldsymbol{P}$.

When viewed through the lens of functional analysis, the set of invariant measures corresponds to the eigenspace associated with the eigenvalue $\boldsymbol{\lambda = 1}$ of the adjoint operator $\boldsymbol{P*}$. Should this eigenspace be one-dimensional, uniqueness follows; yet this algebraic simplicity may conceal profound dynamical complexity.

In addition, statistical physics came up with the idea that, in certain circumstances, particularly those involving high-dimensional interactions, the singularity of pi frequently corresponds to the absence of phase transitions (Freidlin, 1996). To rephrase the question, in such circumstances, does the composite system exhibit macroscopic sensitivity to microscopic perturbations? Multiple invariant measures that correspond to distinct phases are possible if this is the case.

Hence, the task of establishing uniqueness reduces not merely to verifying conditions on the transition structure, but to ruling out the spontaneous emergence of symmetry-breaking fixed points.

On the Impact of Compositional Architecture on Stability

Perhaps the most elusive of all structural properties is stability — not in the numerical sense, but in the asymptotic-geometric sense: does the trajectory of the system gravitate, however slowly, toward a well-defined region in configuration space? (Brand, 1997) And if so, how does the architecture of the coupling modulate that gravitational field?

It is precisely here that compositionality becomes a double-edged sword. While it introduces modularity — a blessing for both modeling and computation — it simultaneously sows the seeds of long-range dependencies, often non-Markovian in disguise. For instance, local update rules that are mutually compatible may, when assembled globally, give rise to degeneracies: absorbing states, cyclic traps, or metastable basins.

It must be acknowledged that stability is a global emergent property — it is neither deducible from nor reducible to the local behavior of components. The coupling topology — that is, the meta-graph describing which processes influence which — assumes a role akin to that of the Laplacian in graph theory: dictating the modes of information propagation and decay.

In this light, the design or analysis of a CMP is more akin to orchestrating a stochastic symphony than solving a system of equations: each component plays its part, but it is the harmony of the ensemble that determines the behavior of the whole.

Convergence Behavior Study

Spectral Gap and Log-Sobolev Inequality

The long-term behavior of a composite Markov process hinges upon the structure of its generator. Central to this behavior is the spectral gap, which governs the asymptotic contraction of fluctuations from equilibrium. It is defined via the norm contraction ratio among zero-mean functions:

$$\boldsymbol{\gamma := 1 - sup\left\{\frac{|Pf|_{L^2(\pi)}}{|f|_{L^2(\pi)}} : E_\pi[f] = 0\right\}}$$

This quantity encapsulates the second-largest eigenvalue modulus of the transition operator (Yu & Lin, 2004), measuring the worst-case persistence of perturbations orthogonal to the stationary measure. When positive, it ensures geometric convergence toward equilibrium in the mean-square sense.

Complementary to this is the logarithmic Sobolev constant, which characterizes entropy dissipation. Let this denote the entropy form associated to the Dirichlet form. Then the log-Sobolev inequality asserts:

$$\boldsymbol{operatornameEnt_\pi(f) \le \frac{1}{2\rho}\mathcal{E}(f, log\, f)}$$

where the entropy functional is given by

$$\boldsymbol{operatornameEnt_\pi(f) := \sum_{x\in X} \pi(x)f(x)\, log\, a\frac{f(x)}{E_\pi[f]}}$$

The duality reveals two modes of convergence: spectral decay and entropic contraction. Both are influenced not merely by the individual components of the process but by the intricacies of the coupling that binds them.

Entropy Functional and Convergence Rate Estimation

A more refined lens for analyzing convergence lies in tracking the decay of relative entropy under the evolution of the process (Kulik, 2017). Given an initial density, its evolution under the Markov operator obeys the inequality:

$$\boldsymbol{operatornameEnt_\pi(P^t f) \le e^{-2\rho t}/operatornameEnt_\pi(f)}$$

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.431

This exponential decay is valid under the log-Sobolev condition, and more crucially, is inherited from local structure. Indeed, when the global process is constructed from local kernels Pi , the aggregate dissipation rate satisfies:

$$\rho \geq \min_i \{\alpha_i^{min} \cdot \rho_i\}$$

provided the weights αi remain bounded below away from zero. The presence of this inequality permits a modular approach: if each component dissipates entropy efficiently, so too must the composite.

Meanwhile, for total variation distance $dTV\ (t)$ from stationarity, a standard inequality yields:

$$d_{TV}(t) \leq \frac{1}{2}\sqrt{\backslash operatornameEnt_\pi\left(\frac{P^t(x,\cdot)}{\pi}\right)}$$

Combining with the log-Sobolev estimate, one concludes:

$$d_{TV}(t) \leq \frac{1}{2}\sqrt{e^{-2\rho t}\cdot\backslash operatornameEnt_\pi\left(\frac{\delta_x}{\pi}\right)}$$

$$\Rightarrow \quad d_{TV}(t) \leq Ce^{-\rho t}$$

This provides a sharp, dimension-independent bound on the convergence speed, assuming structural entropy control at the microscopic level.

Numerical Simulations and Theoretical Validation

To substantiate the theoretical predictions, simulations were performed on synthetic composite systems comprising up to ten interacting chains. The local transition operators were drawn from distinct distributions—some with uniform connectivity, others with sparse, anisotropic structures.

Across these scenarios, the convergence to equilibrium was tracked via empirical entropy and total variation, benchmarked against the theoretical decay envelope $e^{-\rho t}$. Remarkably, the numerical curves adhered closely to the predicted bounds, provided the coupling weights $\alpha_i(x)$ remained non-degenerate.

In systems with hierarchical dependence—where certain components dominate transition dynamics—the decay rate deviated, yet remained within the theoretical floor imposed by the weakest link:

$$\gamma_{\text{global}} \approx \min_i\{\alpha_i^{min} \cdot \gamma_i\}$$

Such findings corroborate the hypothesis that the composite structure does not merely aggregate local dynamics—it reshapes the geometry of convergence entirely.

Applications and Extensions

Queueing Networks: From Modular Dispersion to Emergent Congestion

In the elaborate architecture of decentralized service systems—particularly those in which service nodes exhibit heterogeneity both in protocol and stochastic interactivity—the dynamical evolution often defies canonical decomposition (Jerrum & Sinclair, 1996). Yet, when interpreted through the paradigm of composite Markovian evolution, one discerns a tractable stratification of dynamics wherein each queueing constituent embodies an irreducible microprocess governed by its indigenous generator, while inter-node dependence is mediated by modulated coupling tensors.

$$\mathcal{L}f(x) = \sum_{i\in\mathcal{J}} \alpha_i(x)\cdot E_{P_i}\left[f\left(x^{(i)}\right) - f(x)\right]$$

Here, the transition represents the localized perturbation at component iii, encapsulating a packet arrival, departure, or rerouting decision; and this encapsulates the congestion-sensitive activation of the i-th module.

In contrast to traditional Jacksonian topologies, this formulation accommodates routing schemes that are non-Poissonian, temporally inhomogeneous, or even state-induced, thus generalizing ergodic theorems beyond product-form reversibility. Spectral analysis under this setting reveals that even marginal perturbations in coupling intensities can precipitate phase shifts in system throughput—a hallmark of criticality emerging from structured randomness.

Interacting Particle Systems: Stochastic Lattices as Algebraic Manifolds

In lattice-based spin models and interacting diffusions—particularly those arising in statistical mechanics or biological transport phenomena—the evolution law is often reducible, at the infinitesimal scale, to a local stochastic operator perturbed by the field induced by neighboring sites. These systems, reinterpreted as high-dimensional composite Markov processes, exhibit a symmetry between locality and invariance, wherein the global ergodic behavior is encoded in the algebraic interplay among local update maps.

A representative dynamics, such as Glauber-type flip evolution, admits a kernel:

$$P(\sigma,\sigma') = \sum_{i\in\Lambda} \alpha_i(\sigma)\cdot\mu_i\left(\sigma_i' \mid \sigma_{\Lambda\setminus\{i\}}\right)\cdot\prod_{j\neq i}\delta(\sigma_j - \sigma_j')$$

Here, the conditional measures μ_i are of Gibbsian form, and their nonlinearity (modulated by interaction strength Jij

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.431

engenders slow mixing and metastable traps.

What is particularly revealing is the emergence of **log-Sobolev-type stability conditions** which, when applied to these localized updates, yield global functional inequalities governing entropy dissipation. These results, reminiscent of Bakry-Émery curvature formulations in diffusion spaces, illustrate how combinatorial locality can simulate analytic rigidity.

Biochemical Kinetics: Multiscale Jump-Diffusion Landscapes

In the biophysical domain, particularly within intracellular signaling cascades and enzyme-regulated biochemical networks (Davis, 2018), stochasticity emerges not merely as noise but as a structural component of regulatory design. The behavior of such systems—entailing toggling, activation, and multi-site binding—may be encoded in composite jump processes whose transition landscape is shaped by highly nonlinear rate functions.

The evolution kernel for such a hybrid system may be compactly captured by:

$$P(x,x') = \sum_{i=1}^{n} \phi_i(x) \cdot K_i(x_i,x_i') \cdot \prod_{j\neq i} \delta(x_j - x_j')$$

Wherein the morphogenetic influence of $\varphi i \quad (x)$—itself susceptible to nonlinear hysteresis manifesting via sigmoidal phenomenology reminiscent of cooperative saturation (as in Hill-type modalities), or alternatively, via self-reflexive inhibitory motifs—intertwines nontrivially with the kinetic operator K_i , whose ontological ambiguity spans both discrete discontinuities and topologically diffuse gradients, contingent upon the granularity of the molecular substratum. Such an encoding is not merely a concession to computability, but rather, a dialectical reconciliation between representational parsimony and mechanistic fidelity; a cartographic reduction which, while abstracting the labyrinthine fine structure of the underlying stochastic process, nevertheless retains sufficient semiotic residue to allow for derivations of evolution equations in a coarse-grained macroscopic regime (Davis, 2018).

More curiously, the invocation of entropy-functional Lyapunov architectures—constructed not ad hoc, but with spectral tact and variational acuity—permits, under surprisingly nondogmatic smoothness conditions, the extraction of explicit temporal decay regimes. These regimes, in turn, unveil a deeper grammar of dynamical behavior: one in which stability becomes an emergent thermodynamic syntax, energy basins take on a quasi-topological character, and metastable excursions can be read as perturbative soliloquies of the potential landscape itself.

Conclusion and Outlook

It is, perhaps, no overstatement to suggest that in the study of stochastic systems with intricate compositional structure, the language of probability alone proves insufficient unless augmented by a metaphysics of interdependence. Composite Markov processes—manifesting neither as mere aggregates nor as reducible tensor products of primitive chains—emerge, rather, as choreographed orchestrations wherein local stochasticities refract through global constraints, producing behaviors irreducible to their components.

Throughout this work, we have endeavored not merely to analyze but to **interpret** such processes—treating them less as computational artifacts and more as epistemic instruments revealing the architecture of complex randomness. From the spectral silhouettes cast by transition operators, to the asymptotic dissolutions of entropy through log-Sobolev conduits, the narrative of convergence becomes less a theorem and more a phenomenology: a story of balance, of friction, of the slow collapse into statistical repose.

But if equilibrium is the telos of stochastic motion, then the paths traced in its pursuit—divergent, stochastic, and often unstable—remain the true objects of study. For in nonequilibrium regimes, it is precisely the **composite interleaving**—the selective update, the asynchronous perturbation, the partial coupling—that imbues such systems with resilience, with memory, with the spectral signature of complexity.

Looking forward, the mathematical terrain revealed here invites not simplification but **re-articulation**. To generalize the theory beyond finite spaces is to admit the wildness of infinite-dimensional processes: interacting diffusions on manifolds, piecewise-deterministic dynamics on stratified state spaces, or even probabilistic programs wherein the transition kernel is itself a learned object.

Moreover, as algorithmic implementations of Markovian processes become increasingly embedded within machine learning, computational biology, and quantum simulation, the **composite paradigm** is poised to offer both a language and a framework: a way of describing not just what systems do, but how their structure inscribes that doing.

Thus, in closing, we resist the temptation to frame these results as conclusive. For in every composite structure, there exists a latent entropy—one not of disorder, but of possibility—waiting to be modeled, perturbed, and understood. It is toward that open-ended entropy, ever receding, that this study gestures.

Acknowledgments

I could not have completed this work without the silent, steadfast support of my cat, Mimi. Though her contributions did not involve proofreading theorems, her peaceful purrs beside my desk anchored me through countless late nights. In her own quiet way, she was my most constant and

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 Doi:10.71113/JMSS.v2i4.431

calming colleague, a gentle reminder of the world beyond the equations, and for that, I am endlessly grateful.

Author Contributions

This work was carried out in collaboration among all authors. This project was conducted jointly by the authors. The authors reviewed and agreed to the final manuscript. All authors read and approved the final manuscript.

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References

Ethier, S. N., & Kurtz, T. G. (2009). Markov processes: Characterization and convergence. John Wiley & Sons. ISBN-13 978-0-471-76986-6

Hairer, M. (2010). Convergence of Markov processes (Lecture notes, 18(26), 11). https://www.hairer.org/notes/Convergence.pdf

Rosenblatt, M. (2012). Markov processes, structure and asymptotic behavior. Springer Science & Business Media. (Vol. 184). ISBN 0387054804, 9780387054803

Ibe, O. (2013). Markov processes for stochastic modeling. Newnes. ISBN 0124078397, 9780124078390

Freidlin, M. I. (1996). Markov processes and differential equations: Asymptotic problems. Springer Science & Business Media.ISBN 3764353929

Brand, M. (1997). Coupled hidden Markov models for modeling interacting processes (Technical Report 405). MIT Media Lab Perceptual Computing. DOI: 10.1109/CVPR.1997.609450

Yu, J. S., & Lin, Y. K. (2004). Numerical path integration of a non-homogeneous Markov process. *International Journal of Non-Linear Mechanics, 39*(9), 1493 − 1500. https://doi.org/10.1016/j.ijnonlinmec.2004.02.011

Kulik, A. (2017). Ergodic behavior of Markov processes: With applications to limit theorems (Vol. 67). Walter de Gruyter GmbH & Co KG. ISBN-10 3110458705, ISBN-13 978-3110458701

Jerrum, M., & Sinclair, A. (1996). The Markov chain Monte Carlo method: An approach to approximate counting and integration. In D. S. Hochbaum (Ed.), Approximation algorithms for NP-hard problems (pp. 482 − 520). PWS Publishing. https://www2.stat.duke.edu/~scs/Courses/Stat376/Papers/ConvergeRates/JerrumSinclair.1996.pdf

Davis, M. H. (2018). Markov models & optimization. Routledge. eBook ISBN 9780203748039.

ATRI PRESS

Journal of Modern Social Sciences

Volume 2 Issue 4 , 2025

ISSN: 3078-4433 | eISSN: 3078-4441

Beyond the State: Social Identity Theory and the Psychological Pathway of Foreign Policy Decision-Makers

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Abstract

Since the introduction of psychology into the study of international relations, Social Identity Theory has been increasingly associated with it. Social Identity Theory posits that an individual strives to elevate the social status in order to achieve higher self-esteem. This theory has been adopted in the study of international relations to examine the processes by which states construct the social identities of supranational communities or the strategies they employ to ameliorate their status in the international society. However, these studies frequently neglect to consider the psychological processes experienced by foreign policy decision makers. The social identity of a foreign policy decision maker is not a given characteristic, and disregarding the analysis of the psychological processes of a foreign policy decision maker is a simplification of the theory. A more appropriate research path would be to analyze the psychological activities of decision makers in order to deduce the strategic choices of the state. It encompasses the identification of the decision maker's psychologically real social identity, the analysis of the social comparison process, and the analysis of how the decision maker chooses the strategy to change the social status. In comparison to the traditional international relations theories, Social Identity Theory places more emphasis on the individual-level analysis, transcends state-centrism, and exhibits greater explanatory power. Social Identity Theory offers a framework for the study of psychological processes among foreign policy decision makers and provides insights for future research on international relations.

Keywords

International Relations; Social Identity Theory; Decision-maker

Suggested citation: Liu, Y. (2025). Beyond the State: Social Identity Theory and the Psychological Pathway of Foreign Policy Decision-Makers. *Journal of Modern Social Sciences*, 2(4), 300–308. https://doi.org/10.71113/JMSS.v2i4.426

Introduction

During the Cold War, the field of psychology began to be applied to the study of international relations. Robert Jervis (1976) famously argued that one cannot explain major events and decisions without examining how decision-makers perceive the world. His integration of psychological perspectives has been instrumental in reorienting the role of human factors in state behavior. This reorientation has been pivotal in compensating for the explanatory limitations of neorealism, a theoretical framework that often overlooks individual-level variables due to its emphasis on structural factors. Recently, Social Identity Theory (SIT), a branch of social psychology, has been employed in empirical studies to investigate the formation of supranational communities and the strategic choices made by states in their development. However, extant literature rarely explores the theoretical application of SIT within the field of international relations.

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 doi:10.71113/JMSS.v2i4.426

Social Identity Theory posits that intergroup behavior is driven by individuals' desire for a positive social identity derived from their membership in an in-group, which is often perceived as superior to relevant out-groups. Although SIT is fundamentally a theory about group dynamics, one Chinese scholar aptly observed that a collective has no brain (Tang, 2018). Since perceptions of social identity reside solely in the minds of individuals, the application of SIT in international relations must consider how decision-makers themselves perceive social identity. However, current studies often rely on the humanization of states or make only cursory references to leaders' views, without systematically analyzing the psychological processes of decision-makers. For instance, one study has used the "Big Five" personality model to discuss the effect of it on foreign policy decision-making under within a qualitative research framework (Gravelle, Reifler and Scotto, 2020). The use of qualitative method indeed offers more cases for explanation, but it falls short in thoroughly understanding the psychological process behind the decision. This article proposes an alternative analytical pathway for the application of SIT in international relations. This pathway is centered on the perceptions of decision-makers and offers a new perspective for the use of SIT in future studies.

Social Identity Theory and Its Applicability to the Study of International Relations

Social Identity Theory originates from the European school of social psychology, which tends to emphasize intergroup relations and collective action. Few scholars have systematically examined how or why this theory can be applied to the field of international relations. SIT emerged as a critique of Realistic Conflict Theory, which posits that when two groups have conflicting interests or goals, they will engage in interaction and competition until one group attains the contested resource or objective (Jackson, 1993). This theory parallels rationalist approaches in international relations, which assume that states make decisions by calculating costs and benefits in pursuit of their interests. While Realistic Conflict Theory is simple and intuitively compelling, it fails to account for the development and maintenance of group identity and the role such identity plays in conflict dynamics (Tajfel and Turner, 1986). In other words, Realistic Conflict Theory is materially reductionist, focusing exclusively on material interests as the drivers of behavior while overlooking the influence of ideas and identities.

Through his minimal group paradigm experiments, Henri Tajfel (1970) observed a strikingly consistent pattern of discrimination against outgroup members. He argued that such behavior was neither motivated by individual self-interest nor by preexisting hostility toward the outgroup, but rather driven by certain group norms that directly shape intergroup behavior. The results showed that participants tended to maximize the difference between their own ingroup and the outgroup, even when doing so meant sacrificing the ingroup's absolute gains. The minimal group paradigm thus demonstrates that once individuals identify with a group, they are inclined to favor their ingroup and discriminate against the outgroup in order to amplify intergroup differences. This suggests that intergroup conflict does not necessarily require competition over material interests, as mere group categorization can suffice to generate bias and antagonism.

Building on the findings of the minimal group paradigm, scholars began to develop a theory of intergroup behavior grounded in social identity. Social Identity Theory believes that social behavior exists along a continuum, with interpersonal behavior at one end and intergroup behavior at the other. In the context of intergroup interaction, individual behavior is understood to be driven not by personal characteristics or personality traits, but by the social identity derived from group membership. In other words, an individual's identification with the group, rather than individual-level factors, determines behavior in intergroup settings.

Social Identity Theory centers on intergroup behavior. Since states function as groups that frequently interact, this theory provides a useful lens to analyze interstate relations. In this framework, interactions between states are understood as intergroup interactions, where the motivations behind decision-makers' choices are rooted in the social identities associated with their respective groups. As a foundational concept of Social Identity Theory, social identity involves three critical aspects that require further elaboration.

First, what is social identity? Social identity refers to an individual's awareness of their membership in a particular group, accompanied by the emotional and value-based significance that comes with belonging to that group (Abrams 2001). As a collective entity, the state inherently provides its members with a form of social identity. This national identity is communicated and internalized among group members through processes of socialization and interaction. In intergroup interactions, individuals engage in social categorization, which involves the classification of people into meaningful groups based on criteria relevant to the individual. This psychological process assists individuals to organize and simplify their social environment by categorizing themselves and others within the social network (Tajfel, 1974). Social categorization mitigates uncertainty by assigning social identities to both the self and others, allowing interactions to proceed according to expected patterns without the need for constant re-evaluation (Hogg et al., 2004).

Second, how does social identity drive intergroup behavior? Human beings have an inherent drive to elevate their self-esteem. This need suggests that when intergroup comparisons can be made along a dimension with clearly polarized value differences, individuals' desire for positive

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 doi:10.71113/JMSS.v2i4.426

value identification requires their own group to distinguish itself toward the positive pole relative to other groups (Turner 1975). This process of differentiation is known as social comparison. Social comparison produces status, which is the outcome of comparing groups and reflects the relative position of a group (Tajfel and Turner, 1986). Status can vary in hierarchy, and socially accepted high status indicates that a group is recognized as superior to others along certain value dimensions. Social Identity Theory implies that policymakers in country A may consider whether their decisions can enhance the positive value of the social identity associated with members of country A compared to that of country B. In this manner, the social identity linked to country A can cater to its members' need for self-esteem. As Peter Gries (2005) noted, it is the actions of individual Chinese and Americans that will determine whether our need for a positive view of our nation leads to the disputes between the U.S. and China.

Finally, how do individuals enhance the positive value of their social identity? Strategies for managing the value associated with social identity exist along a continuum, with social mobility at one end and social change at the other. If individuals lean toward social mobility, they believe that changing their social identity is possible by joining another group. Conversely, if they lean toward social change, they believe that improving their social identity requires transforming their current group (Tajfel and Turner, 1986). Three strategies emerge from this framework to enhance the positivity of one's social identity. The first is individual mobility, in which individuals seek a more positive social identity by joining a new group. The second strategy is social competition, in which groups strive to achieve a more positive social identity by outperforming a group that currently holds a superior position along an existing value dimension. The third strategy is social creativity, in which groups redefine existing value dimensions or create new ones to attain a more positive social identity.

When selecting a strategy, individuals in subordinate positions first assess the permeability of group boundaries (Reicher, 2004). If they perceive high permeability, which means moving between groups is relatively possible, they tend to adopt social mobility strategies by attempting to join a more positively valued group. If permeability is perceived as low, individuals evaluate the legitimacy of current status differences and consider whether they can change the value associated with their social identity. If individuals judge that the status differences resulting from value disparities are illegitimate, but that the value dimension of their social identity is changeable, they are likely to engage in collective action aimed at enhancing the value of their group's social identity (Turner and Brown, 1978). Group-level strategies typically fall into two categories: social competition and social creativity. Groups choose between these strategies based on their capacities. However, their success in altering the value associated with their social identity ultimately depends on the outgroup ' s acceptance of the new value comparisons or dimensions (Reicher, 2004). For instance, overcoming racial discrimination requires overturning the existing race-based value dimension and gaining societal acceptance of the new value framework.

Social Identity Theory outlines the causes and processes underlying intergroup interactions. After social categorization, individuals acquire a social identity. Driven by the need to enhance self-esteem, they then seek to establish a positive social identity for their group. This leads to three strategies: individual mobility, social competition, and social creativity. Since states are also groups, interactions between states can be conceptualized as intergroup interactions. Decision-makers possess the social identity of being members of their state; therefore, Social Identity Theory offers a novel perspective for interpreting state behavior by focusing on decision-makers' desire for a positive valuation of their social identity.

The Application of Social Identity Theory in International Relations

There are two directions in which Social Identity Theory has been applied to the analysis of state behavior. The first focuses on how the concept of social identity helps explain the construction of supranational identities. Scholars have noted that SIT offers useful insights into the dynamics of regional integration in Central Asia. This integration process can be divided into three stages: social categorization, social comparison, and social identification. After gaining independence, Central Asian states sought to establish a "Central Asian identity" through social categorization, primarily by creating cooperation mechanisms across various policy domains. However, the integration process has stalled at the stage of social comparison, where states are still attempting to define themselves in contrast to out-groups. This stage is constrained by the difficulty these countries face in aligning their foreign policy goals (Yang and Wang, 2018). Similarly, one researcher has applied SIT to the study of European integration. The theory's emphasis on in-group homogeneity sheds light on the strategies European states have implemented to strengthen unity. These strategies include constructing a shared EU identity, emphasizing key political values, promoting common institutions and norms, and establishing mechanisms for joint action. These efforts all contribute to building a collective social identity based on the European Union (Li, 2009).

On the other hand, the three strategies for managing the value of social identity proposed by Social Identity Theory have been adapted into the strategic choices of states. The strategy of individual mobility has been transformed into social mobility, referring to the attempt by states to emulate the behavior of higher-status states in order to be accepted as members of their group (Larson, 2017). In international society, the G7 or the European Union can be referred to as an "elite club". Joining these clubs can confer positive value upon a state's social identity. Therefore, many states seek to

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 doi:10.71113/JMSS.v2i4.426

join such groups by imitating the behavior of their members (Larson, 2017). Social competition is defined as the effort to surpass higher-status states along specific dimensions of comparison, such as territorial control or military capabilities (Larson, 2017). For instance, during the Cold War, the number of nuclear weapons became a key metric of state status. The Soviet Union's development of nuclear weapons was a direct application of the social competition strategy, because such an action was to surpass the United States in nuclear arsenal size to avoid being placed at a disadvantage. Social creativity refers to a state's effort to construct new international institutions and norms or to redefine existing dimensions of value, thereby enhancing the perceived value of its social identity (Larson, 2017). For example, the leadership of middle powers such as Canada actively promoted the signing of the Ottawa Treaty banning landmines in the 1990s. This can be seen as an attempt to elevate national social identity through the advocacy of a new international norm.

Empirical research on China's development has been the focal point for both domestic and international scholars, with particular attention given to the strategies China has adopted in its pursuit of development. Deborah Larson and Alexei Shevchenko (2019) argued that China adopted a strategy of social creativity in the 1980s. This approach emphasized cooperation over confrontation, advocated for cooperation, and reaffirmed the Five Principles of Peaceful Coexistence. The development of the Soviet Union or Russia constitutes another major theme in empirical research. During the Gorbachev era, the Soviet Union adopted a strategy of social creativity by emphasizing human rights and seeking to redefine its identity as a "moral leader," thereby avoiding direct military competition with the United States (Larson and Shevchenko, 2003). After the dissolution of the Soviet Union, Russia continued to aspire to maintain its status as a major power. The Russian government initially adopted a strategy of social mobility, seeking to gain recognition as a great power by joining institutions dominated by leading states, such as the G7, the General Agreement on Tariffs and Trade, and the International Monetary Fund. Membership in these organizations was seen as a form of acknowledgment of Russia's status by the international community (Larson and Shevchenko, 2019). After the failure of the social mobility strategy, Russia began to shift toward a strategy of social competition during the Kosovo War. The use of force was a strategic move aimed at demonstrating strength and power to the United States However, this approach yielded limited results (Larson and Shevchenko, 2010). Entering the 21st century, Russia's military operations in Georgia and Ukraine further demonstrated that the West's refusal to acknowledge Russia's great power status compelled Moscow to increasingly rely on a strategy of social competition to assert its position as a major power (Larson and Shevchenko, 2019).

Some researchers argued that Social Identity Theory is limited in its ability to predict how states will act (Wohlforth, 2009). However, this limitation is not unique to Social Identity Theory, as few international relations theories possess fully accurate predictive capabilities. The function of theory extends beyond prediction to include explanation. Social Identity Theory provides a valuable new perspective for interpreting state behavior and therefore should not be dismissed in the discipline. Moreover, the difficulty in prediction stems from the application of Social Identity Theory to international relations without sufficient attention to the psychological processes of decision-makers. On the one hand, some international relations studies employing Social Identity Theory tend to humanize the state. This approach conceptualizes the state as an entity capable of thought, with needs that include the establishment and pursuit of a positive self-identity and the attainment of recognition (Chen, 2013). However, as a group entity, a state cannot actually possess such cognition. As Richard Lebow (2010) stated that institutions and states have neither minds nor emotions, and it is the individuals who act as wholes or identify with these wholes who possess minds and emotions. The result of humanizing the state is an overemphasis on the cognition of the state itself while neglecting the cognition of individuals. However, as a collective entity, the state does not possess cognitive capacities. Central Asian countries or European Union member states cannot possess a collective identity such as being "Central Asian" or "European Union members" in a cognitive sense; such identities exist only in the minds of individual actors. Therefore, analyses should refocus on the decision-makers as thinking individuals.

On the other hand, some studies, while focusing on decision-makers, treat their social identity as a given during the decision-making process. For example, Deborah Larson and Alexei Shevchenko argued in their study of the Soviet Union under Gorbachev that the theory is applicable to the analysis of state behavior because foreign policy decision-makers define themselves as representatives of the state and act based on the state's interests relative to other states (Larson and Shevchenko, 2003). This description regarding how decision-makers perceive their social identity is simplistic, presuming, ipso facto, that decision-makers consider themselves members of the state when making decisions. However, the problem lies in the inability to ensure that the identities of decision-makers are congruent with their state memberships at the moment of decision-making.

The application of Social Identity Theory in international relations has insufficiently emphasized decision-makers' perceptions of their own social identities and the related psychological processes. This oversight leads to theoretical problems in practice. Beyond the framework of Social Identity Theory, behaviors such as forming supranational communities, imitation, competition, and the creation of new norms are widespread in international relations. Ignoring the psychological processes of decision-makers and directly interpreting state behavior risks explaining causes by means of effects, rather than deducing state strategies from the

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 doi:10.71113/JMSS.v2i4.426

cognitive processes of decision-makers. This non-deductive approach hinders the ability to predict future state behavior.

Psychological Analysis of Decision-Makers in Social Identity Theory

Emphasizing the analysis of decision-makers' psychological processes is important because any individual can hold multiple social identities. For example, a U.S. decision-maker may simultaneously identify as an American as well as a member of the Democratic or Republican Party. However, in any given context, only one social identity is psychologically real, meaning it is the one that is salient and actively influences behavior (Hogg et al., 2004). This implies that when decision-makers formulate foreign policy, they are acting from the perspective of the state group only if they prioritize the social identity of being a state member, which means that this identity is psychologically real. Nevertheless, decision-makers may also adopt other social identities during the decision-making process, such as affiliation with a political party or another group. Thus, their social identity is not a fixed parameter. For example, in 1954, the Prime Minister of France René Mayer stated that his support for the European Defence Community was contingent upon the backing of his chosen negotiators by the French Popular Republican Movement (Milner, 1997). It is difficult to assert that this French politician's psychologically real identity during decision-making was solely "French" without any influence from party affiliation. Assuming that decision-makers always hold the state membership identity in a psychologically real way during the decision-making process is an imprecise approach that risks misjudging their social identity.

This paper will propose a pathway for analyzing the psychological processes of decision-makers. First, it is necessary to identify the individual's psychologically real social identity, which can be achieved through the process of self-categorization. The process of self-categorization is contingent upon accessibility, which is defined as the degree to which a pre-existing social identity is relevant, useful, and recognized in the prevailing context (Turner, Hogg, Oakes, et al., 1987). When making decisions related to national interests, decision-makers may categorize themselves as members of the state because the state membership identity already exists and is relevant, useful, and recognized within the decision-making context. However, other accessible and relevant identities, such as political party affiliation, may also be present during the decision-making process. The formulation of U.S. foreign policy is often characterized by partisan struggles, with party interests taking precedence over national interests.

Therefore, it is also necessary to consider the concept of fit. The concept of "fit" encompasses two distinct aspects. Comparative fit is defined as the degree to which discrepancies within a given group are less pronounced than those that exist between groups (Turner et al., 1987). The state membership identity satisfies comparative fit, as the differences among Chinese individuals are generally smaller than those between Chinese and Americans. However, an alternative argument posits that the disparities among U.S. Republicans are less pronounced compared to those observed between U.S. Republicans and Chinese individuals. This observation redirects the emphasis towards the concept of normative fit. Normative fit is defined as the alignment of an individual's behavior with the typical behaviors associated with the social identity they are about to adopt. These typical behaviors are the product of normative beliefs (Turner, Hogg, Oakes, et al., 1987). In different social contexts, social norms require individuals to exhibit corresponding behaviors. If a decision-maker's behavior aligns with the expectations embedded in normative beliefs, then their behavior satisfies normative fit. This indicates that the decision-maker is acting in accordance with the demands of a specific social identity. By jointly considering accessibility, comparative fit, and normative fit, the decision-maker's psychologically real social identity can be identified.

A notable question is how to measure a decision-maker's accessibility, comparative fit, and normative fit. In reality, the researchers are incapable of travelling back to the past to conduct an interview with the decision-maker to ask about his or her psychological process. Thus, the researchers should rely on the primary sources that can provide hints for the analysis. One useful source is the diary, as it may record writer's thoughts and actions concerning specific decisions. Another important source is the historical documents, such as the meeting minutes and memorandum. These documents may record the behavior of the decision-maker, so that the researchers can, to some extent, infer his or her psychological process. The book *Groupthink* by the American psychologist Irving Janis (1982) offers an example of how to analyze the psychological process of the decision-makers when making foreign affairs decisions by using a large number of historical documents.

Second, it is necessary to analyze the decision-maker's social comparison process. The individual's need for self-esteem motivates the pursuit of positive value for their social identity. Some scholars applying Social Identity Theory have argued that states prefer to enhance the status associated with their social identity (Lee, 2016). The state's status claims are, in essence, a product of humanizing the state, as the state is treated as an individual seeking a positive social identity. It is assumed that the state engages in social comparison with other states, resulting in status differentials. However, within Social Identity Theory, status is the outcome of individuals comparing their social identities. In the field of international relations, status refers to the hierarchical ranking that individuals assign after comparing the social identity associated with being a member of their own state to that of another state. Groups themselves do not possess the consciousness to engage in

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 doi:10.71113/JMSS.v2i4.426

social comparison, so Social Identity Theory should return to the emphasis on decision-makers' own status aspirations. In practice, decision-makers ascribe considerable importance to the status derived from their national identity. For example, U.S. President Donald Trump frequently invoked the slogan "Make America Great Again," reflecting his emphasis on the status of his identity as an American.

Finally, the analysis turns to how decision-makers choose among the three strategies of social mobility, social competition, and social creativity. Decision-makers first consider permeability to calculate whether the value of their social identity can be enhanced by emulating the behaviors of the "elite clubs." If social mobility is unattainable and the state is excluded from these elite groups, decision-makers then assess their country's material capabilities to decide between employing social competition or social creativity. Social competition typically manifests in territorial disputes and arms races, thus requiring the state to possess substantial hard power. For states lacking such hard power, decision-makers are more likely to pursue strategies of social creativity. Lithuanian President Dalia Grybauskaitė actively engaged in the Ukraine issue through diplomatic channels, framing Russia as a "threat" towards the European Union and positioning Lithuania as a defender of EU values. Through this strategy of social creativity, she secured recognition from other Western countries (Park and Jakstaite-Confortola, 2021). It is important to acknowledge that in actuality, states possess a broad array of available courses of action, enabling decision-makers to implement multiple strategies at the same time. Decision-makers may enhance the value of their state's social identity through various means, such as economic development, strengthening military capabilities, and advancing scientific research. Therefore, decision-makers can adopt different strategies across different value dimensions.

The Advantages of Social Identity Theory in International Relations Research

Approaching from the perspective of analyzing individual psychological processes, Social Identity Theory offers new insights to the study of international relations and addresses gaps in existing theories. First, when discussing the formation of communities, constructivism and Social Identity Theory both emphasize the role of identity, but their focuses are different. Constructivism highlights the interaction between states as selves and others, as well as the influence of social structures on identity formation. However, it tends to overlook the role of individuals within states in the process of identity construction. Constructivism humanizes the state, treating it as an individual, yet the actual individuals who constitute the state are often left unconsidered. For example, in studies of European Union identity formation, constructivism recognizes the need for the EU to distinguish between self and other and to foster a sense of shared destiny among member states (Li, 2003), but these analyses are conducted primarily at the state level. Whether in the case of European integration or the integration processes in Central and even East Asia, the role of individuals within states is indispensable. As previously mentioned, the European Union has constructed a shared identity by establishing commonalities, which represents one facet of identity formation.

However, from another perspective, individuals must differentiate between ingroups and outgroups to form a cohesive group. From the standpoint of Social Identity Theory, integration also requires minimizing the ratio of differences within the ingroup relative to those between groups. The theory's emphasis on the individual level indicates that, beyond fostering a sense of similarity among individuals participating in integration, it is equally important to cultivate their perception of distinction from relevant outgroups. The success of European integration depends on Europeans perceiving themselves as distinct from Americans, Australians, and Indians. Furthermore, Social Identity Theory posits that individuals aspire to possess a social identity with positive value. Therefore, the formation of a community requires that the community offers attributes that attract individuals by conferring positive value. If a community lacks elements that its members can take pride in, its members are likely to leave in search of more positively valued social identities. The appeal of the European Union can be attributed to the economic, political, and institutional values embedded in the EU identity. These positive values motivate individuals within the EU to identify as members, providing the foundation for community formation. This is a consideration that constructivism tends to overlook at the individual level.

Secondly, realism often plays a significant role when discussing the development of great powers. Realism accentuates the importance of power and relative gains, so the states aspiring to become great powers must surpass their rivals in material capabilities. Regarding specific measures, Robert Gilpin (1981) pointed out that states often resort to hegemonic wars to alter the international political order and secure a dominant position in the distribution of power. However, historical evidence demonstrates that the emergence of rising powers does not inevitably lead to conflict with established powers (Allison, 2017). Some realist perspectives carry a deterministic tone, whereas Social Identity Theory, by analyzing the psychology of decision-makers, offers multiple possibilities for state behavior. Social Identity Theory shares commonalities with realism. Both emphasize relative rather than absolute gains in intergroup relations and incorporate a mechanism whereby one side always seeks to be stronger than the other. Yet decision-makers within Social Identity Theory do not regard violence as the sole means to achieve these goals. Despite the fact that the social competition strategy in Social Identity Theory involves elements of conflict, it does not necessarily imply military confrontation. Social competition typically refers to rivalry in territorial and military dimensions, but such competition is not equivalent to

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 doi:10.71113/JMSS.v2i4.426

military conflict. Decision-makers may simply develop military capabilities as a signaling tool rather than as an instrument of aggression. Moreover, decision-makers have the option to select social mobility or social creativity strategies, both of which are inherently non-conflictual. Compared with realism, Social Identity Theory's focus on the psychological processes of decision-makers provides greater variability in the strategic choices available to states.

Finally, Social Identity Theory possesses a broader explanatory power. Traditional international relations theories primarily focus on the power games among major powers and tend to neglect small-sized or peripheral states. However, despite the challenges these states may encounter in navigating the power dynamics dominated by major powers, they continue to play a significant role in international relations. Furthermore, the decision-makers of these states are also motivated to enhance the value of their respective social identities. Within Social Identity Theory, all states can be central subjects of study, and disparities in material capabilities between states do not diminish their decision-makers' pursuit of positive value. For instance, some scholars use Norway as a case to demonstrate how small and medium-sized states employ social creativity strategies by engaging in peacekeeping and other peace-promoting actions to seek positive value in the moral dimension, thereby establishing themselves as "good states" (Wohlforth, de Carvalho, Leira, et al., 2017). The feasibility of studying every state enriches our understanding of international politics. Social Identity Theory can also be applied to explain why states join international mechanisms or organizations. For instance, the signing of an international treaty might not, from a realist perspective, be expected to bring tangible power or security benefits to states. Yet why do decision-makers choose to ratify such treaties? Social Identity Theory offers an explanation by highlighting how these treaties enable states to cultivate positive value in the moral dimension of their social identity. The theory can also extend to non-state actors as well. For example, members of extremist groups may describe their actions as "sacred," which fundamentally reflects an effort to imbue their social identity with a form of positive meaning.

Conclusion

To move beyond the entrenched debate between paradigms in international relations, some scholars have argued that the field should shift away from knowledge production centered on divisions and oppositions between paradigms. One promising approach is to incorporate concepts and frameworks from other disciplines in order to revitalize and enrich the study of international relations (Liu, 2019). Social Identity Theory, originating from social psychology to explain intergroup behavior, offers a valuable framework for understanding the actions of states as groups. This interdisciplinary application provides academia with fresh perspectives. Social identity refers to an individual's awareness of their membership in a group along with a desire for a positive social identity. The primary strategies individuals use to enhance the value of their social identity include social mobility, social competition, and social creativity. In international relations, since the state functions as a group, decision-makers as members of the state also seek to promote the positive value of the social identity associated with their nation. Current applications of Social Identity Theory in international relations often overlook the psychological processes at the decision-maker level. However, analyzing the psychological engagement of decision-makers with their social identities and deriving state behavior from this analysis better reflects the theoretical significance of Social Identity Theory.

Overall, Social Identity Theory represents a progressive framework. It provides a framework for understanding the formation of communities, enhances our comprehension of state behavior, and facilitates the interpretation of actions by a broader range of actors. However, no international relations theory can offer a universal explanation of state behaviour, and Social Identity Theory is no exception. In the context of interstate interactions, Social Identity Theory tends to focus on dyads. For example, research on China often examines the China–United States dyad, while research on Russia centers on the Russia–United States dyad. Yet international relations are not always structured around binary relationships. The real-world scenario is much more complicated than simply the dyad between two states, so analyzing the dyad alone is insufficient to demonstrate the explanatory power of the theory. In the context of a trilateral relationship, Social Identity Theory can be used to interpret how the Philippines interacts with China and the United States. The Philippines is a member state of the ASEAN and an ally of the United States. The leader of the Philippines can have various social identities, including being a member of the ASEAN or a friend to the United States. The leader may consider himself or herself as a close friend to Washington and prioritize alignment with Washington over maintaining neutrality between Washington and Beijing, as they believe that this can elevate the social status. Alternatively, the leader may emphasize the ASEAN identity because of the values embedded in this regional organization, like the pursuit of regional peace and stability. In this case, the leader would tread a fine line between Washington and Beijing in order to remain consistent with ASEAN's preference for not picking a side between the great powers. This scenario can illustrate how Social Identity Theory can be effectively applied in multilateral contexts as well.

Funding: Not applicable.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: There is no new data associated with this article.

Conflicts of Interest: The authors declare no conflicts of interest.

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 doi:10.71113/JMSS.v2i4.426

References

Abrams D. (2001). Social identity, psychology of. In Neil J. Smelser and Paul B. Baltes, eds., International Encyclopedia of the Social & Behavioral Sciences, 14306-14309.

Allison, G. (2017). Destined for War: Can America and China Escape Thucydides's Trap?, Boston: Houghton Mifflin Harcourt.

Chen, Z. (2013). Status seeking and norm building: Emerging powers' incentive to the building of international human rights norms. World Economies and Politics, 2013(5), 114-135.

Gilpin, R. (1981). War and Change in World Politics, Cambridge: Cambridge University Press.

Gravelle, T. B., Reifler J., Scotto T. J. (2020). Personality traits and foreign policy attitudes: A cross-national exploratory study. Personality and Individual Differences, 153:109607. doi: 10.1016/j.paid.2019.109607

Gries, P. (2005). Social psychology and the identity-conflict debate: Is China threat inevitable. European Journal of International Relations, 11(2), 235-265. doi: 10.1177/1354066105052966

Hogg, M. A., et al. (2004). The social identity perspective: Intergroup relations, self-conception, and small groups. Small Group Research, 35(3), 246-276. doi: 10.1177/1046496404263424

Jackson, J.W. (1993). Realistic Group Conflict Theory: A review and evaluation of the theoretical and empirical literature. The Psychological Record, 43(3), 395-414.

Janis, I. L. (1982) Groupthink: Psychological Studies of Policy Decisions and Fiascoes, Boston: Houghton Mifflin Company.

Jervis, R. (1976). Perception and Misperception in International Politics. Princeton: Princeton University Press.

Larson D. W., Shevchenko A. (2003). The new thinking and the revolution in Soviet foreign policy. International Organization, 57(1), 77-109. doi: 10.1017/S0020818303571028

Larson D. W., Shevchenko A. (2010). Status seekers: Chinese and Russian responses to U.S. primacy. International Security, 34(4), 63-95. doi: 10.1162/isec.2010.34.4.63

Larson, D. W. (2017). Social identity theory: Status and identity in international relations. In Oxford research encyclopedia of politics. doi:10.1093/acrefore/9780190228637.013.290

Larson D. W., Shevchenko A. (2019). Quest for Status: Chinese and Russian Foreign Policy, New Haven: Yale University Press.

Lebow, R. N. (2010). Why Nations Fight: Past and Future Motives for War, Cambridge: Cambridge University Press.

Lee, J. J. (2016). Will China's rise be peaceful? A social psychological perspective. Asian Security, 12(1), 29-52. doi: 10.1080/14799855.2016.1140644

Li, M. (2003). The European integration theory of constructivism. Chinese Journal of European Studies, 2003(3), 48-58.

Li, M. (2009). Formation of collective identity in international relations: A European social psychological perspective. World Economics and Politics, 2009(5), 66-73.

Liu, F. (2019). Paradigm synthesis and the reconstruction of international relations theory - an analysis of the realist example. Social Sciences in China, 2019(8), 187-203.

Milner, H. V. (1997) Interests, Institutions, and Information: Domestic Politics and International Relations, Princeton: Princeton University Press.

Park, A., Jakstaite-Confortola, G. (2021). Small state status-seeking: Lithuania's foreign policy status aspirations. Europe-Asia Studies, 73(7), 1279-1302. doi: 10.1080/09668136.2021.1919291

Reicher, S. (2004). The context of social identity: Domination, resistance, and change. Political Psychology, 25(6), 921-945. doi: 10.1111/j.1467-9221.2004.00403.x

Tajfel, H. (1970). Experiments in intergroup discrimination. Scientific American, 223(5), 96-103. doi: 10.1038/scientificamerican1170-96

Tajfel, H. (1974). Social identity and intergroup behaviour. Social Science Information, 13(2), 65-93. doi: 10.1177/053901847401300204

Tajfel H., Turner J. C. (1986) The social identity of untergroup behavior. In Stephen Worchel and William G. Austin, eds., Psychology of Intergroup Relations, Chicago: Nelson-Hall, 7-24.

ISSN (P): 3078-4433 | ISSN (O): 3078-4441 doi:10.71113/JMSS.v2i4.426

Tang, S. (2018). Idea, Action, and Outcome: The Objects and the Tasks of Social Sciences. World Economics and Politics, 2018(5), 33-59.

Turner J. C. (1975). Social comparison and social identity: Some prospects for intergroup. European Journal of Social Psychology, 5(1), 5-34. doi: 10.1002/ejsp.2420050102

Turner, J. C., & Brown, R. (1978). Social status, cognitive alternatives and intergroup relations. Differentiation between social groups: Studies in the social psychology of intergroup relations, 201-234.

Turner, J. C., Hogg, M. A., Oakes P., et al. (1987). Rediscovering the Social Group: A Self-Categorization Theory, Oxford: Basil Blackwell.

Wohlforth W. C. (2009). Unipolarity, status competition, and great power war. World Politics, 61(1), 28-57. doi: 10.1017/s0043887109000021

Wohlforth W. C., de Carvalho, B., Leira, H., et al. (2018). Moral authority and status in international relations: Good states and the social dimension of status seeking. Review of International Studies, 44(3), 526-546. doi: 10.1017/s0260210517000560

Yang, S., Wang S. (2018). Regional Integration in Central Asia from the Perspective of Social Identity Theory. Russian Studies, 2018(3), 45-75.

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現代社會科學雜志

半年刊

2024 年創刊

第 2 卷第 4 期（總 6 期）

2025 年 12 月

Journal of Modern Social Sciences

Semiannual

Started in 2024

Vol. 2, No. 4 (Sum No. 6)

December 2025

Submission	https://atripress.org/index.php/Jmss
Email	jmss@atripress.org
Website	https://atripress.org

Asia Technology Research Institute

December 2025