

CONTENTS

The Effects of Corruption in the Church and Its Consequences: Case of Yaounde I Municipality in the Center Region of Cameroon	1-8
Nchise Delphine Nchang, Shu Gerald Shu, Giyoh Gideon Nginyu	
An Appraisal of the Measures Adopted Within the Context of Sustainable Development to Combat Climate Change	9-19
Simon Ekumene Mbanda, Elizabeth Nkongho, Benvolio Lekunze	
Sorting and Research of Dunhuang Manuscript Literature	20-24
Xiaohan Shi	
Plastic Pollution: A Potential Threat on Health and Environment	25-30
Haradhan Kumar Mohajan	
A Study on the Visual Presentation of Smells Based on the Proust Effect	31-36
Jing Liu	
How the <i>Healthy China 2030</i> Policy Promotes the Construction of a Rural Telemedicine Chronic Disease Management Service System	37-45
Yufeng Wang, Qi Liu, Rui Zhang	
From Neurocolonization to Cognitive Emancipation: The Critical Turn of Neurocapitalism	46-57
Zisi Yang, Ying Yang	
The Loss Aversion Effect in Blind Box Purchases: Why Are Consumers More Willing to Make Additional Purchases?	58-66
Xiaoyu Feng	

CONTENTS

**The Self-Destructive Hero Myth: Death Narrative and the Structure of
Reincarnation in *The Pig, the Snake and the Pigeon*** 67-71

Qiuyi Li, Xueqing Liang

**A Study on the Tragic Consciousness of Han Yan's Directed Works: A Case Study
of *A Little Red Flower*** 72-76

Xiaohui Wang

The Effects of Corruption in the Church and Its Consequences: Case of Yaounde I Municipality in the Center Region of Cameroon

Nchise Delphine Nchang¹, Shu Gerald Shu² & Giyoh Gideon Nginyu¹

¹ Yaounde International Business School, Cameroon

² Community Apostolic Ministry Int'l, Cameroon

Correspondence: Giyoh Gideon Nginyu, Yaounde International Business School, Cameroon.

doi:10.56397/SSSH.2025.03.01

Abstract

Corruption is a phenomenon with serious consequences that affects all communities in the world. In Cameroon, its effects are widespread in all sectors. In both 1998 and 1999, Transparency International identified Cameroon as the globe's leading corrupt nation. Corruption has cut across every sector of the country, and that is why this study was therefore carried out to determine the effects of corruption in the church. Survey data for this study were quantitatively analyzed by use of Semi-structured questionnaires, to test the statistical relationships using descriptive statistical methods and regression methods with the Structural Equation Model [CB-SEM], and with the aid of SPSS and AMOS 24 statistical packages. The study examined the causes of corruption in the church, the consequences of corruption on church growth, and the extent to which corruption can be curbed in the church. The respondents concurred that corruption was a serious issue and that its existence resulted from a lack of accountability, transparency, and awareness of its repercussions.

Keywords: corruption, church, consequences

1. Introduction

1.1 Background of the Study

Greed is the root cause of corruption, which is an act that departs from the formal codes of conduct that regulate the behavior of public officials due to personal goals like wealth power, or status (Ackerman, 1999; Khan, 1996). It entails a pervasive failure to tap self-interest for productive purposes. Hence, corruption whether in the public or private sector, symbolizes an abuse of institutional trust for private gain. Cameroon has a total land area of about 475,440 sq. km and its coastline on the Gulf of Guinea stretches to about 402km. Its international land borders are shared with the Central African Republic, Chad, Equatorial Guinea, Gabon, and Nigeria (Britannica.com, 2023). The country has 10 Regions. It is an obvious fact that corruption is a major problem confronting sustainable development in Cameroon. Some public administrators embezzle public funds with impunity. In the private sector, insider trading and gross abuse of office is the order of the day. The state of Cameroon is presently experiencing a pandemic of corrupt practices in both the public and private sectors. Numerous instances of public administrator corruption have been documented, but they have not been successfully prosecuted. This is a reflection of the judiciary's corruption. Corruption has become the culture of many Cameroonians from the lower to the upper strata of society. The nation holds the distinction of being named the world's most corrupt state twice, in 1998 and 1999 (Transparency International 1998 & 1999).

1.2 Statement of the Problem

The number of churches has significantly increased, but corruption and other social vices have also increased in tandem. It is assumed that if Churches are increasing, their positive impact on the lives of the people should be greater than when there were few Churches. Therefore, the researcher questioned whether the expansion of the

Church and the increase in corruption in these societies are related. This is the reason the researcher plans to look into the effects of church corruption.

1.3 Objective of the Study

Examining the effects of corruption in the church is the study's main goal, but to finish it, the researcher hopes to accomplish the following specific objectives;

- 1) To determine the causes of corruption in the church.
- 2) To examine the consequences of corruption on the growth of the church.
- 3) To analyze the extent to which corruption can be curbed in the church.

1.4 Research Questions

To aid with the study's completion, the researcher developed the following research questions;

- 1) What are the causes of corruption in the church?
- 2) Do the consequences of corruption affect the growth of the church?
- 3) To what extent can corruption be curbed in the church?

1.5 Research Hypotheses

Based on the positivism epistemology and objectivism ontological philosophy, this study is anchored on the deductive approach charged to test theories and empirical evidence using hypotheses as shown below:

- 1) The causes of corruption have a significant effect on the church.
- 2) The consequences of corruption have an impact on the growth of the church.
- 3) The strategy to curb corruption has a significant effect on the church.

1.6 Significance of the Study

As the study aims to investigate the effects of corrupt practices on the body of Christ, it is anticipated that the results will be extremely significant to pastors and church administration upon completion. Since the study aims to investigate the effects of corrupt practices in the church, it will be of importance to all of Christendom. Because the study will be used as a reference for future research, it will also be significant to researchers planning to conduct a study on a related subject.

2. Literature Review

2.1 The Challenge of Corruption in Cameroon: The Present Offensive State of Affairs

The trend of corruption in Cameroon is alarming, and it is a cause for concern (Nchise D. N. & Alain V. N. I, 2019). The country has the record to have been classified twice as the most corrupt state in the world; in 1998 and 1999 Transparency International indices, (1998 & 1999). The corruption classification index for 1998 & 1999 can be seen below.

According to the Transparency International Index for 2021, Cameroon was ranked 144th country of 180 countries which were classified. The 2022 Transparency International Corruption Perceptions Index ranked Cameroon 142nd out of 180 countries. Having a deep look at the results above, the researcher landed on the fact that corruption has become a killer disease in the social, economic, political, and spiritual environment of the country.

2.2 Corruption and the Many Responses to It

Corruption is not an easy word to define. For instance, defining it as having to do with abuse of office excludes those aspects of it not related to abuse of office but which are eminently corrupt practices. A public officer can be guilty of corruption just like a private citizen. Corruption is both legal and moral; it can be economic, political academic, or religious. A seemingly good-intentioned action could be charged with corruption or what has been called noble cause corruption.

According to Bechem (2018), its effects in Cameroon are widespread in Public, Private, and Religious organizations. These organizations are characterized by acts of embezzlement, corruption, misappropriation of funds, and the list goes on. To strengthen the aforementioned view, TITI-NWELL (2009), further highlights that corruption is an offense committed by "any citizen who, for him/herself or third party, solicits, approves, or receives offers, promises, gifts or presents to do, abstain from doing or defer an act from its function". Otite (1986) shares a similar perspective with Titi-Nwell, (2009) by framing corruption as any action, intention, or means that attempts to distort the integrity of the state or influence the state of affairs through acts of bribery, favoritism, or moral depravity.

2.3 Corruption from a Theological Perspective

Corruption has become a disease plaguing all of humanity and no country is exempted from its influence. It has already been noted that even the countries that come top in the ratings of Transparency International are not corruption-free. The T.I. report itself makes that clear. And the problem did not start today; it has always been the case throughout human history. A casual perusal of historical documents, biblical and non-biblical, will make anyone wonder how what is true of contemporary people was also true of the ancients. All of this should lead us to go beyond the issue of corruption itself to examine what could be at the root of all this.

2.3.1 Going back to the Roots: Creation and Fall

To begin to understand the universality and perennial nature of corruption through human history, we need to go back to the genesis of human existence on earth. The Bible traces the origin of humanity to Adam, created by God to be his vice-regent on the earth. Adam was created good, equipped to glorify God and to enjoy a close relationship with him (Gen. 1:26 - 27; 3:8). A calamitous event happened which theologians refer to as the fall; Adam and Eve turned their backs on God deciding to go their ways. The historical implications of this event have been a big theological debate over the years.

2.3.2 The Divine Game Plan: Redemption and Recreation

Theologically, the incarnation is God's answer to the question of human fall. According to some interpreters God served notice of this right in the same account that reports the fall (Gen. 3:15). Others argue that the incarnation had already been ordained even before the fall because God foreknew the fall was going to happen; a case of God answering the question before it was asked. The incarnation, the event at which God took on human form to redeem humanity, and the concomitant work of regeneration that it produces in believing humans represent a reversal of the fall and all its consequences.

2.3.3 The Process of Spiritual Corruption in Cameroon

Cameroon is a very religious society no doubt. Churches, mosques, and shrines dot the country's landscape. Because so many Cameroonian citizens are followers of Christianity, Islam, or African Indigenous Religions, the country's atheist population is negligible. Our religious identity is reflected in our names and dress in addition to the ways we worship. Religious festivals are commonplace here. Easter and Christmas celebrations are observed annually by Christians. These are apart from the annual church congresses, rallies, and conventions. The feast of the Ram and Ramadan is also celebrated by Muslims every year.

Encyclopedia.com describes spiritual corruption as "a light satiric comedy that aims at religious hypocrisy in the form of a charlatan, or fraud"; a certain Brother Jerie, who preached to his followers at Beach Hotel during a convention; Jerie is a master of manipulation and keeps his followers in a subservient position because he understands that they long for money, social status, and power; and convinces them that they will soon be able to fulfill these materialistic desires. That got the researcher thinking. Indeed, spiritual corruption thrives in this country with millions of people being daily scammed by supposed religious leaders.

2.3.4 The Endgame: All Things Made New

Erickson (1994) speaks of optimism and pessimism, the optimism of the change God can make in a man canceling out the pessimism about the goodness of an unregenerate man. The transformation that regeneration brings about in the life of a person is only the beginning of a process that will be consummated in the eschaton (doctrine of the end-time). In reality, the transformation spoken about here does not happen all at once and will only be completed at the consummation of time and this process is supervised by the Holy Spirit of God.

Interestingly, there is a theological connection between the doctrine of the end-time (eschatology) and the doctrine of the Spirit (Pneumatology). In the Bible, the link between the Spirit and eschatology is easily manifested. In the Gospels, the life and ministry of Christ are seen as the beginning of the biblical end of days, especially with the depth of the Spirit's manifestation in Jesus' life and ministry (Matt. 12: 22, Luke 11: 14). Indeed, in prophetic history the last days are portrayed as the age of the Spirit. This connection between the Holy Spirit and the last days helps us to make an important point namely the progressive nature of God's transforming work in the life of the believer and the role of the Holy Spirit in that process.

2.4 Forms of Corruption

Corruption can take different forms. It can occur in the misappropriation of money or property or in an illicit influence on decisions by bribery, which always involves both active and passive participants. Some of the forms that have been observed can be seen as follows:

2.4.1 Misappropriation of Funds

Misappropriation may consist of private use of the funds or resources, use for purposes other than designated, unjustified disbursement, or stealing of these funds or resources. Examples: Funds are used for purposes other than agreed. For example, buildings constructed with project funds are used for purposes not agreed upon in the

project contract, in extreme cases for private purposes, or luxury vehicles are bought.

2.4.2 Nepotism, Patronage, Preferential Treatment

In placing orders and recruiting personnel, persons are preferred who are close to the principal (by religious, ethnic, social, or family relations) lead to recruiting rules and quality standards being neglected. The beneficiaries of this treatment may even take up jobs that are not needed or may be granted higher salaries. Jobs may also be obtained by bribery — ranging from teaching and nursing jobs in church institutions to bishop posts in Protestant churches. In many Protestant churches, the bishop is elected by the synod, sometimes for a limited period, and sometimes for life. In certain churches, these elections have been distorted by the payment of bribes to the electors. The candidates know that the invested sums can be recovered later, but not through their regular salary.

2.4.3 Conduct Towards People with Knowledge of Corruption

Protection by bribery: an office-holder who needs to cover his abuse with forged receipts or other forms of corruption may bribe those who know of it to make them cooperate. In extreme cases, this method may even cripple the work of supervisory bodies which were created to prevent corruption.

2.5 *Consequences of Corruption*

Corruption always has terrible consequences. In the words of Salaudeen Hashimu & James Ancell (2017), corruption is not a victimless crime. Jose Ugaz, chair of Transparency International, is certain of this. Because of corruption, people in far too many nations lack access to their necessities and go hungry every night, while the wealthy and dishonest live extravagant lives with impunity. This is the reason the majority of Cameroonians believe corruption is the cause of the country's underdevelopment, poor infrastructure, comatose healthcare delivery, and falling educational standards, among other things. Across the country, road projects are poorly done or abandoned outright, hospitals lack up-to-date functional equipment needed for effective health care services, public utilities are not properly maintained and there is so much waste as a result.

Unfortunately, what is true of the public space is true also of the church. There are well-publicized as well as unreported cases of church leaders embezzling church funds, tribalism, nepotism, position grabbing, and so on. There are many church leaders and Christians who are sincerely serving their Lord, but several have turned instead to serve Mammon both in the church and in the community.

Shall we talk about the church's penchant for expecting large donations from its members and others who are political officeholders without bothering to consider if their legitimate earnings can support such large donations? At a recent lecture given at Victory Life Bible Church International, the speaker challenged church leaders who not only celebrate but venerate those whose sources of wealth are questionable. They don't ask questions when they accept gifts or offerings from anyone. This creates the idea that anything can be accepted in God's house. The speaker also discussed how the church's teachings promote corruption; genuine believers expect miracles, signs, and wonders, and these must be founded on righteousness. Proclaiming that one can become wealthy without working for it (miracle money/worth) is not only dishonest, but it also encourages corruption. It is false preaching and it is sinful.

2.6 *The Fight Against Corruption: An Interim Agenda*

The following approaches to the fight against corruption represent an action plan that both the nation and the church can engage in for better effectiveness. As we have noted, corruption can only be completely eradicated by God at the consummation of time under the machinery he has already set in motion. But we can work today to minimize it such that it no longer continues to slow down our collective growth and well-being as a nation.

In Catholic social teaching, the principle of human dignity, the social principle, and the principles of solidarity and justice are especially applicable to the fight against corruption. According to the principle of human dignity, which is definitively stated in the encyclical (*Mater et Magistra*, 1961), the human being should be at the center of all social activities, and human dignity is inviolable and must be protected and promoted. Human beings must not be regarded as disposable, as means to an end. According to the social principle, a human being is a social entity and dependent on other people. This leads to the solidarity principle, which states that people should be willing to help each other, and appeals to the golden rule formulated in Matthew 7:12 ESV: "So whatever you wish that others would do to you, do also to them, for this is the law and the prophets." And the principle of justice means that the social order must be preserved which ensures that all human beings are granted what they are justly entitled to.

Protestant and Pentecostal social ethics formerly focused on the ethics of love, with the doctrine of duty as a regulatory force, but recently there has been an increasing trend towards the ethics of responsibility. In 1948 in Amsterdam at the meeting to constitute the World Council of Churches, the ecumenical movement formulated the principle of a "responsible society". It states that human action always takes place in an interpersonal, social

context. Each person must be accountable for his/her actions to society, to future generations (Picht & Jonas, 2007), and to God as the judge of the whole world (Körtner, 2004).

The Christian churches jointly formulated their positions on social ethics in 1997 in a church statement on social and economic matters entitled “A future in justice and solidarity”. It includes the following statement: “The priority of the option for the poor as a guiding principle of social action gives concrete form to the unity of God’s love and human love”. It also formulates “the idea of justice as a fundamental organizational principle for society”.

3. Methodology

3.1 Research Design, Data Collection Method & Sampling Technique

This study is guided by the epistemology of positivism and follows the causal research design in a quantitative method of analysis. This is because quantitative research is often used to question relationships between variables yielding results that are predictive, explanatory, or confirmatory (Williams, 2011). It aims to produce generalized findings in the form of theories and formulae, and so is sometimes associated with positivistic and deductive studies (Bryman, 2012). The researchers seek to establish a relationship between the effects of corruption in the church. The study applied simple random probability sampling i.e., selecting the sample randomly from the sampling frame using random numbers obtained from tables or generated by a computer. (Saunders, M., Lewis, P. & Thornhill A., 2009). A sample of 200 participants constituted mainly of Christians from 20-90 years of age, drawn from several churches in the capital city of Yaoundé, Cameroon. Research questions were administered with the use of questionnaires because they can harness data from a large sample that may be geographically dispersed, and provide broad statistical analysis options (Zikmund, 2003). A well-structured questionnaire was used in this study to provide a hypothetical response of 200 respondents on SPSS worksheet using a 5 Likert scale (SA-SD) and Mean as the measurement of central tendency.

3.2 Data Analysis

Statistical inferences and modeling with the use of statistical software like SPSS and AMOS were used in this research. Data obtained from questionnaires with open-ended questions was coded and analyzed with the use of SPSS 25 and AMOS 24 to have valid and reliable research results.

4. Results

Table 1. KMO and Bartlett’s Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.815
Bartlett’s Test of Sphericity	Approx. Chi-Square	759.273
	df	28
	Sig.	.000

Source: Field Data 2024.

Based on the results $KMO > 0.05$. This implies $0.815 > 0.05$.

Bartlett’s test is significant at <0.05 . This implies $0.000 < 0.05$.

Table 2. Total Variance Explained

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total
1	6.653	83.158	83.158	6.443
2	2.785	9.812	92.970	3.846
3	1.213	2.665	95.635	3.762

Extraction Method: Principal Component Analysis.

a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

Source: Field Data 2024.

A component can only be retained with Eigenvalues of more than 1. so components 1, 2, and 3 have Eigenvalues of 6.443, 3.846, and 3.762 respectively which means they will be retained.

Table 3. Coefficients of Multicollinearity

Model		95.0% Confidence Interval for B		Collinearity Statistics	
		Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	1.731	2.194		
	CC_ORG	-.062	.196	.501	1.994
	CG_ORG	-.280	.304	.501	1.994
	CE_ORG	-.481	.100	.501	1.994

a. Dependent Variable: CV

Source: Field Data 2024.

Construct CC, CG, and CE

Tolerance > 0.1 whereby $0.501 > 0.1$ which is admissible.

VIF < 10, whereby $1.994 < 10$ which is admissible.

In this case, there is no multicollinearity among these variables.

4.1 Structural Equation Modeling (SEM)

In this study, EFA allowed the researcher to establish the factor structure for the study variables through a scrutiny of the factors that load on the various components.

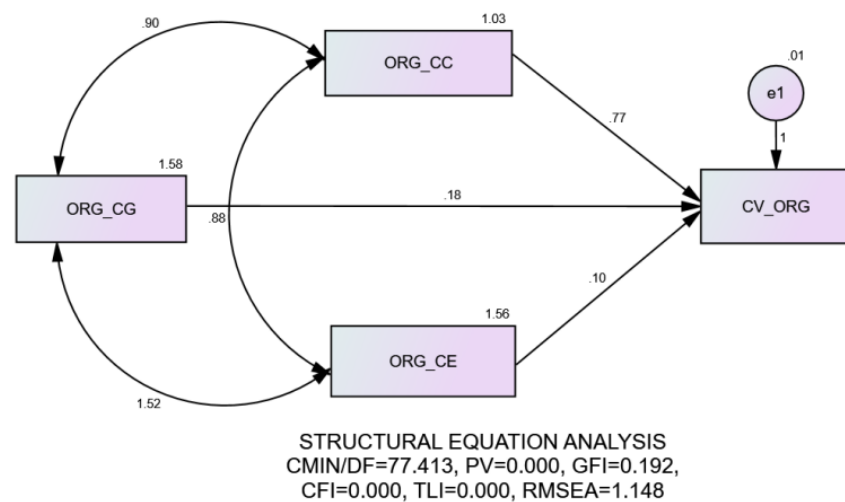


Figure 1. SEM — Causes of Corruption, Consequences of Corruption, and Extent to Curb Corruption

Source: Field Data 2024.

Table 4. Regression Weights: (Group number 1 — Default model)

	Estimate	S.E.	C.R.	P	Label
CV_ORG <--- ORG_CG	.184	.044	4.183	***	par_2
CV_ORG <--- ORG_CC	.767	.020	39.336	***	par_3
CV_ORG <--- ORG_CE	.101	.044	2.299	.022	par_4

Source: Field Data 2024.

Looking at the regression weights table above, based on the regression paths for all established constructs and indicators, they are all significant at 10%, 5%, and 1%.

Table 5. Hypothesis Testing

Hypothesis	P-value at 95% CI	Decision/ Conclusion
The causes of corruption have a significant effect on the church (CC_ORG on CV_ORG)	PV=0.000<0.05 (significant at 1%, 5% and 10%)	Reject the null hypothesis
The consequences of corruption have an impact on the growth of the church (CG_ORG on CV_ORG)	PV=0.000<0.05 (significant at 1%, 5% and 10%)	Reject the null hypothesis
The extent to curb corruption in the church	PV=0.022<0.05 (significant at 1%, 5% and 10%)	Reject the null hypothesis

Source: Field Data 2024.

5. Discussion and Conclusion

The results of this study have shown the causes of corruption in the church, is a significant impact. Based on the structural equation model (Path Analysis), we realized that the causes of corruption in the church have a 77% significant impact on voiding corruption in the church. With the effect of consequences of corruption on the growth of the church, we can realize from the path analysis that there is a significant impact. In the diagram, we have an 88% significant impact on voiding corruption in the church. The extent to curb corruption in the church, we will realize from the path analysis that it has a 10% significant impact on voiding corruption. As we have noted, corruption can only be completely eradicated by God at the consummation of time under the machinery. He has already set in motion. But we can work today to minimize it such that it no longer continues to slow down our collective growth and well-being as a nation. The church should be an oasis of transparency and honesty in this ocean of rot and decay.

References

- Ackerman, B., (1999). The Political Economy of Corruption, Crediting the Voters: A New Beginning for Campaign Finance. *American Prospect*, 13, 71-80.
- Bechem, E. E., (2018). Corruption in Cameroon: Public Perception on the Role and Effectiveness of the Different Anti-Corruption Agencies. *Review of Public Administration and Management*, 6(1), 1-6. <https://doi.org/10.4172/2315-7844.1000235>.
- Britannica.com, (2023). Encyclopedia Britannica. <https://www.britannica.com>.
- Eliaeson S., (2002). *Max Weber's Methodologies*. Cambridge: Polity.
- Elliot, A. J., (1997). A hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology*, 218-232. <https://doi.org/10.1037/0022-3514.72.1.218>.
- Eluwa, Stephen Enyinnaya, (2015). Modelling Neighborhood Satisfaction of Residents in High — And Medium-Density Neighborhoods of Lagos City, Nigeria. *Pertanika Journal of Social Science and Humanities*, 23(1).
- Erickson, J., (1994). The Political Economy of Corruption, Crediting the Voters: A New Beginning for Campaign Finance. *American Prospect*, 13, 71-80.
- Field, A., (2009). Discovering Statistics Using SPSS. 3rd Edition, Sage Publications Ltd., London. *Open Journal of Nursing*, 6(9).
- Gareth, Terry, (2017). Thematic analysis: The SAGE handbook of qualitative research in psychology. *SAGE Publications*, 17-37.
- Gerard, Delanty, (2005). Social Science: Philosophical and Methodological Foundations (Concepts in the Social Sciences).
- Gomm, R., Hammersley, M., Foster and P., (2000). Case study and generalization, Case study method. *London: Sage*, 98-115.
- Gundlach, E., (2008). A farewell to critical junctures. Sorting out the long-run causality of income and democracy. University of Aarhus, School of Economics and Management. Economics Working Paper. <http://www.econ.au.dk/afn/abstr08/04.htm>.
- Habshah Midi, Saroje Kumar Sarkar, Sohel Rana, (2013). Collinearity diagnostics of binary logistic regression model. *Journal of Interdisciplinary Mathematics*, 13(3), 253-267. DOI:10.1080/09720502.2010.10700699.
- Körtner, U., (2004). *Unverfügbarkeit des Lebens?: Grundfragen der Bioethik und der medizinischen Ethik*, 2nd edn. Neukirchener Verlag, Neukirchen-Vluyn.

- Mater et Magistra, (1961). <https://www.doctrine-sociale-catholique.fr/introductions-aux-textes-officiels/13-introduction-a-mater-et-magistra>.
- Nchise Delphine N., Alain V. N. I., (2019). Quantitative Analysis of the Effects of Financial Fraud Management and Mitigation Strategies on The Sustainability of Medium Size Enterprise in the Centre Region of Cameroon. *Journal of Accounting Information and Innovation*, 5(9).
- Otite, (1986). *Autonomy and Dependence: The Urhobo Kingdom of Okpe in Modern Nigeria*. Evanston, Ill. Northwestern University Press.
- Picht, Jonas, (2007). Government Spending, Corruption and Economic Growth. *World Development*, 84. DOI:10.1016/j.worlddev.2016.03.011.
- Salaudeen Hashimu., James Ancell., (2017). Boko Haram feeds off corruption in Nigeria. <https://www.aljazeera.com/opinions/2017/4/14/boko-haram-feeds-off-corruption-in-nigeria>.
- TITI-NWELL, Pierre, (2009). The Fight against Corruption in Cameroon from 1999 to 2008.
- Transparency International, (2000). Corruptions Perception Index 2000. www.transparency.org, accessed 29th Sept.

Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).

An Appraisal of the Measures Adopted Within the Context of Sustainable Development to Combat Climate Change

Simon Ekumene Mbanda¹, Elizabeth Nkongho² & Benvolio Lekunze³

¹ PhD Research Fellow, University of Buea, Cameroon

² Associate Professor of Laws, University of Buea, Cameroon

³ Lecturer of Laws, University of Buea, Cameroon

Correspondence: Elizabeth Nkongho, Associate Professor of Laws, University of Buea, Cameroon.

doi:10.56397/SSSH.2025.03.02

Abstract

Climate change has continuously been regarded as a major environmental threat, which has hampered the realization of sustainable development in Cameroon. In response to the scourge of climate change, the State of Cameroon has adopted several measures. The measures adopted in Cameroon have not only been vital in fighting climate change, but have also contributed to fostering sustainable development in Cameroon. The research methodology used in this work is qualitative, and it further employs the doctrinal research method, which analyses primary and secondary data sources. This paper therefore appraises the measures adopted against climate change in Cameroon, specifically within the context of sustainable development. Cameroon has recorded successes and has also faced challenges in the journey of promoting sustainable development, these aspects will be examined in the subsequent paragraph starting with the successes recorded.

Keywords: climate, climate change, sustainable development

1. Introduction

Climate change has over the years been recognized as a contemporary environmental and public health threat in 21st century. Not only has climate change hampered on the realization of human rights, but also it has further hampered on the realization of sustainable development in contemporary societies. The scourge of climate change has over the years been known to be accompanied by a multiplicity of effects, which have posed a threat to sustainable development, thereby affecting economic growth, social equity and environmental integrity. For example, climate change has continued to affect economic stability, as extreme weather events such as floods droughts and hurricanes disrupt agriculture, leading to food shortages and increased prices. This situation has hampered on the ability of societies, especially low-income societies to achieve economic resilience and stability.

2. Successes Recorded in the Promotion of Sustainable Development in Cameroon

Several successes have been recorded in the promotion of sustainable development in Cameroon. The measures adopted in Cameroon against climate change have contributed to this level of success recorded in the promotion of sustainable development in Cameroon. These successes include; enhancement of agricultural productivity, improved access to energy, improved health quality, job creation/employment opportunities amongst others. These successes are examined below as follows:

2.1 The Enhancement of Agricultural Productivity

One of the core measures adopted in Cameroon in a bid to combat climate change is reforestation. Reforestation is vital in that it increases the number of trees, which serve as carbon sinks that absorb excess carbon dioxide in

the atmosphere and purify the air. Additionally, reforestation plays a crucial role in enhancing agricultural productivity by improving soil fertility, water availability and climate resilience. It is worth noting that reforestation efforts in Cameroon not only help with carbon sequestration but also enhance biodiversity, improve soil quality and increase agricultural productivity. Trees also contribute to soil fertility by adding organic matter through leaf litter and root decomposition.¹ In addition, tree roots contribute to agricultural productivity in that they help stabilize soil structure, reducing erosion and nutrient loss.²

Furthermore, trees planted as part of reforestation efforts in Cameroon have been vital in that they play a significant role in maintaining the water cycle by regulating ground water recharge and reducing surface runoff. Tree roots have over the years contributed to increasing soil porosity, allowing water to infiltrate and be stored for longer periods, which is beneficial to crops.³

Reforestation efforts in Cameroon therefore have not only contributed to the fight against climate change but have contributed to enhancing agricultural productivity by improving soil quality. This has facilitated the realization of sustainable development, as farmers have been able to increase productivity and ensure food security for Cameroonians.

In an interview conducted with a farmer in the Bokwai-Buea, the interviewee expressed the opinion that reforestation has made a big difference in his farming activities. The interviewee explained that after planting trees in an unused land around his farm, the soil quality improved and his crop yields have increased. According to the farmer, these trees drop leaves, which later decompose and make the soil rich in organic matter thereby improving soil fertility. The interviewee further expressed the opinion that in recent times, he has noticed that his crops look healthier as the trees around his farm attract birds and other beneficial insects that help control pests. The interviewee however acknowledged that the major challenge faced with tree planting (reforestation) vis-à-vis its role in enhancing agricultural productivity is that the trees take time to grow; however, to the interviewee; he found that integrating trees into his farm has resulted in more benefits than losses.⁴

2.2 Improved Access to Energy

One of the core measures adopted to combat climate change in Cameroon is the implementation of renewable forms of energy such as hydroelectric energy and solar energy. It is worth noting that national electricity access has significantly improved in Cameroon in recent years, reaching approximately 70% as of recent reports.⁵ This increase has over the years been attributed to various projects, including the construction of hydroelectric dams and the implementation of photovoltaic projects across various parts of Cameroon.⁶ The enhancement of these forms of renewable energy have been vital in that they have facilitated sustainable development as they have improved access to energy for diverse activities including industry and manufacturing, enabling the operation of local businesses, which in turn stimulate economic activities, thereby contributing to income generation and reducing poverty levels.⁷

Improved access to renewable energy in a bid to combat the effects of climate change has further contributed to sustainable development in Cameroon. That is, it has provided reliable electricity supply, which has contributed to enhancing the operation and functioning of essential services such as healthcare and education, particularly in rural areas where there has historically been a continuous lack of access to power supply. For example, hospitals and health facilities can now store vaccines and certain types of medicines and students can actively study at night, thereby contributing to better educational outcomes as compared to when electricity supply is limited.⁸

In an interview conducted in January 2025, the interviewee expressed the opinion that renewable energy, notably solar energy has played a vital role in enhancing security, as the recent installation of solar panels in the streets

¹ Foley J.A. et al, (2011). Solutions for a Cultivated Planet. *Nature Journal*, 478(7369), pp. 337-342.

² *Ibid.*

³ Ellisson D. et al, (2017). Trees, Forests and Water: Cool Insights for a Hot World. *Global Environmental Change Journal*, 43, pp. 51-61.

⁴ This information was derived based on an unstructured interview with a farmer at Bokwai Buea on February 8, 2025.

⁵ Chu Donatus et al, (2023). Driving the Clean Energy Transition in Cameroon: A Sustainable Pathway to Meet the Paris Accord and the Power Supply/Demand Gap. *Frontiers in Sustainable Cities*, 5, pp. 1-23.

⁶ *Ibid.*

⁷ Fotsing Metegam Isabelle Flora, Njomo Donatien, Rene Tchinda & Oumarou Hamandjoda, (2019). Impact of Sustainable Electricity for Cameroonian Population through Energy Efficiency and Renewable energies. *Journal of Power and Energy Engineering*, 7, pp. 11-51.

⁸ *Ibid.*

has resulted in lighting the Town of Buea.¹ The interviewee stated that at first, people could not freely move late at night because of insecurity (the constant aggression in the dark by thieves) since the streets had no lights. Now with the lighting of the streets by solar panels, even if there is electricity failure, the streets are lighted thereby bringing security to the town of Buea. The interviewee further expressed the opinion that solar energy is vital for it brings security, making people to go on with their various activities hinge free. The interviewee ended by suggesting that the government should take steps to improving access to energy by installing solar panel in all the quarters not only in Buea but also in the other towns of Cameroon.

In another interview conducted in February 2025, the interviewee expressed the opinion that renewable energy, notably solar energy has in recent months played a vital role in enhancing his education, as the installation of solar panels has resulted in fewer power interruptions in his residence.² The interviewee stated that in the second semester of the 2023/2024 academic year, he had a project, which required him to study at late hours of the night, and he was able to efficiently work on his project because of power stability derived from solar energy installed at his home.

The interviewee further expressed the opinion that solar energy is vital for educational pursuits as he feels secure and confident, knowing that he can embark on his studies with good lighting and access to online resources using his computer whenever he feels like carrying out academic research. The interviewee further stated that since the installation of the solar panels at his residence, he has felt more energized, with an increased zeal to study, which has ultimately leads to the improvement of his grades at school. The interviewee ended by suggesting that the government should take steps to improving access to energy for students by not only installing solar panels in student residential areas, but also in the university campuses for this will create a better learning environment not just for studying at night, but also for fostering innovative ideas that promote sustainability among students.

2.3 Improved Health Quality

It is no doubt that there exists a symbiotic relationship between health and sustainable development as health outcomes significantly influence economic stability and social equity. Sustainable development emphasizes on the need for health systems that are not only equitable but also efficient in ensuring that all individuals have access to quality health care without financial restraint.³ It is worth noting also that health is not merely the absence of disease, but encompasses social dynamics, lifestyles and environmental elements that contribute to the overall wellbeing.⁴

Sanitation is a fundamental determinant of health influencing a wide range of outcomes. According to the World Health Organization (WHO), sanitation has a relationship with health in that poor sanitation can lead to the spread of infectious diseases such as cholera, dysentery, typhoid, intestinal worm infections and polio.⁵

One of the measures adopted to combat climate change in Cameroon is the improvement of waste management. This measure adopted to combat climate change has over the years impacted on sanitation as a determinant of health in that it has improved the sanitary state in Cameroon, thereby promoting the health of Cameroonians. It is worth noting that improved waste management practices in response to climate change in Cameroon has over the years directly improved sanitation and hygiene reducing the prevalence of hygiene-related diseases. In fact, according to the WHO, improves waste management practices decreases the incidence of diarrheal diseases, which are prevalent in areas with inadequate sanitation.⁶ Councils have also over the years played a pivotal role in improving the sanitary conditions of various cities across Cameroon. They have done so specifically through the institution of specific days in various towns and cities around the country for businesses and private citizens

¹ This information was derived based on an unstructured interview with businessperson having a store at the O.I.C. market in Buea, on Wednesday 15/01/ 2025.

² This information was derived based on an interview with a Student at the Faculty of Health Science, University of Buea, on Wednesday 19/02/2025.

³ Margaret E. Kruk *et al.* (2018). High Quality Health Systems in the Sustainable Development Goals Era: Time for a Revolution. *Lancet Global Health Journal*, 5(6), pp. 1196-1252.

⁴ Ivy Panda, (2020). Health Promotion and Sustainable Development. Available online at: <https://ivypanda.com/essays/health-promotion-and-sustainable-development>. (Accessed on February 25, 2025).

⁵ WHO, (2024). Sanitation. Available online at: <https://www.who.int/news-room/fact-sheets/detail/sanitation#:~:text=Poor%20sanitation%20is%20linked%20to,the%20spread%20of%20antimicrobial%20resistance>. (Accessed on the 24/02/2025).

⁶ WHO, (2024). Diarrhoeal disease. Available online at: <https://www.who.int/news-room/fact-sheets/detail/diarrhoeal-disease>. (Accessed on the 24/02/2025).

to keep their businesses and premises clean, which is a measure not only to protect the environment, but also to promote quality health.

For example: the Fomuban Council has set aside Thursdays of every week as a general clean-up day in the Fomuban Municipality; the Mamfe Council has set aside the first Thursday of the month as a day for the general clean-up of the town; the Kumba City Council has set aside the first Thursday of every month as a general clean-up day in Kumba; The Limbe city council has set aside the third Wednesday of every month as a general clean-up day in the town of Limbe; the Buea Council has set aside the first and last Wednesday of every month as the general clean-up day within the Buea municipality; and the Douala City Council has set aside Thursdays of every week as a general clean-up day, just to name a few. These specific days set aside by councils across Cameroon have over the years had an impact on sanitation and the right to health as a whole, as these cleaning activities have contributed to the general reduction of diseases by eliminating breeding grounds for pests and pathogens such as mosquitoes that transmit diseases like dengue and malaria. Another impact of these cleaning campaigns instituted by councils is that it has served as a tool of education, sensitising the public on waste management, recycling, and the importance of environmental stewardship, fostering sustainable behaviour.

In order to understand how sanitation improves the quality of health, the researcher conducted an interview with a Sanitation officer of the Limbe City Council. During the interview, the interviewee reiterated the fact that the health of the people of the town of Limbe has greatly improved due to the general cleanup campaign put in place by the Limbe City Council for businesses and private citizens to keep their businesses and premises clean. He said that the specific day set aside for the environment of Limbe is the third Wednesday of every month. He further said that, the environs of Limbe had cases of cholera outbreak and other illnesses due to poor sanitation in the past but this is not the case now. The interviewee said that HYSACAM, a private waste management Company also helps to keep the town clean. He said that, the problem faced as far as sanitation in Limbe is concerned is lack of equipment due to limited financial resources and the lack of responsible behaviour from the citizens. The interviewee said that, apart of the challenges, the environment of Limbe is protected and the hospitals do not have cases of illnesses due to sanitation therefore healthcare has greatly improved in the Limbe Municipality. He further said that, the government should provide more financial resources and sensitize the population on the relationship between sanitation and health so that the environment can be protected and to promote quality health.¹ All these have contributed to improving the quality of health, which is fundamental for sustainable development in Cameroon.

2.4 Job Creation/Employment Opportunities

The measures adopted in Cameroon to combat climate change have significantly contributed to the creation of jobs which is fundamental for achieving sustainable development. Employment has over the years been vital for the realisation of sustainable development in that it contributes to economic growth, poverty reduction and social stability by providing individuals with the means to meet their basic needs and contribute to societal wellbeing.

The fight against climate change in Cameroon has doubt led to substantial investments in renewable energy as public electricity generation from renewable sources has increased from 41.56 GWh in 2015 to 66.3 GWh in 2019 reflecting a positive move towards the promotion of renewable energy.² It is worth noting that this shift towards renewable energy sources has not only enhanced energy security but has also created jobs in the renewable energy sector, including roles in the construction, operation and maintenance of renewable energy facilities.³

An example of a renewable energy entrepreneur who has recorded enormous success as a result of renewable energy is Soukaina Bouba Dalil who exemplifies the employment potential within the renewable energy sector. In 2019, she founded a company named *Energie D'Afrique* as a result of the desire to promote renewable energies, within the context of a gross energy deficit in Cameroon.⁴ Presently, the company has several employees who are actively engaged in the transformation of agricultural farms into biogas, which is used for heating/drying, as a bio fertiliser to boost soil yields as part of the circular economy.⁵ The company has over the

¹ This information was derived based on an unstructured interview with Sanitation Officer working with the Limbe City Counsel, on Wednesday 15/11/ 2024.

² ATMFP, (2024). Implications of Climate Policies over the Past Ten Years in Cameroon. Available online at: https://camepi.org/agriculture-and-trade/the-impact-of-green-policies-over-the-past-ten-years/?utm_. (Accessed on the 03/03/2025).

³ *Ibid.*

⁴ Initiatives Climat, (n.d.). Energie D'Afrique Plus Entrepreneur Verts-Femmes. Available online at: <https://www.initiativesclimat.org/Porteurs-d-initiatives/Energie-d-Afrique-Plus>. (Accessed on the 03/03/2025).

⁵ *Ibid.*

years not only provided employment but has also enabled families with little access to energy and gas to produce their own energy (biogas) from waste from agricultural activities and some of this biogas is used to dry certain fruits such as cocoa and mango.¹

In an interview conducted in March 2025, the interviewee expressed the opinion that the shift to renewable sources of energy has been a blessing because it has provided employment to him, which has made it easier for him to cater for his family. The interviewee further stated that recently, about 70% of his projects are related to renewable energy, especially the installation and maintenance of solar panels. To the interviewee, this shift to renewable energy has opened up many opportunities not just for him but also for several electricians in the Buea municipality.² The interviewee further expressed that the job market for electricians is changing, and that the demand for electricians who specialise in renewable energy will continue to grow, resulting in more job opportunities for electricians. The interviewee further stated that with the advancement in technology and increasing awareness about climate change, he foresees a massive expansion in the renewable energy sector.³ The interviewee ended by recommending that the state should establish learning institutions where people will be trained in bid to develop their skill vis-à-vis the use of renewable sources of energy.

From the above paragraphs, it is evident that that measures adopted to combat climate change in Cameroon have not only been vital for environmental protection, but have also been vital for the achieving sustainable development in Cameroon through the creation of jobs.

Apart of the successes recorded by Cameroon in fighting climate change to promote sustainable development, the country faces serious challenges in the said domain, lack of awareness on environmental sustainability, which are examined below as follows:

3. Challenges Faced by Cameroon in Fighting Climate Change to Promote Sustainable Development

Several measures have been adopted in Cameroon to combat climate change in a bid to promote sustainable development. However, there exists some challenges which have over the years been faced. These challenges include among others; population growth and increased deforestation, limited financial resources, weak Institutional/Governance framework, limited technological capacity, corruption/bad Governance, fragmented legislations, inadequate penalties for environmental crimes, examined in the subsequent paragraphs.

3.1 Population Growth and Increased Deforestation

Urbanization and population growth in Cameroon have been a major challenge towards the country's fight against climate change.

In recent years, Cameroon has undergone rapid transformation, manifested in the form of significant shifts of its population from rural to urban areas. In fact, according to the World Bank, the percentage of Cameroon's population living in urban areas has increased from 39.5% in 1990 to 56% in 2020.⁴ This rapid urbanization has resulted in a wide range of environmental challenges such as climate change. One of the primary consequences of urbanization in Cameroon is that it has resulted in the expansion of cities through the clearing of forested lands which have contributed to climate change. Also, the concentration of economic activities and transportation in urban areas has resulted in a significant increase in greenhouse gas emissions, thereby increasing the country's overall emission rates.

Rapid urbanization in Cameroon has also been accompanied by a corresponding increase in population. According to the United Nations, Cameroon's population is projected to reach 36.4 million by 2030 from 27.2 million in 2022.⁵ Population growth has over the years intensified pressures on the environment, thereby serving as a major challenge towards the ability of the State of Cameroon to adapt to and contain the scourge of climate change.

Despite Cameroon's efforts to curtail climate change and its undesirable repercussions, the problem of persistent

¹ Food and Agriculture Organization, (2024). Women SME Accelerator Programme. Available online at: https://agrifood.net/wp-content/uploads/2024/01/SME-Accelerator-Website-Profile_Soukaina-Bouba-Dalil.pdf. (Accessed on the 03/03/2025).

² This information was derived based on an interview with an electrical engineer in Buea on 02/03/2025.

³ *Ibid.*

⁴ World Bank, (n.d.). Cameroon City Competitiveness Diagnostic. Available online at: <https://documents1.worldbank.org/curated/en/838941529565340570/pdf/Cameroon-City-Competitiveness-Diagnostic.pdf>. (Accessed on the 19/02/ 2025).

⁵ United Nations, (2022). World Population Prospects. Available online at: <https://population.un.org/wpp/DataSources/120>. (Accessed on the 19/02/ 2025).

deforestation serves as a huge setback to her strives. The increase in the rates of deforestation in Cameroon can be attributed to factors including: demographics (that is, population growth and pressure), economic changes (especially market growth and economic structures), just to mention a few. Statistics show that deforestation decreased with some oscillation until 2014 and continues to increase until today.¹

It is recorded that, in 2010, Cameroon had a natural forest that extended to 30.4Mha, covering over 66% of its land area. However, in 2021, she lost 167Kha of her natural forest, which absorbs about 150Mt of carbon dioxide emitted.² Between the years 2015 to 2018, deforestation was said to have accounted for the loss of between 40.000 to 80.000 hectares of primary forest on an annual basis.³

Hence, with the increased rate of deforestation in Cameroon, the success rate of her fight against climate change is lessened. The implications of population growth and deforestation in Cameroon extend to sustainable development goals as rapid population growth hinders efforts to improve health, education, and economic stability making it difficult to implement sustainable practices. Also, deforestation undermines the livelihood of communities that depend on forests for their economic activities such as agriculture, forestry and tourism. The loss of biodiversity not only hampers on efforts to protect the environment but also leads to decreased agricultural productivity.⁴

3.2 Lack of Awareness on Environmental Sustainability

One of the major challenges in the fight against climate change in Cameroon and most sub-Saharan African countries is the lack of awareness, which impedes on the goal of addressing climate change in decision-making regarding climate change and in the actions of non-governmental actors. This problem arguably stems from the fact that in countries like Cameroon, issues concerning the environment is not addressed in the professional institutional system. The outcome of such a situation is that when Cameroonians rise to positions of authority, they have limited ideas and knowledge on matters concerning the environment.

Over the years, there has been an argument that some of the environmental-related cases brought before the judges may not be well handled because most of the judges are not trained in this area of the law.⁵ Consequently, some judges have problems in handling such cases especially when they come before them for the first time. This problem is principally as a result of the fact that the National School of Administration and Magistracy (ENAM) where magistrates are trained in Cameroon does not provide trainees with a course on environmental law, which makes them face challenges in practice when environmental cases are brought before them. In order to ensure that judges effectively discharge their functions, they need to attend capacity building seminars and refresher courses on environmental law.

Lawyers on their part are not so different from the magistrates. Lawyers are auxiliaries of justice and they have a vital role to play in the protection of environmental rights before the courts. In Cameroon today, there are limited lawyers specialised in environmental law. This has over the years been a contributing factor to the inefficient enforcement of environmental legislation in Cameroon. Some of the reasons why there exist fewer environmental lawyers include: firstly, environmental law is a new and contemporary discipline introduced to the syllabuses of universities; secondly, most lawyers are not always interested in attending workshops or seminars on environmentally-related issues; and lastly, environmental law litigation is not lucrative because the fines levied against the defaulter is paid to the state and not the lawyer and very few lawyers are willing to render free services.⁶

The lack of public awareness has been accompanied by a corresponding lack of public engagement in the fight against climate change. The limited engagement of civil society organisations, community based groups, and the private sector in Cameroon's climate change efforts has been a major challenge as it has reduced the overall effectiveness of the country's efforts to combat climate change. Combating climate change requires collective

¹ WWF, (n.d.). Deforestation Front; Cameroon, available at https://wwfint.awsassets.panda.org/downloads/deforestation_fronts_factsheet_cameroon.pdf. (Accessed on the 20/02/2025).

² GFW, (n.d.). Cameroon Deforestation Rates and Statistics, available online at <https://www.globalforestwatch.org>. (Accessed on the 20/02/2025).

³ EUREDD Facility, (n.d.). Cameroon, available online at <https://euredd.efi.int/countries/cameroon/>. (Accessed on the 22/02/2025)

⁴ Mekou Youssoufa Bele et al, (2011). Forests and Climate Change Adaptation Policies. *Journal of Mitigation and Adaptation Strategies for Global Change*, 16, pp. 369-385.

⁵ Zaelke, D, (2005). Making Law Work: Environmental Compliance and Sustainable Development. Available online at: <https://www.ecolex.org/details/literature/making-law-work-environmental-compliance-and-sustainable-development-volumes-i-and-ii-mon-074246>. (Accessed on the 22/02/2025).

⁶ Pro bono services.

efforts from both the state and private stakeholders as such private stakeholders can play a crucial role in raising awareness and advocating for policy changes. The limited involvement of these private sector stakeholders in Cameroon's efforts against climate change has over the years been a major challenge faced in the fight against climate change in a bid to promote sustainable development in the country.

3.3 Limited Financial Resources

Another challenge faced in the fight against climate change in promoting sustainable development in Cameroon is that of limited financial resources. It is no doubt that finance is a requisite for an effective fight against climate change and its effects. As a developing country, the state of Cameroon has continued to face economic challenges, including high rates of poverty, debt burdens and reliance on foreign aid. This obvious lack of financial resources has the effect of constraining the government's ability to invest on climate change initiatives. In fact, according to the United Nations Development Program (UNDP), Cameroon Requires an estimated \$3.8 Billion per year to effectively address climate change but the government only allocates about \$20 million annually to climate related programs.¹

While Cameroon has been able to secure funding from global climate finance mechanisms such as the Green Climate Fund, the availability of these funds is often inconsistent and subject to the priorities and agendas of international donors, which may not often align with the specific needs of Cameroon. Hence, limited finance remains a major challenge in the fight against climate change in Cameroon.

3.4 Weak Institutional/Governance Frameworks

The existence of weak institutional/governance frameworks is another challenge faced in the fight against climate change in a bid to achieve sustainable development in Cameroon. In Cameroon, there exists a lack of a cohesive and well-coordinated national strategy as well as a clear fragmentation of responsibilities across the various government agencies. This situation has hindered the country's ability to tackle climate change in a comprehensive and coordinated manner.

The Ministry of the Environment, Nature Protection and Sustainable Development (MINEPDED) is the primary government institution charged with the responsibility for environmental protection and development of climate change related policies and initiatives. The ministry's limited resources and capacity often result in a reactive rather than a proactive approach to climate change.

In addition, the National Observatory on Climate Change (NOCC) which is charged with the responsibility of assessing the socio-economic and environmental impacts of climate change and proposing measures to prevent, and mitigate/adapt to the adverse effects of climate change has continued to face several challenges impeding on its mission such as the unavailability of state of the art equipment necessary for weather monitoring stations, data analysis tools, and climate modelling capabilities.

In addition, the lack of collaboration between MINEPDED and other ministries and governmental agencies relating to the environment such as the Ministry of Forestry, Ministry of Agriculture, and the Ministry of Energy has been a major challenge encountered in the fight against climate change in Cameroon. Such a lack of cooperation has over the years resulted in a fragmented response to climate change, thereby weakening Cameroon's resilience to climate change.

3.5 Limited Technological Capacity

The Paris Agreement on Climate change recognizes the importance of fully realizing technology development in order to improve resilience to climate change and reduce greenhouse gas emissions.² Technology within the climate change context is necessary to ensure a shift from the fossil fuel era to environmentally friendly technology in areas such as transportation, agriculture, and industry.³

Cameroon as a developing country lacks access to the latest technologies that can help adapt and mitigate the effects of climate change. Cameroon's technological infrastructure and research development capabilities are underdeveloped, and this has further been compounded by the limited level of investment in science and technology. This lack of technology in Cameroon has been due to factors such as: limited financial resources, inadequate infrastructure, and a lack of technical expertise. The lack of state of the art technology in Cameroon has in recent years proven to be a major challenge in Cameroon's efforts to combat climate change in a bid to

¹ UNDP, (n.d.). Climate Change Adaptation. Available online at: <https://www.adaptation-undp.org/explore/western-and-central-africa/cameroon>. (Accessed on the 22/02/ 2025).

² Article 10 (1), Paris Agreement on Climate Change, 2015.

³ Tamukum Princewill. A, (2023). Capacity Building on Climate Change in Cameroon: A Legal Appraisal. Available online at: https://ic-sd.org/wp-content/uploads/2023/10/2023submission_165.pdf. (Accessed on the 23/02/2025).

achieve sustainable development.

3.6 Corruption/Bad Governance

Corruption is a cankerworm which has eaten deep into the African society as most African countries today are known for their high levels of corruption. Corruption refers to the violation of the obligations of probity, fidelity, and impartiality in the exercise of public service to the detriment of the user.¹ Corruption is said to have taken place when an individual is paid to perform or refrain from performing his duty either with gifts, promises or presents.² Corruption is also deemed to have occurred when an individual pays a compliant professional to do his work or refrain from doing so.³ Corruption and fraud are legally, morally, and socially condemned in the society because it is the denial of the constitutional or legal principles of equality of citizens in rights and duties, and free rendering of public services etc.

Corruption is one of the worst most widespread forms of behaviour which is inimical to the administration of public affairs.⁴ Despite the world recognition of the ills of corruption, the practice has been on the rise in society. For two consecutive years, Cameroon was classified by Transparency International as the most corrupt country with the lowest corruption perception index. As of June 2024, Cameroon is classified as the 21st most corrupt country in Africa with a corruption perception index of 27.⁵

Corruption remains one of the hindrances to the success of the fight against climate change in Cameroon. A number of those charged with the responsibility of ensuring the protection of the environment however demonstrate corruption tendencies. This is true with both some forestry as well as judicial officials. For instance, noted by the Congo Basin Forest Partnership, 'For several decades in Cameroon, corruption had made its bed on Cameroon's forest canopy, promoting illegality in the sector with serious consequences for the environment, local communities and the State's budgetary revenues.'⁶ When forestry officials demonstrate such corrupt tendencies, illegal deforestation becomes the order of the day, and by extension, climate change becomes the price.

Unfortunately, the problem of corruption also stretches to the judicial sector in Cameroon. As Carlson Emmanuel notes,⁷ corruption within the Cameroonian judiciary is 'fairly common.' He proceeds to cite a number of instances which prove his stance. As he explains, the allusion of the Head of State to the judiciary in condemnation of corruption is indicative of the prevalence of the vice within the judicial arm.⁸ He further cites Justice Endeley's appeal to the public to cease from corrupting judicial officers. As Justice Endeley said, 'If you do not offer to corrupt him, he will remain uncorrupted; if you do not subject him to tribal or social pressures, he will remain free to judge in obedience to his conscience...' As Justice Endeley continued, 'all too often, one came up against judicial officers who looked on their office as a means of self-aggrandisement... There are judicial officers whose sense of justice and fair play was polluted by downright corruption, or by pressure arising from social, tribal or professional affinities, or by complicity with certain interests with mercenary motives.'⁹

The corrupt nature of officials charged with the responsibility of enforcing, protecting and adjudicating on environmental laws regulating matters such as climate change therefore remains a huge setback to the successful implementation, enforcement and protection of these laws.

3.7 Fragmented Legislation

In Cameroon today, several environmental statutes are made subject to implementation decrees from the

¹ Friedrich-Ebert-Stiftung, (n.d.). Corruption in Cameroon. Available online at: <https://library.fes.de/pdf-files/bueros/kamerun/07797.pdf>. (Accessed on the 25/02/2025).

² *Ibid.*

³ *Ibid.*

⁴ Fonja Julius, (2019). The Law in Cameroon and the Vexing Problems of Groundwater Pollution. *Scholars International Journal of Law, Crime and Justice*, 2(4), pp. 96-109.

⁵ The Nairobi Law Monthly, (n.d.). Top 30 Most Corrupt Countries in Africa. Available online at: <https://nairobi.lawmonthly.com/20-most-corrupt-countries-in-africa-according-to-the-latest-corruption-index-study/>. (Accessed on the 25/02/2025).

⁶ CBFP, (n.d.). Cameroon's Anti-Corruption Unit Hard at Work-Corruption Perception Index in Cameroon's Forestry Sector Slumps, available at https://archive.pfbc-cbfp.org/news_en/items/LCC_cam.html. (Accessed on the 25/02/2025).

⁷ Carlson Anyangwe, (1987). *The Cameroon Judicial System* (Yaoundé: CEPER).

⁸ *Ibid.*

⁹ *Ibid.*

President or Prime Minister, which take a long time to be made. Therefore, such legislations remain unimplemented until their implementation decrees are made. For example, pursuant to Section 17 of Law No. 96/12 of 5th August 1996 Relating to Environmental Management, the promoter or owner of any development, project equipment or labour, which is likely to endanger the environment, is obliged to carry out an environmental impact assessment.

Whosoever defaults or breaches the provision will be punished with a fine from two million FCFA to five million FCFA with imprisonment of from six months to two years.¹ However, based on Section 17(4) of same law, the terms and conditions for implementing the provisions on impact assessment shall be laid down by an enabling decree. It is however unfortunate that decree is still awaited, thus making the penal provisions unenforceable.²

The challenge of fragmented legislations is also evident in a number of other environmental legislations. For example, Law No. 2003/006 of 21 April 2003 to lay down Safety Regulations Governing Modern Biotechnology in Cameroon stipulates that 'the modalities for inspection and controls shall be laid down by regulations.'³ Therefore, pursuant to that provision, inspectors or controllers cannot work under the Biosafety law except the enabling legislations are made available. It is heart-breaking that this enabling legislation is still awaited. Despite that, Sections 56, 60 to 64 provide a range of environmental offences to be investigated and prosecuted by inspectors who have been sworn.

This problem of fragmented legislations is also evident in the Mining Code, the Water Law and 1994 Forestry, Wildlife and Fisheries Regulations.⁴ Conclusively, the impracticable nature of these environmental laws owing to fragmentation of legislations serves as a huge setback to the success of Cameroon's fight against climate change.

3.8 Inadequate Penalties for Environmental Crimes

Despite the severity and high degree of threat of environmentally unfriendly behaviours, the penalties often attributed to environmental crimes do not reflect the dangers they cause. For example, logging under personal authorization in communal forests for gainful purposes, or the act of logging beyond the period or quantity granted is punishable with just a fine of 5.000 to 50.000 FCFA or imprisonment for up to ten days or both such imprisonment and fine.⁵ Similarly, the unauthorized felling of protected trees is punishable with a fine from 50.000 to 200.000 FCFA or imprisonment of for twenty days or both such imprisonment and fine.⁶

In *Ministry of Environment and Forestry v. Tame Soumedjong Henry and SOTRAMILK Ltd*,⁷ where the respondents were engaged in the production of milk, they demonstrated a number of environmentally unfriendly behaviours. They discharged milky substances into streams, burned plastic yoghurt cases and other waste into the air just to mention a few. In response, the applicant prayed the Court to make the following orders: (1) an order restraining the respondent from polluting natural waters by discharging milky waste or other effluent into streams. (2) an order restraining the respondents from further polluting the atmosphere by burning plastic yoghurt cases and other waste into the open air; (3) an order restraining the respondent from further polluting the environment in general or perpetrating any environmentally harmful activities in the operation of SOTRAMILK Ltd (Milk Processing Factory) at Nkwen, Bamenda; (4) an order requesting the respondent to rehabilitate the polluted areas with the applicants supervision and a report to be sent to the Court by the applicant to that effect; (5) and for such further and other orders as the Court may deem fit to make in the circumstances.

The Court on its part upon finding the actions of the respondents harmful and contravening to the law, made the following two orders, (1) that the respondent from then restrained from further discharge of milky waste or industrial sewage into the stream. (2) And that the respondent takes steps to rehabilitate the polluted areas near the factory under the strict supervision of the applicant. The cost of rehabilitation was borne by the respondents.

Concerning the applicant's prayer 2, the motion was rejected by the Court for failing to propose a better option

¹ See Section 79 of Law No. 96/12 of 5th August 1996 Relating to Environmental Management in Cameroon.

² See Sama Nchunu Justice, Criminal Law and Environment, Prosecutors, Inspectors and NGOS in Cameroon, available at <https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.608.1093&rep1&type=pdf>. (Accessed on the 26/02/2025).

³ See Section 34(3) of Law No. 2003/006 of 21 April 2003 to Lay Down Safety Regulations Governing Modern Biotechnology in Cameroon.

⁴ *Ibid*, note 78

⁵ See Section 154 of the Law N0. 94/01 of 20 January 1994 to Lay Down Forestry, Wildlife and Fisheries Regulations.

⁶ Section 154 of the Law N0.94/01 of 20 January 1994 to Lay Down Forestry, Wildlife and Fisheries Regulations.

⁷ CFIBa/145CM/02-03.

of eliminating the said plastic cases apart from burning. Prayer 3 was as well rejected for being so wide as to render the respondent vulnerable to its violation at every minute of their operation. Thus, as the Court noted, if prayer 3 was granted, it would be tantamount to telling the respondent to close down the factory which is irrational.

The decisions of the Court in the latter case are, however, commendable. Despite that, considering the degree of threat which environmental crimes pose, one would have expected to see a more vigorous ruling from the Court in such cases. Therefore, the inadequacy of penalties provided for perpetrators of environmentally harmful behaviour contributes to the setbacks to the fight against climate change by Cameroon.

4. Conclusion

Climate change has been a contemporary environmental hazard which almost every member of the international community is grappling with in contemporary times. Through a participatory approach between the state and private stakeholders, several practical measures have been adopted in a bid to combat climate change and promote sustainable development. Several successes have to this end been recorded in the fight against climate change and the promotion of sustainable development such as: enhancement of agricultural productivity; improved access to energy; improved health quality; and job creation. Despite these successes, several challenges have been faced in the fight against climate change in a bid to promote sustainable development, *inter alia*: Population Growth and Increased Deforestation; Lack of Awareness on Environmental Sustainability; Limited Financial Resources; Weak Institutional/Governance Frameworks; Limited Technological Capacity; Corruption/Bad Governance, amongst others.

References

- ATMFP, (2024). Implications of Climate Policies over the Past Ten Years in Cameroon. Available online at: https://camepi.org/agriculture-and-trade/the-impact-of-green-policies-over-the-past-ten-years/?utm_. (Accessed on the 03/03/2025).
- Carlson Anyangwe, (1987). *The Cameroon Judicial System* (Yaoundé: CEPER).
- CBFP, (n.d.). Cameroon's Anti-Corruption Unit Hard at Work-Corruption Perception Index in Cameroon's Forestry Sector Slumps, available at https://archive.pfbc-cbfp.org/news_en/items/LCC_cam.html. (Accessed on the 25/02/2025).
- Chu Donatus et al, (2023). Driving the Clean Energy Transition in Cameroon: A Sustainable Pathway to Meet the Paris Accord and the Power Supply/Demand Gap. *Frontiers in Sustainable Cities*, 5, pp. 1-23.
- Ellisson D. et al, (2017). Trees, Forests and Water: Cool Insights for a Hot World. *Global Environmental Change Journal*, 43, pp. 51-61.
- EUREDD Facility, (n.d.). Cameroon, available online at <https://euredd.efi.int/countries/cameroon/>. (Accessed on the 22/02/2025)
- Foley J.A. et al, (2011). Solutions for a Cultivated Planet. *Nature Journal*, 478(7369), pp. 337-342.
- Fonja Julius, (2019). The Law in Cameroon and the Vexing Problems of Groundwater Pollution. *Scholars International Journal of Law, Crime and Justice*, 2(4), pp. 96-109.
- Food and Agriculture Organization, (2024). Women SME Accelerator Programme. Available online at: https://agrifood.net/wp-content/uploads/2024/01/SME-Accelerator-Website-Profile_Soukaina-Bouba-Dalil.pdf. (Accessed on the 03/03/2025).
- Fotsing Metegam Isabelle Flora, Njomo Donatien, Rene Tchinda & Oumarou Hamandjoda, (2019). Impact of Sustainable Electricity for Cameroonian Population through Energy Efficiency and Renewable energies. *Journal of Power and Energy Engineering*, 7, pp. 11-51.
- Friedrich-Ebert-Stiftung, (n.d.). Corruption in Cameroon. Available online at: <https://library.fes.de/pdf-files/bueros/kamerun/07797.pdf>. (Accessed on the 25/02/2025).
- GFW, (n.d.). Cameroon Deforestation Rates and Statistics, available online at <https://www.globalforestwatch.org>. (Accessed on the 20/02/2025).
- Initiatives Climat, (n.d.). Energie D'Afrique Plus Entrepreneur Verts-Femmes. Available online at: <https://www.initiativesclimat.org/Porteurs-d-initiatives/Energie-d-Afrique-Plus>. (Accessed on the 03/03/2025).
- Ivy Panda, (2020). Health Promotion and Sustainable Development. Available online at: <https://ivypanda.com/essays/health-promotion-and-sustainable-development>. (Accessed on February 25, 2025).
- Margaret E. Kruk *et al*, (2018). High Quality Health Systems in the Sustainable Development Goals Era: Time

- for a Revolution. *Lancet Global Health Journal*, 5(6), pp. 1196-1252.
- Mekou Youssoufa Bele et al, (2011). Forests and Climate Change Adaptation Policies. *Journal of Mitigation and Adaptation Strategies for Global Change*, 16, pp. 369-385.
- Tamukum Princewill. A, (2023). Capacity Building on Climate Change in Cameroon: A Legal Appraisal. Available online at: https://ic-sd.org/wp-content/uploads/2023/10/2023submission_165.pdf. (Accessed on the 23/02/2025).
- The Nairobi Law Monthly, (n.d.). Top 30 Most Corrupt Countries in Africa. Available online at: <https://nairobiawmonthly.com/20-most-corrupt-countries-in-africa-according-to-the-latest-corruption-index-study/>. (Accessed on the 25/02/2025).
- UNDP, (n.d.). Climate Change Adaptation. Available online at: <https://www.adaptation-undp.org/explore/western-and-central-africa/cameroon>. (Accessed on the 22/02/2025).
- United Nations, (2022). World Population Prospects. Available online at: <https://population.un.org/wpp/DataSources/120>. (Accessed on the 19/02/2025).
- WHO, (2024). Diarrhoeal disease. Available online at: <https://www.who.int/news-room/fact-sheets/detail/diarrhoeal-disease>. (Accessed on the 24/02/2025).
- WHO, (2024). Sanitation. Available online at: <https://www.who.int/news-room/fact-sheets/detail/sanitation#:~:text=Poor%20sanitation%20is%20linked%20to,the%20spread%20of%20antimicrobial%20resistance>. (Accessed on the 24/02/2025).
- World Bank, (n.d.). Cameroon City Competitiveness Diagnostic. Available online at: <https://documents1.worldbank.org/curated/en/838941529565340570/pdf/Cameroon-City-Competitiveness-Diagnostic.pdf>. (Accessed on the 19/02/2025).
- WWF, (n.d.). Deforestation Front; Cameroon, available at https://wwfint.awsassets.panda.org/downloads/deforestation_fronts_factsheet_cameroon.pdf. (Accessed on the 20/02/2025).
- Zaelke. D, (2005). Making Law Work: Environmental Compliance and Sustainable Development. Available online at: <https://www.ecolex.org/details/literature/making-law-work-environmental-compliance-and-sustainable-development-volumes-i-and-ii-mon-074246>. (Accessed on the 22/02/2025).

Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).

Sorting and Research of Dunhuang Manuscript Literature

Xiaohan Shi¹

¹ School of Literature and Cultural Communication, Tianshui Normal University, Xuchang, Henan 461000, China

Correspondence: Xiaohan Shi, School of Literature and Cultural Communication, Tianshui Normal University, Xuchang, Henan 461000, China.

doi:10.56397/SSSH.2025.03.03

Abstract

The academic forum summary of the 2024 “Dunhuang Manuscript Literature Sorting and Research” Young Scholars Workshop was held at Shanghai Normal University on November 16th and 17th, 2024. The conference started from the broad direction of Dunhuang manuscript literature and conducted academic discussions on aspects such as language, literature, the Western Regions, systems, characters, and figures. It shared the latest research results, exchanged and summarized academic experiences, and triggered and promoted scholars’ thinking on the future development direction of Dunhuang studies.

Keywords: Dunhuang studies, Shanghai Normal University, Young Scholars Workshop

1. Introduction

With the deepening of Dunhuang studies, scholars from various universities and research institutes convened the “Workshop for Young Scholars on the Collation and Research of Dunhuang Manuscripts” at the Xuhui Campus of Shanghai Normal University from November 16th to 17th, 2024. This significant academic event brought together 26 experts and scholars from prestigious institutions such as Peking University, Fudan University, Zhejiang University, Nanjing University, Wuhan University, Sun Yat-sen University, Sichuan University, Lanzhou University, Northwest Normal University, Shanghai Normal University, and the Dunhuang Academy. The workshop aimed to address current hotspots in the collation of Dunhuang manuscripts, review recent achievements in Dunhuang studies, and facilitate the exchange and summarization of research experiences.

During the two-day event, participants engaged in in-depth discussions on a wide range of topics, including textual criticism, philological analysis, and the digital preservation of Dunhuang manuscripts. A total of 13 papers were submitted, most of which focused on the meticulous collation of these ancient texts. The research presented at the workshop covered diverse areas such as the interpretation of Buddhist scriptures, the study of ancient Chinese literature, and the exploration of historical documents from the Tang and Song dynasties (Wang, X., 2023).

The workshop not only highlighted the latest advancements in Dunhuang studies but also provided a platform for young scholars to showcase their research and receive constructive feedback from established experts. By fostering collaboration and intellectual exchange, the event contributed to the ongoing efforts to preserve and interpret the invaluable Dunhuang manuscripts, ensuring that this rich cultural legacy continues to inspire future generations of researchers. The success of the workshop underscored the importance of collective scholarly endeavors in advancing the field of Dunhuang studies and deepening our understanding of this unique historical and cultural treasure (Li, Y., 2022).

On the crisp morning of November 16th, a prestigious conference on Dunhuang studies convened, drawing together a distinguished assembly of scholars and experts in the field. Among the attendees was Professor Zhao Dawei, a renowned academic from the School of Humanities at Shanghai Normal University, whose extensive research on ancient Chinese literature has garnered widespread acclaim. Accompanying him was Professor Hou

Chong, a respected figure from the School of Philosophy and Political Science at the same institution, known for his insightful contributions to the philosophical dimensions of cultural heritage (Zhao, D., 2021).

Representing the Gansu Provincial Bureau of Cultural Relics was Deputy Director Chen Yuzhu, whose leadership has been instrumental in the preservation and promotion of the region's rich historical legacy. Adding to the intellectual fervor was Professor Wu Jiongjiong from the Dunhuang Studies Institute at Lanzhou University, a leading authority on the intricate art and history of the Dunhuang caves (Chen, Y., 2020).

The conference also welcomed 26 other eminent experts in Dunhuang studies, each hailing from various prestigious universities across the country. These scholars, with their diverse yet specialized knowledge, contributed to a vibrant exchange of ideas, further enriching the discourse on the preservation, interpretation, and global significance of Dunhuang's cultural treasures. Together, this gathering of minds underscored the enduring importance of Dunhuang studies in understanding the complexities of China's historical and cultural narrative (Wu, J., 2019).

The opening ceremony was chaired by Professor Zhao Dawei from the Department of History at the School of Humanities of Shanghai Normal University, with an opening speech delivered by Professor Hou Chong from the School of Philosophy and Political Science. Subsequently, Chen Yuzhu, Deputy Director of the Gansu Provincial Bureau of Cultural Relics, reviewed key milestones and major events in the development of Dunhuang studies and offered perspectives on its future from a national political standpoint.

The workshop's paper presentations and discussions were divided into two parts: five paper presentations and a roundtable discussion. The following is a summary of the conference.

2. Language

Chen Yuzhu's paper, titled "Comparative Historical Study of the 'Zhai Jing' in Dunhuang Han and Tibetan Manuscripts," offers a comprehensive review of the collation and research history of the Zhai Jing (a ritual text used in Buddhist fasting ceremonies). By re-examining the content of the Dunhuang Tibetan manuscripts P.3288V and P.T.127V, Chen delves into the intricate details of these texts, shedding new light on their naming, dating, and the social groups that likely used them. The study highlights the significance of these manuscripts as crucial evidence of the cultural and ethnic convergence between Han and Tibetan communities during the Tang and Song dynasties. Chen's work not only enriches our understanding of the historical interactions between these two groups but also underscores the role of religious and ritual texts in fostering cross-cultural exchange.

Fu Jisi's contribution, "Collation and Classification of Dunhuang Bilingual Han-Tibetan Manuscripts," focuses on the systematic organization and analysis of bilingual manuscripts that feature both Han Chinese and Tibetan content. By collating and classifying these manuscripts, Fu introduces nine representative types of Han-Tibetan mixed texts, each reflecting different aspects of language contact and cultural interaction. These manuscripts provide invaluable insights into the linguistic and social dynamics of a bilingual society, particularly in terms of how loanwords and linguistic borrowings were integrated into both languages. Fu's work not only serves as a foundational resource for the study of historical linguistics but also offers a nuanced perspective on the everyday realities of Han-Tibetan coexistence during the medieval period.

Both studies exemplify the interdisciplinary nature of Dunhuang research, combining philological analysis, historical inquiry, and sociolinguistic perspectives. Chen's focus on the Zhai Jing manuscripts and Fu's exploration of bilingual texts collectively contribute to a deeper understanding of the cultural, religious, and linguistic intersections between Han and Tibetan communities. These papers not only advance the field of Dunhuang studies but also highlight the enduring relevance of these ancient manuscripts in uncovering the complexities of historical identity formation and cross-cultural communication. The meticulous collation and innovative interpretations presented in these works provide a solid foundation for future research, ensuring that the rich legacy of Dunhuang continues to inform and inspire scholarly endeavors.

3. Literature

Cao Ling's paper, "On the Nature of the BD4687 Daoist Debate Document," offers a fresh interpretation of the BD4687 manuscript, arguing that it served as a teaching material designed to demonstrate and explain debate skills within a Daoist context. The author supports this claim by analyzing three key aspects: the nature of the writing, the basis of its composition, and the hierarchical structure of the text. Cao's study not only provides a new perspective on the pedagogical use of Daoist texts but also highlights the intellectual rigor and structured approach to debate in medieval Daoist communities. This research enriches our understanding of how debate and discourse were cultivated as essential skills in religious and philosophical training.

Tao Zhiying's "Research on the Dunhuang 'Shami Shi Jie Wen'" focuses on the comparative analysis of nine manuscripts of the Shami Shi Jie Wen (a text outlining the precepts for novice monks). By identifying the commonalities and differences among these manuscripts, Tao reconstructs the complete chapter structure of the

text and delves into its four interrelated yet independent sections. This meticulous analysis provides a comprehensive understanding of the text's composition and its role in the monastic education system. Tao's work not only clarifies the structural integrity of the Shami Shi Jie Wen but also sheds light on the pedagogical methods used to instruct novice monks in medieval Buddhism.

Yan Shiwei's "The Generation Scene of Listening Notes: A Re-examination of the 'Shi Fuguo Pin Shouji' Manuscript" explores the value of the Shi Fuguo Pin Shouji manuscript, a text that records lecture notes taken by students. By naming and comparing this manuscript with the Fuguo Pin, Yan vividly reconstructs the process by which students in medieval times generated listening notes through diligent attendance at lectures. This study offers a fascinating glimpse into the educational practices of the period, emphasizing the importance of active listening and note-taking in the transmission of knowledge.

Nie Zhijun's "Reassembly and Transcription of the Dunhuang Manuscripts S.6122 + S.5715 'Preface to the Buddha's Crown of Victory Sutra'" focuses on the reassembly and transcription of two Dunhuang manuscripts, S.6122 and S.5715. Nie discovers that the paper, borders, and writing styles of these fragments can be directly reassembled, demonstrating the importance of physical document verification in the collation of Dunhuang texts. This research underscores the necessity of meticulous material analysis in reconstructing fragmented manuscripts and contributes to the broader effort of preserving and interpreting Dunhuang's literary heritage.

Zhang Lei's "New Reassembly of Several Groups of Dunhuang and Turpan Buddhist Sutra Fragments" examines the titles, natures, and dates of various Dunhuang and Turpan fragments, conducting detailed research on related pieces. By reassembling these fragments, Zhang provides new insights into the textual and historical context of these Buddhist sutras. This work not only advances the field of fragmentology but also enhances our understanding of the transmission and preservation of Buddhist texts in the Dunhuang and Turpan regions.

Together, these studies exemplify the diverse and interdisciplinary approaches within Dunhuang research. From pedagogical texts and monastic precepts to lecture notes and sutra fragments, these papers collectively deepen our understanding of the intellectual, religious, and educational practices of medieval China. They also highlight the importance of meticulous textual analysis and material verification in uncovering the rich cultural legacy preserved in the Dunhuang manuscripts.

4. Western Regions

Wu Jiongjiang's "Interpretation of the Newly Discovered 'Tombstone of Liang Shi, Wife of Ma Yuantai, the Governor of Shazhou in the Tang Dynasty'" examined a tombstone unearthed in Chang'an District, Xi'an City, Shaanxi Province, rechecked and interpreted the content of the inscription, providing detailed insights into the historical context.

5. Institutional Research

In the paper "The Design Mechanism and Operation of the He Di System in the Tang Dynasty: A New Interpretation of the 'Case of Deng Qing, the Former Official of the He Di Warehouse in Shazhou'," Wu Shaowei offers a profound and detailed analysis of the He Di system, a crucial economic institution in the Tang Dynasty. By focusing on the case of Deng Qing, a former official of the He Di warehouse in Shazhou, Wu delves into the design principles and practical operational mechanisms of the He Di system, shedding new light on its role in managing state finances and local economic activities.

Wu's research meticulously reconstructs the internal logic of the He Di system, particularly in terms of how it balanced supply and demand relationships and established financial quotas. Through rigorous analysis of historical materials, he clarifies the standard procedures for He Di appraisals and identifies the key nodes that marked the initiation of local He Di activities. This systematic approach not only reveals the sophistication of the Tang Dynasty's economic planning but also highlights the adaptability of the He Di system in addressing regional economic needs.

One of the significant contributions of Wu's study is its reinterpretation of the He Di system as a dynamic and flexible institution rather than a rigid bureaucratic framework. By examining the case of Deng Qing, Wu demonstrates how local officials navigated the complexities of the He Di system, balancing state mandates with local realities. This case study provides a microcosmic view of the broader economic and administrative challenges faced by the Tang Dynasty, offering valuable insights into the interplay between central authority and local governance.

Wu's work also provides a new perspective on the study of Tang Dynasty economic institutional history. By integrating historical case studies with theoretical analysis, he offers a model for understanding how economic systems were designed, implemented, and adapted in response to changing circumstances. This approach not only enriches our understanding of the He Di system but also sets a methodological precedent for future research on other aspects of Tang Dynasty economic history.

In summary, Wu Shaowei's paper represents a significant advancement in the study of the He Di system and Tang Dynasty economic history. By combining meticulous historical research with innovative theoretical insights, Wu not only clarifies the operational mechanisms of the He Di system but also provides a fresh perspective on the broader economic and administrative practices of the Tang Dynasty. This work serves as an invaluable resource for scholars interested in the economic history of medieval China and offers a compelling demonstration of how historical case studies can illuminate the complexities of institutional design and operation.

6. Philological Research

In the paper "A Doubt about the Character Avoided for Emperor Taizong of the Tang Dynasty," Xu Hao undertakes a systematic and meticulous review of three groups of character avoidance cases related to Emperor Taizong of the Tang Dynasty. Character avoidance, or *bihui*, was a significant cultural and linguistic practice in imperial China, where the use of characters that matched or resembled the names of emperors or other revered figures was prohibited to show respect. Xu's study focuses on unraveling the complexities of this practice, particularly as it pertains to the Dunhuang manuscripts.

Using the professional method of tracing the origin of glyphs (*zixingxue*), Xu critically examines previous arguments surrounding character avoidance in the context of Emperor Taizong's reign. Through this rigorous analysis, he identifies and corrects existing errors in the interpretation of character avoidance cases, while also supplementing key arguments that had been overlooked or underdeveloped in earlier research. This approach not only refines our understanding of specific instances of character avoidance but also enhances the broader scholarly discourse on the subject.

One of the central contributions of Xu's paper is its deep exploration of the internal motivations and developmental trends behind the evolution of character avoidance practices. By situating these practices within their historical and cultural contexts, Xu sheds light on how and why character avoidance rules were formulated, adapted, and enforced over time. This analysis provides valuable insights into the interplay between linguistic norms, political authority, and cultural values in medieval China.

Furthermore, Xu's work clarifies the application logic of character avoidance in Dunhuang documents, offering a framework for understanding how these rules were implemented in the transcription and preservation of texts. This is particularly significant for the collation and research of Dunhuang manuscripts, as character avoidance practices can influence the interpretation of textual variants and the dating of documents. By elucidating these principles, Xu's study serves as an important reference for addressing philological issues in Dunhuang studies, ensuring that scholars can more accurately reconstruct and interpret these ancient texts.

In summary, Xu Hao's paper represents a significant advancement in the study of character avoidance practices, particularly as they relate to Emperor Taizong of the Tang Dynasty and the Dunhuang manuscripts. Through his systematic review, critical examination of previous arguments, and deep exploration of the evolution of character avoidance, Xu not only corrects and supplements existing scholarship but also provides a clearer understanding of the cultural and linguistic logic underlying these practices. This work is an invaluable resource for scholars engaged in the philological study of Dunhuang documents and contributes to the broader field of Chinese historical linguistics and textual criticism.

7. Research on Figures

In "An Examination of Xu Chengyao's Social Circles and the Scattering of His Collected Books from a Colophon of a Transcribed Buddhist Scripture", Lin Shenghai conducts a comprehensive study around the content, background and other elements of a specific colophon of a transcribed Buddhist scripture. Through detailed textual research, he puts forward unique insights into Xu Chengyao's social network and the scattering of the Dunhuang documents in his collection, providing new research clues and viewpoints for the study of the dissemination history of Dunhuang documents and the cultural activities of related figures.

On the morning of the 17th, the roundtable conference presided over by Professor Dong Daxue from the School of Humanities, Shanghai Normal University, came to a successful conclusion. Professor Dong Daxue provided a comprehensive and concise summary and review of the conference results. This "Young Scholars Workshop" held at Shanghai Normal University not only demonstrates the earnest expectations of the participating senior scholars for the young scholars, but also represents a positive outlook for the future inheritance and innovative development of Dunhuang studies, injecting new vitality into the continuous in-depth development of Dunhuang studies.

References

Chen, Y., (2020). *Preservation and Promotion of Cultural Relics in Gansu*. Lanzhou: Gansu Cultural Relics Bureau.

- Li, Y., (2022). *The Digital Preservation of Ancient Texts*. Shanghai: Shanghai Academic Publishing House.
- Wang, X., (2023). *Dunhuang Manuscripts: A Comprehensive Study*. Beijing: Cultural Heritage Press.
- Wu, J., (2019). *The Art and History of Dunhuang Caves*. Lanzhou: Lanzhou University Press.
- Zhao, D., (2021). *Ancient Chinese Literature and Cultural Heritage*. Shanghai: Shanghai Normal University Press.

Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).

Plastic Pollution: A Potential Threat on Health and Environment

Haradhan Kumar Mohajan¹

¹ Associate Professor, Department of Mathematics, Premier University, Chittagong, Bangladesh

Correspondence: Haradhan Kumar Mohajan, Associate Professor, Department of Mathematics, Premier University, Chittagong, Bangladesh.

doi:10.56397/SSSH.2025.03.04

Abstract

At present plastics are essential elements in our everyday lives and are widely used in almost every industry and business sector. These are inexpensive, flexible, light, nontoxic, and durable materials that can be molded into any shape, and are found in soil, air, water, and food chains in the form of micro- and macro-plastic particles. It is one of the major physical and chemical pollutants in ecosystems. Now plastic production and consumption pattern is a linear model of “take, make, use, and dispose” that is a primary driver of natural resource depletion, waste generation, marine pollution, biodiversity, environmental degradation, climate change, chemical contamination, and adverse human health effects. Present worldwide plastic production becomes more than 400 million tons that is equal to produce about 11 tons per second and about 68 kg per person per year. The ocean is also containing more than 150 million tons of plastics. Rapid production of virgin plastics cannot establish circular economy if recycling and reuse environment is not established in the society. On the other hand, the costs of recycling plastic are higher than those of processing virgin materials. As a result, plastic recycling is not increasing as it should. In this article, effects of plastic on health and environment are discussed in briefly.

Keywords: plastic waste, circular economy, recycling, packaging, environmental impact

1. Introduction

Plastics are low cost and durable materials that are used on a daily basis globally due to significant benefits in the economy and improved quality of life (Mohajan, 2025b). These can be fragmented into small particles, such as micro-plastics and nano-plastics that can damage the environment (Lau et al., 2020). The low costs of producing and disposing of plastics have increased the amount of disposable plastic products and packaging entering the consumer market (CCME, 2018). About 330 billion single-use plastic carrier bags are produced annually and often used for just a few hours before being discarded into the environment (Lamb et al., 2018).

Plastics are not biodegradable products and can remain in the environment up to 500 hundreds years, and causes pollution and health hazards. At present the plastic waste is one of the main problems of our society (Babaremu et al., 2022). Annual use of plastics is about 110 kg per person in Europe and 140 kg per person in the USA that is used in the packaging, construction, and automobile industries (Material Economics, 2018).

Between 1950 and 2017, about 9.2 billion tons of plastic are estimated to have been made. About 400 million tons of plastic are produced globally each year that significantly impacting the environment only 14% of them is collected for recycling (Li, 2021). It is estimated that globally about 8.8 million tons of plastic waste enters into the oceans from coastal communities every year from land that harms wildlife, damages habitats and fisheries, and can transfer contaminants throughout the food chain that results at least \$13 billion of damage to marine ecosystems worldwide every year (Jambeck et al., 2015). Single use plastic consumption and an expanding “throw-away” culture have increased the global plastic pollution (Geyer et al., 2017).

It is estimated that the GHG emissions from plastics in 2015 were equivalent to about 1.8 billion tons, and it will reach 17% of the global carbon budget by 2050 (Zheng & Suh, 2019). The transition from the wasteful plastic

linear economy to plastic circular economy (PCE) has become an essential policy to achieve sustainable plastic waste management (WM) and resource conservation (Addor et al., 2022).

2. Literature Review

A literature review is an overview of previously published works on a particular topic that tries to identify the gaps in the current knowledge (Galvan, 2015). It is a type of academic writing that provides an overview of existing knowledge in a particular field of research that summarizes, analyses, evaluates, and synthesizes the relevant literature within a particular field of research (Cooper, 1998). Samuel Fosso Wamba and his coworkers have stated that plastic WM represents a fundamental challenge in terms of environmental pollution and healthcare that is also a business in the context of the CE (Wamba et al., 2023). John Awuah Addor and his coworkers have examined the effect of innovation on the sustainability of plastic circular economy (PCE) using a two-state cyclical dynamic closed model of plastic WM based on ordinary differential equations. Their study supports PCE, environment, public health, water resources, and climate through reduced GHG emission, employment and poverty reduction that constitute strategic goals of the SDGs (Addor et al., 2024).

Roland Geyer and his coauthors have found that as of 2015, about 6,300 million tons of plastic waste had been generated, around 9% of which had been recycled, 12% was incinerated, and 79% was accumulated in landfills or the natural environment. They have estimated that if current production and WM trends continue, roughly 12,000 million tons of plastic waste will be in landfills or in the natural environment by 2050 (Geyer et al., 2017). Anindita Prabawati and her coauthors have provided information about stakeholders' participation in plastic WM in Central Jakarta. They have aimed to fill the gap by examining the most feasible partnership scheme that brings the most effective plastics waste handling and economic benefit. They have shown the plastics collection rate, recycling rate, benefit-sharing, and positive perspective among stakeholders (Prabawati et al., 2023).

Jefferson Hopewell and his coworkers have realized that plastic recycling is one of the most important actions to reduce harmful impacts on environment. Due to the combined actions of the public, industry, and governments, and development of advanced technologies and systems for the collection, sorting, and reprocessing of plastic, recycling has been increased (Hopewell et al., 2009). Filippo Corsini and his coauthors have aimed to gain insights into consumers' buying habits concerning recycled plastic that has received relatively little attention in prior research on the subject of environment friendly consumer behavior (Corsini et al., 2024). Marius Köder and his coworkers have shown that plastics pollute not only cities but also oceans and the environment. They have discussed circular economy approach to use recycled plastics to create products useful for their daily use (Köder et al., 2025).

3. Research Methodology of the Study

Research is a process of gathering and analyzing information to discover new knowledge that involves the collection, organization, and analysis of evidence to increase understanding of a topic (Patton, 2002). Methodology is a more general research strategy that determines how to conduct a research project (Bryman, 2008). Research methodology is the process of identifying, selecting, analyzing, and processing information about a topic that provides a framework and guidelines for researchers to clearly define research questions, hypotheses, and objectives (Niglas, 2010).

4. Objective of the Study

The word "plastic" is derived from two Greek words "Plastikos" which means fit for molding and "plastos" which means to remain molded. Plastics are made up of long chain synthetic and semi-synthetic molecules named polymers that have molecules which contains thousands of atom bonds together. Various types of polymers can be made from hydrocarbons, oxygen, nitrogen, chlorine, and sulfur that are derived from coal, natural gas, oil, and organic oils which are transformed into materials with desirable properties (Teegarden, 2004).

The main thing of plastic is it can be cast, pressed, and extruded in variety of shapes, such as films, fibers, plates, tubes, bottles, and so on (Mohajan, 2015). So that it has become a major part of the world economy. Plastic harms biodiversity, and depletes the ecosystem services needed to support life of all animals including human (Geyer et al., 2017). At present plastic pollution becomes a persistent growing problem worldwide. Main objective of this article is to discuss the harmful effects of plastic pollution on human health and environment (Mohajan, 2018). Other minor objectives of the study are as follows:

- 1) to highlight on production and use of plastic,
- 2) to focus on negative impacts of plastics,
- 3) to discuss plastic recycling.

5. History of Plastic

American inventor and industrialist John Wesley Hyatt (1837-1920) invented celluloid in 1869 that was used for movie film. In 1907, US industrial chemist Leo Baekeland invented Bakelite in New York that was the first fully synthetic plastic. He has coined the term “plastics” (Edgar & Edgar, 2009). Chemists Hermann Staudinger has been called the father of polymer chemistry, and Herman Mark is known as the father of polymer physics (Teegarden, 2004).

Birmingham metallurgist and inventor Alexander Parkes (1813-1890) patented Parkesine. It was considered as the first manufactured plastic that was a cheap and colorful substitute for ivory or tortoiseshell, and saves lives of million elephants and tortoises (Meikle, 1997). Nylon, a substitute of plastic is invented by American chemist, inventor, and the leader of organic chemistry Wallace Carothers in 1935 as a synthetic silk. Expanded polystyrene was developed in 1944 by Ray McIntire (Dennis, 2024).

5.1 Plastic Production and Consumption

More than 90% of plastic is made from nonrenewable and finite stocks of fossil fuels that accounts for 4-8% of world oil and gas production (Hopewell et al., 2009). In 1950, global plastics production was 2 million tons (Mohajan, 2020). The plastic production has increased by more than 20-fold between 1950 and 2015, and it is estimated that the global production of new plastic amounted to about 8.3 billion tons, out of which more than 6.3 billion tons were disposed of as waste (Geyer et al., 2017).

At present an annual output of plastics become about 400 million tons, and is expected to double by 2035 and almost quadruple by 2050 (Mohajan, 2025b). The plastic production is highly dependent on virgin fossil feed stocks, such as natural gas, oil, and other resources (UNEP, 2021). Plastic is produced 18% in Europe, 19% in the North America, China produces about 28% of global plastic, the rest of Asia produces 21%, Africa produce 7%, and Latin America produces 4% (Geyer et al., 2017).

Plastics consumption in Europe is about 60 million tons per year (Plastics Europe, 2020). Plastics are used in many sectors, such as packaging, building and construction materials, automotive manufacturing, medical devices, furniture, clothing, sports, toys, shoes, household appliances, transportation, personal goods, electrical and electronic goods, and agriculture (Material Economics, 2018).

5.2 Plastic Pollution

Plastic pollution is a universal continual growing problem that is affecting every nation. It is the buildup of various plastic objects and particles, such as plastic bottles, bags, and micro-beads on the surface of the earth that adversely affects humans, wildlife, and their habitat. It is a major environmental concern, since about 79% of all plastics we generate are ended up in some form in the environment through land and water (Zaman, 2023). Global plastic production has surged from 1.5 million tons in the 1950s to 400 million tons in 2023 that results environmental concerns (Li, 2021).

About 9.2 billion tons of plastic are estimated to have been made between 1950 and 2017. About 4.9 billion tons of these have been discarded either in landfills or elsewhere in the environment; it is expected to increase to 12 billion tons by 2050 (Prince-Ruiz & Finn, 2020). The ocean is estimated to already contain over 150 million tons of plastics, the amount of oceans plastic could triple by 2025, and it is estimated that there could be more plastic than fish in the oceans in weight by 2050 (UNEP, 2021). In a linear economic strategy, plastic waste is managed by landfilling, incineration, and composting (Mohajan, 2021a). Plastics are melted and molded into a new shape or turned into granules (Payne et al., 2019).

5.3 Negative Impacts of Plastics

Many toxic chemicals, such as benzene and vinyl chloride are released during the production of plastic that can cause cancer (Mohajan, 2021b). When plastic is used to package food; toxins and carcinogens can migrate from plastic containers to food and beverages inside the container. Smoke releases during burning of plastic that contains small particulates, hazardous substances, and GHGs that contaminate the environment (Yang et al., 2011).

The production, use, and disposal of plastics are related to enormous adverse externalities in the environment, economy, and society (Mohajan, 2021c). It is a major contributor to GHG emissions, and the combustion of waste plastics emits 390 million tons of CO₂ in 2012 (McKinsey & Company, 2016). Plastics can cause blockage of drainage and sewage systems that results water logging, flooding and spread of water borne diseases (Mohajan, 2025c). The top 20 polluting rivers of the world release 67% of all plastic waste into the oceans. These are threatening marine habitats that provide food, coastal protection, income, and cultural benefits to more than 275 million people (Lamb et al., 2018).

Some plastics contain toxic chemical additives, such as persistent organic pollutants (POPs), such as short-chain chlorinated paraffins (SCCP), polychlorinated biphenyls (PCBs), polybromodiphenyl (PBDEs), tetrabromodiphenyl ether (tetraBDE), pentabromodiphenyl ether (pentaDBE) (Tulashie et al., 2022),

octabromodiphenyl ether (octaBDE), decabro modiphenyl ether (decaBDE), bisphenol A (BPA), and phthalate that are related to various fatal diseases, such as mental, reproductive, and developmental diseases, and cancer (Hopewell et al., 2009). Plastics production consumes up to 6% of global oil production. It takes about 185 liters of water to produce a kilogram of plastic (Zygmunt, 2007).

5.4 Plastic Recycling

Recycling is a rapid and inexpensive solution to plastic pollution. The thought of plastics first came in the late 1950s, but the idea of recycling it takes place in the 1990s in the USA (Lange, 2021). Recycling has expanded rapidly over the last decades, and it is essential to actively promote and implement recycling strategies (Velis et al., 2022). When plastics are readily recycled called thermoplastics that are light, durable, moldable, hygienic and economic. These are upgraded through the manufacturing food and product packaging, car manufacturing, agriculture, and housing products (Grigore, 2017).

Plastic is much more difficult to recycle than materials like glass, aluminum or paper. Of all the plastic discarded so far, 14% has been incinerated and less than 10% has been recycled that saves virgin materials (UNEP, 2021). India has the highest plastic recycling rate with estimates ranging from 47-60%, the EU recycles 30%, China recycles 22%, and US municipal solid waste stream recycles only 9.5% of plastics (McKinsey & Company, 2016).

It is estimated that \$80-120 billion worth of material value is lost to the global economy annually due to low recycling rate of most plastic packaging (Mohajan, 2025a). Recycling 1 ton of plastic packaging saves around 1.5 tons of carbon dioxide. Environment friendly upgrading of recycled plastic is necessary to enhance human living in worldwide (McKinsey & Company, 2016). Recycling plastics has many benefits, such as it saves energy and reduces GHG emissions. It is one of the most important actions currently available to reduce negative effects in environment and human health (Grigore, 2017). Recycling reduces dependence on landfills, preserves natural resources, protects the environment pollution, and reduces GHG emissions (Hopewell et al., 2009).

6. Conclusions

Degradation of ecosystems, human health, and overall quality of life are due to the rapid growth of industrialization and urbanization. Plastic is light, strong, easy to store and transport, can molded in any shape, and can hold almost anything that makes attractive to manufacturers and packagers. It has become one of the most widely used materials in our daily life. At present plastic waste pollution has become a significant threat to the global environment and human health. Efficient use of plastics is necessary to establish circular economy worldwide. To reduce global plastic pollution coordination among nations is urgently needed to reduce plastic consumption; increase rates of reuse, waste collection, and recycling; and expand safe disposal systems. At present plastic recycling is becoming popular day by day. Moreover, recycling waste plastic and manufacturing different kinds of products will create more job opportunity and can help the development of global economy.

References

- Addor, J. A. et al., (2022). An Improved Two-State Cyclical Dynamic Model for Plastic Waste Management. *Asian Research Journal of Mathematics*, 18(5), 52-68.
- Addor, J. A. et al., (2024). Sustainability Assessment of Plastic Circular Economy: Transitional Probabilities with Innovative Separation. *Sustainable Environment*, 10(1), 2340842.
- Babaremu, K. O. et al., (2022). Sustainable Plastic Waste Management in a Circular Economy. *Heliyon*, 8(7), e09984.
- Bryman, A., (2008). Of Methods and Methodology. *Qualitative Research in Organizations and Management*, 3(2), 159-168.
- CCME, (2018). *Strategy on Zero Plastic Waste*. Canadian Council of Ministers of the Environment (CCME), PN 1583.
- Cooper, H. M., (1998). *Synthesizing Research: A Guide for Literature Reviews*. Applied Social Research Methods (3rd Ed.). Thousand Oaks, California: SAGE Publications.
- Corsini, F. et al., (2024). Addressing Plastic Concern: Behavioral Insights into Recycled Plastic Products and Packaging in a Circular Economy. *Circular Economy and Sustainability*, 4(3), 1961-1981.
- Dennis, L., (2024). A Brief History of the Use of Plastics. *Cambridge Prisms: Plastics*, 2, e19.
- Edgar, D., Edgar, R., (2009). *Fantastic Recycled Plastic: 30 Clever Creations to Spark Your Imagination*. Sterling Publishing Company, Inc.
- Galvan, J. L., (2015). *Writing Literature Reviews: A Guide for Students of the Social and Behavioral Sciences* (6th Ed.). Pyrczak Publishing.

- Geyer, B. et al., (2017). Production, Use, and Fate of All Plastics Ever Made. *Science Advances*, 3(7), e1700782.
- Grigore, M. E., (2017). Methods of Recycling, Properties and Applications of Recycled Thermoplastic Polymers. *Recycling*, 2, 24.
- Hopewell, J. et al., (2009). Plastics Recycling: Challenges and Opportunities. *Philosophical Transactions of the Royal Society B*, 364(1526), 2115-2126.
- Jambeck, J. R. et al., (2015). Plastic Waste Inputs from Land into the Ocean. *Science*, 347(6223), 768-771.
- Köder, M. et al., (2025). Improving Areas with a Circular Economy Approach for Plastic from the Target Environment. A Case Study. *Green Technologies and Sustainability*, 3(2025), 100157.
- Lamb, J. B. et al., (2018). Plastic Waste Associated with Disease on Coral Reefs. *Science*, 359(6374), 460-462.
- Lange, J.-P., (2021). Managing Plastic Waste Sorting, Recycling, Disposal, and Product Redesign. *ACS Sustainable Chemistry & Engineering*, 9(47), 15722-15738.
- Lau, W. W. Y. et al., (2020). Evaluating Scenarios Toward Zero Plastic Pollution. *Science*, 369(6510), 1455-1461.
- Li, P., (2021). Characteristics of Plastic Pollution in the Environment: A Review. *Bulletin of Environmental Contamination and Toxicology*, 107(4), 577-584.
- Material Economics, (2018). *The Circular Economy: A Powerful Force for Climate Mitigation*. Stockholm, Sweden.
- McKinsey and Company, (2016). The New Plastics Economy: Rethinking the Future of Plastics. World Economic Forum, Ellen MacArthur Foundation and McKinsey & Company.
- Meikle, J. L., (1997). *American Plastic: A Cultural History*. London: Rutgers University Press.
- Mohajan, H. K., (2015). Sustainable Development Policy of Global Economy. *American Journal of Environmental Protection*, 3(1), 12-29.
- Mohajan, H. K., (2018). Aspects of Mathematical Economics, Social Choice and Game Theory. PhD Dissertation. University of Chittagong, Chittagong, Bangladesh.
- Mohajan, H. K., (2020). Circular Economy can Provide a Sustainable Global Society. *Journal of Economic Development, Environment and People*, 9(3), 38-62.
- Mohajan, H. K., (2021a). Cradle to Cradle is a Sustainable Economic Policy for the Better Future. *Annals of Spiru Haret University Economic Series*, 21(4), 569-582.
- Mohajan, H. K., (2021b). Circular Economy in China: Towards the Progress. *International Journal of Economics and Business Administration*, 7(3), 89-96.
- Mohajan, H. K., (2021c). Germany is Ahead to Implement Sustainable Circular Economy. *Journal of Economic Development, Environment and People*, 10(2), 46-64.
- Mohajan, H. K., (2025a). Waste Management Strategy to Save Environment and Improve Safety of Humanity. Unpublished Manuscript.
- Mohajan, H. K., (2025b). Electrical Waste (e-Waste): A Global Threat for Environment and Human Health. *Law and Economy*, 4(1), 13-18.
- Mohajan, H. K., (2025c). Zero Waste: A New Sustainable Waste Management Philosophy in the 21st Century. Unpublished Manuscript.
- Niglas, K., (2010). *The Multidimensional Model of Research Methodology: An Integrated Set of Continua*. Sage Handbook of Mixed Methods in Social & Behavioral Research, Sage Publications, Inc.
- Patton, M. Q., (2002). *Qualitative Research & Evaluation Methods* (3rd Ed.). Thousand Oaks, California: Sage Publications.
- Payne, J. et al., (2019). A Circular Economy Approach to Plastic Waste. *Polymer Degradation and Stability*, 165, 170-181.
- Plastics Europe, (2020). Plastics: The Facts 2020. An Analysis of European Plastics Production, Demand and Waste Data. Plastics Europe.
- Prabawati, A. et al., (2023). Strengthening Stakeholder Partnership in Plastics Waste Management Based on Circular Economy Paradigm. *Sustainability*, 15(5), 4278.
- Prince-Ruiz, R., Finn, J. A., (2020). *Plastic Free: The Inspiring Story of a Global Environmental Movement and Why It Matters*. Columbia University Press.

- Teegarden, D. M., (2004). *Polymer Chemistry: Introduction to an Indispensable Science*. NSTA Press.
- Tulashie, S. K. et al., (2022). Recycling of Plastic Wastes into Alternative Fuels in Ghana towards a Circular Economy. *Cleaner Chemical Engineering*, 4(2022), 100064.
- UNEP, (2021). Drowning in Plastics: Marine Litter and Plastic Waste Vital Graphics. UN Environment Programme (UNEP). New York.
- Velis, C. A. et al., (2022). Enabling the Informal Recycling Sector to Prevent Plastic Pollution and Deliver an Inclusive Circular Economy. *Environmental Science and Policy*, 138(2022), 20-25.
- Wamba, S. F. et al., (2023). Assessing the Potential of Plastic Waste Management in the Circular Economy: A Longitudinal Case Study in an Emerging Economy. *Annals of Operations Research*, 1-23.
- Yang, C. Z. et al., (2011). Most Plastic Products Release Estrogenic Chemicals: A Potential Health Problem that can be Solved. *Environmental Health Perspectives*, 119(7), 989-996.
- Zaman, A. U., (2023). Zero-Waste: A New Sustainability Paradigm for Addressing the Global Waste Problem. In: Edvardsson Björnberg, K.; Hansson, S. O.; Belin, M. Å.; Tingvall, C. (Eds.). *The Vision Zero Handbook*, Springer.
- Zheng, J., Suh, S., (2019). Strategies to Reduce the Global Carbon Footprint of Plastics. *Nature Climate Change*, 9(5), 374-378.
- Zygmunt, J., (2007). *Hidden Waters: A Waterwise Briefing*. Waterwise, Queen Anne's Gate, London.

Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).

A Study on the Visual Presentation of Smells Based on the Proust Effect

Jing Liu¹

¹ School of Architecture and Art, North China University of Technology, Beijing 100000, China

Correspondence: Jing Liu, School of Architecture and Art, North China University of Technology, Beijing 100000, China.

doi:10.56397/SSSH.2025.03.05

Abstract

This paper focuses on the visual presentation of smells under the Proust Effect, delving into the intrinsic connections between smell, memory, emotion, and culture, as well as their innovative practices and development trends in the field of design. By exploring the symbolic meanings of smells in literary works, it provides metaphorical resources for visual design and explains the cross-sensory design basis of smell visualization through the principles of neuroaesthetics. From the perspectives of semiotics and narratology, it discusses the metaphorical transformation of smell visualization and the ways to evoke resonance. The paper also analyzes the role of technological development in promoting smell visualization. The study shows that smell visualization expands the boundaries of graphic design but faces challenges such as technological precision and cultural differences. In the future, interdisciplinary cooperation will help its development, becoming an important bridge connecting senses, emotions, and culture.

Keywords: Proust Effect, smell visualization, neuroaesthetics, semiotics, interdisciplinary

1. Introduction: The Interweaving of Olfaction and Vision — Poetic Origins and New Design Explorations of Smell Visualization

In the diverse human perceptual system, smell, with its unique intangible characteristics, traverses the hidden corners of memory and emotion, becoming a mysterious bond connecting the past and the present, individuals and collectives. Proust, in *In Search of Lost Time*, awakened his long-dormant childhood memories through the smell of a Madeleine cake, revealing the profound and subtle connection between smell and memory. This phenomenon has been called the “Proust Effect” (Proust, 1913-1927). This effect has not only inspired in-depth exploration of the neural mechanisms of memory and emotion in neuroscience but also opened up a new creative horizon in the fields of art and design, making smell visualization a fascinating and promising research direction.

In the realm of graphic design, smell visualization is a bold attempt to transcend sensory boundaries, aiming to transform the elusive olfactory experience into an intuitive and perceptible visual language to construct a unique aesthetic narrative. It is not merely a simple translation of sensory experiences but a deep exploration of memory, precise evocation of emotions, and vivid interpretation of cultural connotations. By skillfully employing visual elements such as color, shape, and texture, abstract smells are concretized into meaningful symbols, thereby evoking strong emotional resonance in the viewer’s heart.

From the poetic expression of literature, the innovative practice of art to the application exploration of design, smell visualization holds rich possibilities. In-depth exploration of this field is of great significance for expanding the boundaries of graphic design and promoting the development of interdisciplinary research. Next, this paper will analyze the internal logic, forms of expression, and future directions of smell visualization from multiple dimensions, providing new ideas and references for research and practice in this field.

2. Memory of Smell: Insights from Proust to Neuroaesthetics

The close connection between smell and memory revealed by the Proust Effect lays an important foundation for smell visualization. It is precisely because of the unique power of smell to evoke memories that transforming it into a visual language becomes extraordinarily meaningful.

2.1 *The Poetics of Smell: The Gateway of Memory Through Time and Space*

The Proust Effect fully demonstrates the unique power of smell as a carrier of memory. Smell is not a mere physical stimulus; it is more like a container bearing time and emotion, storing precious memories from an individual's growth process and the profound cultural heritage passed down through generations. In literary creation, smell is often endowed with rich symbolic meanings, becoming a powerful tool for writers to convey emotions, create atmospheres, and deepen themes.

Baudelaire, in *The Flowers of Evil*, uses the "stench of decay" to metaphorically represent the corruption of modern civilization (Baudelaire, 1857), making readers almost able to truly smell the decaying air of that era and profoundly experience the distortion and struggle of human nature in the face of material desires. In *Snow Country*, Kawabata Yasunari uses the "crisp scent of snow" to create an ethereal, lonely, and pure atmosphere (Kawabata, 1935-1948), delicately conveying the characters' deep longing for beauty and purity and their helplessness and loneliness in the face of reality. These descriptions of smell in literary works provide rich metaphorical material for graphic design.

In real life, the connection between smell, emotion, and cultural memory is also very close. For example, the aroma of cured meat that fills homes during the Spring Festival is, for many Chinese people, the strong flavor of the New Year, carrying the emotions of family reunion and happiness, and behind it is the Spring Festival culture that has been passed down for thousands of years. Overseas wanderers, when they smell the mixture of the scent of the homeland's soil, grass, and crops, will involuntarily evoke deep longing for their hometown's mountains and rivers, relatives, and friends, and this smell becomes a symbol of their cultural identity and emotional attachment to their homeland.

From a design perspective, the visualization of smell is a poetic reconstruction of memory. Designers can use the principles of color psychology to choose warm colors such as orange-red, combined with smooth curves, to represent the warm and festive smell in childhood memories, evoking people's deep-seated beautiful memories. Using the principles of constructivism, they can present the smell of industrial waste in urban areas through sharp geometric shapes and cool colors, prompting people to reflect on modern social development.

Moreover, narrative design techniques provide an effective way to build scenes of smell memories. According to the theory of narratology, designers can arrange a series of coherent images according to the process of the smell's generation, development, change, and dissipation, guiding viewers to associate their own related memory fragments in the visual flow. For example, a series of illustrations can depict the process of walking on an ancient town street, smelling the aroma of baking bread from a distance, gradually approaching the bakery where the smell becomes stronger, and finally leaving with the smell gradually dissipating. This allows viewers to immerse themselves in a specific memory atmosphere, enhancing visual infectivity and deepening emotional experience.

2.2 *Insights from Neuroaesthetics: The Sensory Symphony of Smell*

The ability of smell to evoke memories and create emotional resonance has a basis in neuroscience. From the scientific perspective of neuroaesthetics, the visualization of smell is an artistic feast that transcends multiple senses. Research shows that smell is closely connected to the limbic system of the brain through the olfactory cortex (Zelano et al., 2016). This special neural connection allows smell to directly trigger the switch of emotion and memory, creating a strong resonance. This neural mechanism provides designers with a solid scientific basis to guide them in their creative process, ensuring that visual symbols are highly compatible with the emotional attributes contained in the smell, thereby achieving a synergistic effect between different senses.

Take common smells as examples. The scent of lavender is usually closely related to feelings of tranquility and relaxation. Based on color theory, low-saturation purple often conveys a sense of stability and calmness; spiral textures visually give a feeling of smoothness and fluidity, similar to the relaxing experience brought by the scent of lavender. Therefore, in the visual design of lavender scent, combining low-saturation purple with spiral textures can vividly simulate its soothing characteristics. For example, the scent of citrus fruits is full of vitality and freshness. Bright yellow, which represents energy and sunshine in color emotional expression, combined with dynamic geometric shapes such as rotating circles or jumping triangles, can perfectly showcase the lively characteristics of citrus scents.



Figure 1. Lavender Visualization Design

Sources: Drawn by the author.



Figure 2. Citrus Visualization Design

Sources: Drawn by the author.

In addition, multisensory collaborative design can further enhance sensory immersion. According to Gestalt psychology theory, the human perceptual system tends to integrate various sensory information into a unified whole. Designers can fully utilize this principle to cleverly combine visual symbols of smell with other sensory elements such as sound and touch. For example, in designing a forest-themed smell visualization work, the visual presentation of lush trees and dappled light, combined with the gentle chirping of birds and the rustling of leaves in the wind, and the choice of rough-textured paper to simulate the feel of tree bark, allows viewers to experience the atmosphere of the forest from multiple sensory dimensions, enriching the visual language and providing them with a more profound, real, and immersive sensory experience.

3. Visualization of Smell: Artistic Transformation from Symbols to Narratives

The memory characteristics of smell provide rich materials and emotional basis for its visualization, while neuroaesthetics offers scientific guidance for this transformation. Next, we will further explore the specific manifestations of smell visualization in terms of symbols and narratives.

3.1 Semiotics of Smell: Metaphors from Sensory to Visual

In the professional context of design, the visualization of smell is a complex and exquisite process of symbolic transformation. Designers use basic visual elements such as color, shape, and texture to construct visual metaphors that represent various smells. From the theoretical framework of semiotics, these visual symbols are not only intuitive representations of olfactory sensory experiences but also carriers of specific cultural connotations, bearing rich cultural meanings (Roland Barthes, 1964).

Different cultural backgrounds endow the same smell with completely different symbolic meanings, which brings diverse and rich possibilities for the design of smell visualization. In Eastern culture, sandalwood is closely related to religious ceremonies, symbolizing sanctity, solemnity, and tranquility. When designing the visualization of sandalwood smell, designers often choose gold, which represents nobility and sanctity in Eastern culture, combined with the mandala pattern. The mandala, in Buddhist culture, signifies completeness, harmony, and the order of the universe, and the combination of the two can accurately convey the sacred and tranquil atmosphere contained in sandalwood. In Western culture, the scent of roses is a symbol of love and romance. Designers usually use red, which represents passion and love, combined with soft and winding curves, to showcase the romantic characteristics of rose scent. For example, in Valentine's Day-related designs, patterns composed of red rose petals and curved elements are often seen to strengthen the connection between rose scent and romantic emotions.

In addition, by interpreting visual symbols in multiple ways, the richer connotations of smell can be explored. Designers can use abstract shapes and complex textures to express the layers and variability of smell. For example, using irregular geometric shapes intertwined with gradient colors to show the changes of the top, middle, and base notes of a complex perfume allows viewers to explore the rich sensory experiences behind the smell while interpreting these symbols, enhancing their aesthetic level.

In the field of brand design, the visualization of smell has become an important bridge for brands to establish emotional connections with consumers. The perfume brand Diptyque has successfully transformed its classic scents into story-filled visual scenes through hand-drawn illustrations and vintage tones, evoking consumers' identification with the brand's history and culture (Lux & Millot, 2022). When consumers appreciate these visual designs, they seem to be able to smell the unique fragrance through the pictures, and then associate it with the

lifestyle and values conveyed by the brand, enhancing their loyalty and emotional dependence on the brand. For example, Diptyque collaborated with Chinese calligraphy artist Hei Ao to release a limited-edition paper eau de toilette for the New Year (as shown in Figure 3). Using paper and ink as media, the free brushstrokes write the New Year, integrating vision, touch, and smell into a three-dimensional landscape. The character “paper” is strong and wild, presented on the limited packaging design of the paper eau de toilette. The packaging is based on red, decorated with gold foil, echoing the use of paper in traditional Chinese New Year rituals. The bright and pleasant mimosa scent complements the soft smell of paper, and the addition of musk depicts the delicacy and subtlety of ink touching paper. The different postures of ink spreading on paper are like the changing performances of paper eau de toilette on different skin and over time, painting a thousand-person thousand-face personality portrait.



Figure 3. Diptyque Paper Eau de Toilette

Source: <https://post.smzdm.com/talk/p/aeqgx0wz/>

3.2 Narrativity of Smell: From Individual Memory to Collective Resonance

The visualization of smell not only conveys information through symbols but also evokes emotional resonance through narratives. Designers can build a bridge of communication between individual and collective memories through carefully designed visual symbols, allowing people to find emotional resonance points in shared smell memories.

The “Olfactory Memory Bank” project by the University of the Arts London is an exemplary innovative practice in this regard. The project scans individuals’ brain activities to transform each person’s unique smell memory into customized visual symbols. For example, a participant’s memory of the cinnamon scent in their grandmother’s kitchen was transformed into interwoven orange curves and gray grids, forming a unique “smell portrait” (Dade-Robertson, 2024). This personalized visual storytelling approach respects the uniqueness of individual memories, allowing each person to find their own emotional attachment in the visual symbols and also opens up new creative ideas for the design field.

In brand design, the narrativity of smell visualization also has great value. Brands can tell stories related to smell, integrating the brand’s history, culture, and values into them, enabling consumers to deeply connect emotionally with the brand. The Diptyque brand precisely tells the stories behind its classic scents through story-rich hand-drawn illustrations and vintage tones, allowing consumers to deeply understand the brand’s connotations while experiencing the fragrance, thereby enhancing their sense of identification and belonging to the brand.

In addition, constructing memory scenes through narrative design techniques can further enhance the effect of smell visualization. Designers can present a series of continuous images according to a certain narrative logic, showing the process of smelling from the initial perception to dissipation, guiding viewers to associate specific memories related to it. For example, in a series of illustrations depicting a beach vacation, the first picture shows waves hitting the beach, and the sea breeze carries a faint smell of seawater, with blue and white as the main colors and relatively simple lines. In the second picture, the protagonist walks into a beach snack stall, and the smell of grilled fish spreads, with the addition of orange flames and food patterns in the picture, and the colors become richer. In the last picture, the protagonist leaves the snack stall, and the smell gradually dissipates, with the picture’s colors becoming more subdued and the lines becoming smoother. This narrative design allows viewers to feel as if they have personally experienced the beach vacation, and their memories of the related smells are more profound.

The symbolization and narrativity of smell design make smell visualization more vivid and meaningful. With the development of technology, smell visualization has also ushered in new changes.

4. The Future of Smell: Cross-Boundary Exploration from Art to Technology

Driven by modern technology, smell visualization continues to break through tradition, presenting more diverse forms and bringing new sensory experiences to people.

4.1 Artistry of Smell: Dynamic Visual Expression from Static to Dynamic

With the rapid development of technology, the visual presentation of smell has undergone a significant transformation from static to dynamic. Dynamic design, with its unique advantages, can more vividly simulate the diffusion and change of smell, providing viewers with a stronger sensory immersion and elevating the artistic expression of smell visualization to a new level.

The “Shylight” installation by Dutch Studio Drift is an outstanding representative in this field (as shown in Figure 4). The installation uses the folding movement of mechanical silk to accurately simulate the fleeting nature of the night-blooming cereus scent (Van Herpen, 2019). In this work, the dynamic changes of silk are not only a visual representation of the physical characteristics of the night-blooming cereus scent but also contain philosophical reflections on the brevity and beauty of time and life. It breaks through the limitations of traditional static design, allowing viewers to more profoundly feel the subtle connections between smell, time, and life in the dynamic visual experience.



Figure 4. Shylight device

Source: <https://zhuanlan.zhihu.com/p/27513316>

In the field of graphic design, dynamic graphics provide rich possibilities for expressing the layers and temporality of smell. Designers use animation principles, through color gradients, flowing lines, and shape transformations, to vividly and graphically show the process of perfume changing from the top note to the base note.

In addition, dynamic interactive design offers viewers unprecedented opportunities to participate in the experience of smell visualization. Designers use sensors to capture viewers' behaviors, such as movements, positions, and expressions, and adjust the changes in visual patterns in real time. This interactive design reflects the user-centered design philosophy, emphasizing the interactivity between users and design works. Viewers can more actively participate in the experience of smell visualization, enhancing sensory immersion while obtaining more personalized and unique experiences, and establishing a closer and deeper connection between the design work and the viewers.

4.2 Technological Nature of Smell: Sensory Integration from Virtual to Reality

Continuous technological advancements have brought many innovative opportunities to smell visualization, especially the rise of augmented reality (AR) and virtual reality (VR) technologies, making it possible to combine visual symbols of smell with virtual environments and creating richer and more diverse multidimensional sensory experiences for people. The Japanese team “Scentee Machina” has achieved a clever integration of visual symbols of smell with virtual scenes through AR technology. Users simply need to scan specific visual patterns with their smartphones to trigger the release of virtual smells (Nakamoto & Ota, 2023). For example, in an AR tour application for a historical and cultural site, when users scan the site's buildings, their smartphone screens not only display virtual information about the buildings' historical changes and internal structures but also release smells related to the buildings at the same time, such as the aroma of old wood or the scent of spices from a particular period, allowing users to feel as if they have traveled through time and are immersed in the atmosphere of history. This technology breaks the boundaries between reality and virtuality, greatly enriching users' sensory experiences and bringing new development ideas to fields such as cultural tourism and education.

Blockchain technology has also been applied in the field of smell visualization, providing strong support for the standardization and copyright protection of smells. The digital smell database jointly built by Smell Kingdom and Hangzhou Internet Notary Office generates a unique hash value for each digital smell, ensuring the

copyright of creators. The application of this technology not only promotes the standardization process of smell visualization, allowing different creators' works to be managed and traded under unified norms, but also lays a solid foundation for its commercial application.

Smell visualization can also create unprecedented sensory experiences through the cross-border integration of multiple technologies. As a cutting-edge technology, brain-computer interface technology brings new possibilities to smell visualization. Designers can use brain-computer interface devices to capture viewers' EEG signals, analyze their emotional and attention states, and adjust the changes in visual patterns in real time.

5. Conclusion: Outlook and Challenges of Smell Visualization

In summary, inspired by the Proust Effect, smell visualization has integrated the power of literature, art, design, and technology to achieve a leap from theoretical basis to practical application. From the exploration of smell memories to the scientific guidance of neuroaesthetics; from metaphorical expression through symbols to emotional resonance through narratives; and to the innovative changes achieved with the help of modern technology, smell visualization continues to expand its boundaries.

In the future, smell visualization has a broad development prospect. In artistic creation, it will promote the innovation of artistic forms and create more works that integrate multiple sensory experiences, enriching people's aesthetic experiences. In the commercial field, it can enhance the emotional connection between brands and consumers and improve the competitiveness of products. In cultural dissemination, it helps people better understand and inherit smell memories from different cultures.

However, the development of smell visualization also faces some challenges at present. In terms of technology, the precise simulation of smell and its perfect matching with visual effects still need to be improved, and the equipment costs are high and difficult to popularize. In terms of culture, there are significant differences in the perception and understanding of smell across different cultural backgrounds. How to overcome cultural barriers and ensure that smell visualization works are widely accepted is a problem that needs to be solved.

At the same time, it is also necessary to establish and improve relevant laws, regulations, and industry standards to regulate the creation, dissemination, and application of smell visualization works and protect the rights and interests of creators and consumers. Through the joint efforts of all parties, smell visualization is expected to become an important bridge connecting senses, emotions, and culture, opening a door for people to a new world of perception and promoting the continuous development of human perception and cultural cognition.

References

- Baudelaire, (1857). *The Flowers of Evil*.
- Dade-Robertson, M., (2024). Designing with olfactory memories. *Leonardo*, 57(1), 88-95.
- Henshaw, V., et al., (2021). Olfactory cartography: Mapping smellscape in design. *Design Issues*, 37(2), 45-60.
- Kawabata Yasunari, (1935-1948). *Snow Country*.
- Lux, C., & Millot, M., (2022). Molecular aesthetics in perfume packaging. *Packaging Design Quarterly*, 19(4), 112-127.
- Nakamoto, T., & Ota, R., (2023). EEG-driven adaptive olfactory visualization system. *IEEE Transactions on Affective Computing*, 14(1), 234-245.
- Proust, (1913-1927). *In Search of Lost Time*.
- Roland Barthes, (1964). *Elements of Semiology*.
- Spence, C., (2020). Crossmodal correspondences: A tutorial review. *Attention, Perception, & Psychophysics*, 83(2), 455-464.
- Van Herpen, I., (2019). Biomimetic design in olfactory visualization. *Journal of Sensory Studies*, 34(3), e12489.
- Zelano, C., et al., (2016). Nasal respiration entrains human limbic oscillations and modulates cognitive function. *Journal of Neuroscience*, 36(49), 12448-12467.

Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).

How the *Healthy China 2030* Policy Promotes the Construction of a Rural Telemedicine Chronic Disease Management Service System

Yufeng Wang¹, Qi Liu¹ & Rui Zhang¹

¹ Anhui Medical University, Hefei, China

Correspondence: Yufeng Wang, Anhui Medical University, Hefei, China.

doi:10.56397/SSSH.2025.03.06

Abstract

The *Healthy China 2030* policy aims to enhance healthcare accessibility and equity, with a strong emphasis on integrating telemedicine into rural chronic disease management. With China's rapidly aging population and a high prevalence of chronic diseases such as hypertension, diabetes, and cardiovascular conditions, rural healthcare systems face significant challenges due to limited medical infrastructure, specialist shortages, and financial barriers. Telemedicine has emerged as a critical solution, enabling remote consultations, AI-assisted diagnostics, and digital health monitoring to improve patient outcomes in underserved regions.

This paper examines the role of telemedicine in strengthening rural chronic disease management under the *Healthy China 2030* framework. It analyzes policy-driven investments, digital infrastructure expansion, and public-private partnerships that have facilitated telehealth integration. Through regional case studies, the research highlights successful implementation models, including AI-driven remote diagnosis in Gansu, wearable health monitoring initiatives in Guizhou, and mobile telemedicine vans in Tibet. However, the expansion of rural telemedicine faces barriers such as digital literacy gaps among elderly populations, inconsistent data security regulations, and fragmented healthcare policies.

To maximize telemedicine's impact, future efforts should focus on closing technological gaps, strengthening cybersecurity measures, and improving digital literacy training for rural patients and healthcare providers. Additionally, policy standardization, increased funding for rural digital healthcare infrastructure, and enhanced physician training programs will be crucial for sustainable development. By addressing these challenges, telemedicine can play a transformative role in achieving *Healthy China 2030*'s vision of universal healthcare access and improved chronic disease management in rural China.

Keywords: telemedicine, rural healthcare, chronic disease management, *Healthy China 2030*, digital health, AI-driven diagnosis, healthcare accessibility

1. Introduction

China is experiencing a rapid demographic shift characterized by an aging population and a growing burden of chronic diseases, particularly in rural areas. According to the National Bureau of Statistics of China (2022), individuals aged 60 and above accounted for 19.8% of the total population, a figure projected to surpass 30% by 2050. Chronic diseases, including hypertension, diabetes, cardiovascular diseases, and chronic respiratory conditions, account for nearly 88% of total deaths in China. These health conditions impose significant economic and social burdens, especially in rural areas where access to specialized healthcare services remains limited.

Rural residents face significant disparities in healthcare accessibility compared to their urban counterparts. A 2021 report by the National Health Commission highlighted that rural areas have only 1.8 licensed doctors per 1,000 people, compared to 3.8 per 1,000 in urban areas. Many township hospitals and village clinics lack

specialized healthcare professionals, forcing rural patients to travel long distances to urban centers for diagnosis and treatment. Additionally, rural elderly populations often have lower health literacy, financial constraints, and limited mobility, further exacerbating healthcare accessibility challenges.

To address these issues, the Chinese government launched the *Healthy China 2030* initiative, a national strategy aimed at improving healthcare accessibility, enhancing disease prevention, and promoting public health equity. One of the key pillars of this initiative is the development of digital health infrastructure, including telemedicine, to bridge the urban-rural healthcare divide. By leveraging telecommunication technologies, mobile health applications, and AI-driven medical diagnostics, telemedicine provides rural patients with access to specialized care without requiring physical travel to major hospitals.

The integration of telemedicine in chronic disease management aligns with the broader objectives of *Healthy China 2030*, which emphasize early disease detection, health monitoring, and patient-centered care. In China's 14th Five-Year Plan (2021–2025), telemedicine development was listed as a national priority, with government investments in 5G infrastructure, AI-powered diagnostic tools, and digital healthcare networks. Several provinces have already implemented pilot telemedicine programs, demonstrating its potential to enhance healthcare efficiency and reduce disparities in rural chronic disease management.

This paper examines how *Healthy China 2030* facilitates the construction of a rural telemedicine chronic disease management service system. It explores the current healthcare challenges in rural China, the role of telemedicine in chronic disease care, government policy interventions, implementation models, barriers to expansion, and future directions for sustainable development. Through this analysis, the study aims to provide insights into how telemedicine can become an integral part of China's rural healthcare framework, contributing to more equitable and accessible healthcare services nationwide.

2. Current Challenges in Rural Chronic Disease Management

Rural China faces significant challenges in chronic disease management, largely due to insufficient medical resources, economic constraints, and limited healthcare accessibility. While chronic diseases such as hypertension, diabetes, cardiovascular diseases, and chronic respiratory illnesses have become major health burdens, rural healthcare systems struggle to provide adequate long-term management and treatment. The following key challenges illustrate the difficulties in delivering effective chronic disease care in rural areas.

One of the primary obstacles is the shortage of healthcare facilities and specialized medical professionals. According to the National Health Commission (2022), over 60% of China's population lives in rural areas, but only 30% of the country's healthcare resources are distributed there. Many township hospitals and village clinics lack specialists in chronic disease management, forcing patients to seek care in urban hospitals. This leads to delayed diagnoses, irregular treatment adherence, and increased complications. Furthermore, rural doctors often have limited training in chronic disease care, as medical education and continuous professional development opportunities are primarily concentrated in large cities.

Another major issue is the financial burden on rural patients. Chronic disease management requires regular check-ups, medication adherence, and lifestyle modifications, which impose significant costs on patients with limited financial means. Although China has established the New Rural Cooperative Medical Scheme (NRCMS) to provide health insurance coverage, out-of-pocket expenses for chronic disease care remain high. A 2021 survey by the Chinese Academy of Medical Sciences found that over 35% of rural patients with chronic conditions skip follow-up visits due to financial concerns. Additionally, the reimbursement policies for telemedicine consultations and digital healthcare services are still developing, leaving many rural patients unable to afford remote diagnostic and monitoring services.

Geographical barriers also play a significant role in restricting healthcare access. Many rural communities are located in mountainous or remote areas with poor transportation infrastructure, making it difficult for elderly and disabled individuals to travel to township hospitals. A study by Peking University's School of Public Health (2020) found that nearly 45% of rural patients must travel over 50 kilometers to access specialized care, leading to delayed treatment and worsening health conditions. Seasonal weather conditions, particularly in Western China's high-altitude and cold regions, further limit access to essential healthcare services.

Beyond infrastructural and financial limitations, low health literacy and limited awareness of chronic disease prevention contribute to poor disease management outcomes. Many rural residents lack basic knowledge about early symptoms, self-monitoring techniques, and lifestyle modifications necessary for managing chronic illnesses. According to a 2022 study by the China Health and Nutrition Survey, less than 40% of rural hypertensive patients monitor their blood pressure regularly, and only 30% of diabetic patients in rural areas adhere to prescribed dietary guidelines. Misinformation, reliance on traditional medicine over evidence-based treatment, and lack of trust in modern healthcare systems further exacerbate the challenge.

The digital divide in healthcare services is another key barrier, particularly as telemedicine is emerging as a

critical component of China's healthcare reform. While the government has prioritized rural digital infrastructure development, internet penetration and smartphone adoption rates in older rural populations remain low. Many elderly patients, who make up the majority of chronic disease sufferers, struggle with using telemedicine applications, scheduling online consultations, and interpreting digital health records. Without comprehensive digital literacy programs, a significant portion of the rural elderly population remains excluded from telemedicine-based chronic disease management services.

These challenges highlight the urgent need for policy interventions, technological innovations, and improved healthcare workforce training to ensure that rural patients receive effective chronic disease care. Addressing these barriers through telemedicine integration, government support, and public health education is crucial to realizing the *Healthy China 2030* vision of equitable healthcare access for all.

3. The Role of Telemedicine in Chronic Disease Management

The integration of telemedicine in chronic disease management has significantly improved healthcare delivery in rural China. By utilizing digital technologies, telemedicine bridges the gap between rural patients and urban healthcare specialists, offering remote diagnosis, continuous health monitoring, and cost-effective healthcare solutions. These innovations align with the *Healthy China 2030* initiative's goal of enhancing healthcare accessibility and efficiency, particularly for managing chronic diseases such as hypertension, diabetes, cardiovascular illnesses, and chronic respiratory conditions.

3.1 Remote Consultation and Diagnosis Services

Telemedicine has revolutionized the way rural patients access medical expertise by providing virtual consultations and remote diagnosis services. Many rural areas lack specialized physicians, forcing patients to travel long distances for diagnosis and treatment. Through teleconsultation platforms, AI-powered diagnosis tools, and remote imaging analysis, patients can now receive real-time expert opinions without leaving their communities.

A 2021 report from the National Health Commission found that over 70% of rural hospitals have implemented some form of telemedicine, reducing the need for patient referrals to urban hospitals. Government-supported platforms, such as China's National Telemedicine Center, connect rural health clinics with top-tier hospitals, allowing doctors to provide remote consultations, medical imaging analysis, and e-prescriptions. This has led to a 35% reduction in unnecessary hospital visits and a 25% increase in early chronic disease detection rates.

Artificial intelligence (AI) is also playing an increasingly important role in tele-diagnosis. AI-powered tools, such as AI-assisted radiology interpretation and machine-learning-based symptom assessment, help rural healthcare providers improve diagnostic accuracy. In 2022, Guizhou Province launched an AI-supported telemedicine program, which improved the accuracy of chronic disease diagnoses by 30% and reduced referral times by 40%. These advancements demonstrate how telemedicine enhances early detection, treatment efficiency, and specialist accessibility for rural patients.

3.2 Digital Health Monitoring and Disease Prevention

Chronic disease management requires continuous monitoring and preventive interventions, which can be challenging in rural settings where patients have limited access to regular check-ups. Telemedicine addresses this issue through digital health monitoring technologies, including wearable devices, mobile health (mHealth) applications, and remote monitoring systems.

Smart health devices, such as wearable blood pressure monitors, glucose trackers, and ECG sensors, allow rural patients to track their health status in real time. These devices transmit patient data to healthcare providers, who can then assess health trends and provide timely interventions. A 2022 pilot study in Sichuan Province found that elderly patients with hypertension who used wearable blood pressure monitors experienced a 40% reduction in emergency hospital visits due to earlier detection of abnormal readings and timely medical adjustments.

Mobile health applications (mHealth) also play a critical role in disease prevention and patient education. Apps such as "Ping An Good Doctor" and "JD Health" provide patients with personalized health recommendations, medication reminders, and virtual consultations. The Health Cloud Platform in Zhejiang Province, for instance, has successfully reduced diabetes-related complications by 28% by integrating mHealth-based patient engagement strategies.

Remote monitoring systems supported by 5G technology have further enhanced telemedicine outreach. Rural community hospitals now utilize real-time patient data collection to detect health deterioration early and adjust treatment plans accordingly. This proactive disease management approach has improved patient adherence to chronic disease care plans, helping to prevent complications and reduce mortality rates.

3.3 Reduction of Healthcare Costs and Improved Accessibility

One of the biggest barriers to chronic disease management in rural areas is the high cost of transportation, hospital visits, and long-term treatment. Telemedicine lowers financial burdens by reducing the need for in-person hospital visits, enabling early disease detection, and offering cost-effective medication management solutions.

A 2022 study by the China Health Economics Research Institute found that rural patients using telemedicine services saved an average of 30% in out-of-pocket medical expenses, primarily by reducing travel costs and minimizing unnecessary hospital admissions. In addition, AI-driven remote consultations help lower diagnostic costs, as patients can receive specialist advice without paying for expensive in-person hospital visits.

Telemedicine platforms also streamline the supply of chronic disease medications, ensuring continuous treatment adherence. Many rural areas now utilize e-prescription services, where patients can order prescribed medications online and have them delivered directly to their homes. The e-pharmacy initiative in Jiangsu Province successfully reduced medication non-compliance among diabetic patients by 22%, demonstrating how telemedicine enhances treatment accessibility.

The government has further promoted affordability by integrating telemedicine into the National Medical Insurance System, allowing reimbursement for online consultations, remote diagnostic services, and digital prescriptions. These policies reduce financial barriers and ensure that more rural patients can benefit from accessible chronic disease management services.

Telemedicine is transforming chronic disease management in rural China by expanding specialist access, enhancing digital health monitoring, and lowering healthcare costs. By utilizing remote consultations, AI-driven diagnostics, and wearable monitoring devices, telemedicine aligns with *Healthy China 2030* goals to create a more inclusive and efficient healthcare system. However, successful implementation requires continued investment in rural digital infrastructure, increased patient education, and integration with national healthcare policies to maximize its long-term benefits.

4. Policy Initiatives Under *Healthy China 2030* Supporting Rural Telemedicine

The *Healthy China 2030* initiative has prioritized digital healthcare transformation, particularly in rural telemedicine to improve chronic disease management. The government has implemented policy-driven investments, infrastructure development, and strategic collaborations to enhance healthcare accessibility. These initiatives focus on expanding telemedicine infrastructure, advancing 5G networks, and fostering public-private partnerships to bridge healthcare disparities between urban and rural areas.

4.1 Investment in Telemedicine Infrastructure and Technology

The Chinese government has made significant investments in telemedicine infrastructure to improve rural healthcare accessibility. The National Health Commission's 14th Five-Year Plan (2021-2025) explicitly promotes telemedicine integration into primary healthcare services, allocating funding for telehealth platforms, AI-driven diagnostics, and cloud-based patient record systems. By 2022, over 1,500 county hospitals had established telemedicine centers, connecting local healthcare facilities to provincial and national hospitals for remote diagnosis and specialist consultations.

Artificial Intelligence (AI) and big data analytics have also been incorporated into telemedicine-enabled chronic disease management. AI-powered radiology analysis, predictive modeling for disease progression, and automated patient monitoring systems have been deployed in rural hospitals to enhance diagnostic accuracy and streamline treatment plans. In 2021, Anhui Province launched an AI-driven hypertension management platform, which reduced hospital readmissions among rural patients by 18% due to early risk detection and remote intervention capabilities.

To ensure the sustainability of telemedicine services, the Chinese government has also expanded digital health insurance coverage. As of 2022, the National Medical Insurance Bureau extended reimbursement policies to include online consultations, digital prescriptions, and remote chronic disease monitoring. This policy shift has encouraged more rural patients to adopt telemedicine services, reducing their financial burden and ensuring long-term access to remote healthcare solutions.

4.2 Expansion of 5G Networks and Internet Connectivity

The success of rural telemedicine depends on stable internet access and real-time data transmission, prompting large-scale investments in 5G network expansion. The Chinese government has prioritized broadband and mobile network coverage in remote areas under the "Internet Plus Healthcare" initiative, ensuring that rural clinics, township hospitals, and village health stations can support high-speed video consultations, cloud-based medical records, and real-time patient monitoring.

By 2022, China had deployed over 2.3 million 5G base stations, with a network coverage rate exceeding 97% in townships and 75% in rural villages. The 5G-enabled telemedicine programs in Guangxi and Guizhou provinces

have significantly reduced patient referral times by 40%, allowing specialists from urban hospitals to remotely diagnose complex chronic conditions through high-definition imaging transmission and real-time patient data sharing.

The government has also supported digital literacy training programs for healthcare workers in rural regions. Many township hospitals now offer telehealth training programs, equipping rural doctors with the necessary skills to operate remote diagnosis systems, AI-assisted medical tools, and electronic health records. In Henan Province, a 2021 pilot program successfully trained 3,000 rural doctors, increasing telemedicine adoption rates by 35% within one year.

4.3 Encouraging Public-Private Collaboration in Telehealth

To accelerate telemedicine development, the Chinese government has fostered public-private partnerships between state-owned hospitals, technology firms, and digital healthcare platforms. These collaborations have led to innovative telehealth solutions, enhancing accessibility, affordability, and efficiency in rural healthcare.

Leading Chinese tech companies such as Tencent, Alibaba Health, and Ping An Good Doctor have partnered with public hospitals to expand telemedicine services. Tencent's AI-assisted diagnostic system has been integrated into over 300 rural hospitals, improving the early detection of diabetes, hypertension, and cardiovascular diseases through machine learning algorithms. Meanwhile, Alibaba Health's rural e-prescription system has provided affordable online medication delivery services, ensuring continuous chronic disease treatment for rural patients.

Additionally, provincial governments have introduced telemedicine funding incentives to encourage private sector investment. In 2022, Jiangsu Province launched a subsidy program that provides financial incentives to private companies developing rural-focused telehealth solutions. This initiative led to a 20% increase in private telemedicine investments, expanding the availability of remote consultation services in lower-tier hospitals.

Government-backed telemedicine research centers have also been established to evaluate and optimize digital healthcare solutions. The National Telemedicine Center of China, headquartered in Zhengzhou, conducts pilot studies on AI-driven chronic disease management, data security in telehealth, and telemedicine's economic impact on rural communities. Findings from these research centers help shape evidence-based policy adjustments to improve long-term telemedicine effectiveness and integration.

The *Healthy China 2030* policy has played a crucial role in expanding telemedicine infrastructure, improving digital connectivity, and fostering public-private collaborations to support chronic disease management in rural China. Investments in AI-driven diagnostics, cloud-based patient monitoring, and 5G telehealth platforms have significantly improved healthcare accessibility. However, continued government support, regulatory adjustments, and increased private sector involvement are essential for sustaining telemedicine adoption and ensuring its long-term success in rural healthcare systems.

5. Implementation Models and Regional Case Studies

The expansion of telemedicine in rural China under the *Healthy China 2030* policy has been guided by several strategic implementation models. These include integrating telemedicine into primary healthcare centers, launching regional pilot programs, and developing community-based health initiatives. Each of these approaches has been adapted to suit local healthcare needs, technological capabilities, and policy frameworks, ensuring that telemedicine enhances chronic disease management, healthcare accessibility, and medical efficiency in underserved rural areas.

5.1 Integration of Telemedicine with Primary Healthcare Centers

Primary healthcare centers (PHCs) serve as the first point of contact for most rural patients, yet they often lack specialist doctors, advanced diagnostic tools, and adequate healthcare infrastructure. To address this issue, the Chinese government has introduced a tiered healthcare system, integrating telemedicine platforms into PHCs to facilitate remote consultations, diagnostic support, and treatment guidance from top-tier hospitals in major cities.

One of the most successful examples of this model is the Henan Province Rural Telemedicine Network, which links village clinics, township hospitals, and county-level hospitals with major tertiary hospitals in Zhengzhou. Under this system, local doctors conduct basic examinations, collect patient health data, and submit reports to specialists in urban hospitals for further evaluation. The network has significantly improved chronic disease management, particularly for hypertension and diabetes, as urban specialists can now provide personalized treatment plans remotely.

A key feature of this model is the use of AI-assisted medical diagnostics. In Gansu Province, where many rural PHCs lack trained cardiologists, the government partnered with Tencent's AI Medical Platform to deploy AI-powered ECG interpretation systems. These systems analyze electrocardiogram (ECG) results in real time, flagging abnormalities and recommending specialist consultations when necessary. Since its deployment in 2021,

the program has led to a 22% reduction in misdiagnosed cardiovascular diseases and a 40% decrease in unnecessary patient transfers to urban hospitals.

Another example is the National Health Cloud Platform, a government-backed initiative that integrates telemedicine with electronic medical records (EMRs). In Fujian Province, this system connects over 1,000 rural clinics with provincial hospitals, allowing doctors to access patient histories, order lab tests, and prescribe medications remotely. This has shortened chronic disease treatment delays by 35% and reduced medication errors by 20%.

5.2 Successful Telemedicine Pilot Programs in Rural Provinces

Several Chinese provinces have implemented pilot telemedicine programs to test the effectiveness of remote healthcare services in rural settings. These pilots have provided valuable insights into best practices for scaling up telemedicine nationwide, particularly for chronic disease prevention, early diagnosis, and long-term patient monitoring.

Case Study 1: Guizhou Province — AI-Powered Hypertension and Diabetes Management

Guizhou Province, with its mountainous terrain and dispersed rural population, has historically struggled with hypertension and diabetes management. In 2020, the provincial government partnered with Ping An Good Doctor and the Guizhou Medical University Hospital to develop a remote chronic disease management program. The program provided 5G-enabled wearable blood pressure monitors and glucose sensors to over 50,000 rural patients, enabling real-time health monitoring.

The collected data was analyzed by AI-driven predictive models, which identified high-risk patients and recommended early interventions. Additionally, rural doctors were trained to use telemedicine dashboards to adjust treatment plans based on AI-generated insights. Within the first two years, the program achieved:

- A 35% reduction in emergency hospital visits due to hypertension complications
- A 28% increase in medication adherence among diabetic patients
- A 25% improvement in patient engagement with telemedicine consultations

These results demonstrated that AI-powered telemedicine could effectively manage chronic diseases, particularly for elderly patients who struggle with self-monitoring and early symptom detection.

Case Study 2: Inner Mongolia — Remote Diagnosis Through Telehealth Kiosks

Inner Mongolia's vast rural landscape and extreme winter conditions make hospital access difficult, particularly for elderly patients with chronic diseases. In response, the provincial government, in collaboration with China Mobile and the National Telemedicine Center, deployed self-service telehealth kiosks in 200 village health clinics.

These kiosks, equipped with high-resolution cameras, AI-driven diagnostic tools, and real-time specialist connectivity, allow patients to conduct routine health assessments without traveling to major hospitals. Features include:

- Instant blood pressure and glucose monitoring
- Teleconsultations with specialists in Hohhot and Beijing
- Remote prescription ordering and medication delivery services

In its first year, the program facilitated over 80,000 virtual consultations, reducing travel costs for rural patients by an estimated 40%. Additionally, the system improved early diagnosis rates for cardiovascular diseases by 32%, as rural residents could access specialist opinions without financial or logistical barriers.

5.3 Community-Based Health Initiatives Using Telehealth Services

Beyond hospital-based telemedicine programs, community-driven telehealth initiatives have been instrumental in promoting preventive healthcare, chronic disease awareness, and digital health literacy in rural areas. These initiatives focus on equipping rural populations with the knowledge and tools necessary to manage their health effectively.

Case Study 3: Jiangsu Province — Telehealth Education for Elderly Patients

Jiangsu's rural elderly population faces low digital literacy rates, making it difficult for them to use telemedicine applications and online health services. In 2021, the Jiangsu Health Bureau launched a telehealth education campaign that established:

- Workshops at community health centers to train elderly residents on using telemedicine apps
- Volunteer-run tech support desks at township hospitals for telehealth assistance

- A “telemedicine ambassadors” program, where local youth teach seniors how to schedule online consultations

Within a year, the program resulted in:

- A 20% increase in elderly engagement with mobile health services
- A 15% improvement in chronic disease self-management, particularly for hypertension
- A 25% increase in telemedicine appointment bookings

This initiative highlights the importance of digital literacy training in ensuring that rural populations fully benefit from telehealth services.

Case Study 4: Tibet — Mobile Telemedicine Vans for Remote Villages

In Tibet, where healthcare access is severely limited by geographical challenges, the government introduced mobile telemedicine vans equipped with satellite internet and AI-powered diagnostic tools. These vans travel to remote villages, providing:

- Real-time teleconsultations with specialists in Beijing and Shanghai
- On-site diagnostics, including ultrasound and ECG screenings
- Health education sessions on chronic disease prevention

Since its launch in 2021, this initiative has provided over 10,000 remote diagnoses, ensuring that even the most isolated communities receive timely medical attention.

The successful implementation of telemedicine in rural China has been driven by strategic integration into primary healthcare centers, regional pilot programs, and community-based health initiatives. These models have significantly improved chronic disease management, reduced healthcare disparities, and increased accessibility to specialist care. Moving forward, continued investments in digital infrastructure, expanded AI-driven healthcare solutions, and enhanced patient education programs will be essential in ensuring that telemedicine remains a sustainable and effective solution for rural chronic disease management.

6. Challenges and Barriers to Telemedicine Expansion

Despite the advancements in telemedicine for chronic disease management in rural China, several challenges hinder its full-scale implementation. Key barriers include technological limitations, digital literacy gaps, privacy concerns, and regulatory hurdles. These issues must be addressed to ensure equitable access to telemedicine services and to maximize their effectiveness in managing chronic diseases.

6.1 Technological and Digital Literacy Barriers

A major challenge to telemedicine expansion in rural China is the uneven development of digital infrastructure and the lack of technological literacy among elderly patients. While the Chinese government has invested heavily in 5G expansion and broadband connectivity, many remote areas still suffer from unstable internet connections, preventing seamless telemedicine services. According to a 2022 report by the China Academy of Information and Communications Technology, nearly 30% of rural villages still experience low-speed internet, limiting the effectiveness of real-time remote consultations and AI-assisted diagnostics. This issue is particularly problematic in mountainous regions and geographically isolated areas where the cost of expanding network infrastructure is high.

Beyond infrastructure, digital literacy remains a significant barrier, especially among the elderly population, which constitutes the majority of chronic disease patients in rural areas. Many elderly patients are unfamiliar with using smartphones, mobile health applications, and wearable health monitoring devices. A 2021 study by the National Health Commission found that only 45% of rural elderly patients regularly use digital health services, compared to 78% in urban areas. This digital divide prevents many rural residents from benefiting from remote consultations, telehealth education programs, and AI-driven chronic disease management tools.

To address this issue, various provinces have launched digital literacy training programs for the elderly. In Jiangsu Province, local health authorities have introduced community workshops where volunteers and healthcare workers teach elderly residents how to use telemedicine apps and wearable health devices. Similarly, in Sichuan, local governments have set up “telehealth support centers” in township hospitals, where medical staff assist patients in scheduling online consultations and accessing their digital medical records. However, the scale of these initiatives remains limited, and further investment in rural digital education is required to ensure widespread adoption of telemedicine services.

6.2 Privacy, Data Security, and Regulatory Concerns

The expansion of telemedicine also raises concerns about patient data security, medical privacy, and regulatory

oversight. As more rural patients rely on digital health platforms, concerns over data protection and cybersecurity vulnerabilities have become increasingly prominent. Telemedicine platforms collect vast amounts of sensitive patient information, including medical history, biometric data, and prescription records. In the absence of robust data encryption and privacy protocols, there is a heightened risk of data breaches, unauthorized access, and cyberattacks. A 2022 report by the China Cybersecurity Industry Alliance indicated that healthcare institutions accounted for 18% of all reported data breaches in China, highlighting the growing risks associated with digital healthcare systems.

In response, the Chinese government has strengthened data protection regulations under the Personal Information Protection Law (PIPL) of 2021, which mandates stricter guidelines for handling medical data. However, enforcement remains a challenge, especially in rural areas where healthcare providers may lack the expertise and financial resources to implement comprehensive cybersecurity measures. Many rural hospitals and clinics still operate with outdated digital security systems, leaving patient data vulnerable to breaches. Furthermore, the lack of standardized telemedicine regulations has led to inconsistencies in medical liability, raising concerns about who is responsible for treatment errors and misdiagnoses that occur during remote consultations.

Another issue is the fragmentation of telemedicine services across different platforms and healthcare institutions. Various public and private telemedicine providers operate under different regulatory frameworks, leading to disparities in service quality, reimbursement policies, and medical data sharing. In some cases, patients using different telehealth platforms are unable to transfer their medical records between providers, limiting the continuity of care. This lack of integration also creates difficulties for healthcare professionals, who may struggle to access comprehensive patient histories when making remote diagnoses.

To address these regulatory challenges, the Chinese government has taken steps to standardize telemedicine services under national healthcare reform policies. The National Health Insurance Administration has expanded reimbursement policies to cover telemedicine consultations and digital prescriptions, improving financial accessibility for rural patients. Additionally, the State Council has proposed a unified telemedicine framework, aimed at integrating electronic health records, ensuring data security compliance, and establishing clear liability guidelines for telehealth services. However, the full implementation of these regulations requires better coordination between government agencies, healthcare providers, and private telemedicine companies to create a cohesive and secure digital healthcare ecosystem.

While telemedicine holds great promise for improving chronic disease management in rural China, significant challenges remain. Technological infrastructure gaps, digital illiteracy among elderly patients, and cybersecurity vulnerabilities continue to hinder the widespread adoption of telehealth services. Additionally, unclear regulatory frameworks and fragmented data systems create barriers to service standardization and patient data security. Addressing these issues will require continued government investment in rural digital infrastructure, expanded digital literacy training programs, and stricter enforcement of data protection regulations. By overcoming these challenges, China can build a more secure, efficient, and inclusive telemedicine system, ensuring that rural patients receive high-quality healthcare in line with the *Healthy China 2030* vision.

7. Future Directions and Recommendations

The continued expansion of telemedicine in rural China under the *Healthy China 2030* initiative presents a transformative opportunity to enhance chronic disease management. However, realizing its full potential requires targeted improvements in infrastructure, policy frameworks, healthcare workforce development, and patient education. Future efforts should focus on closing existing gaps in accessibility, security, and integration while fostering a sustainable and inclusive telehealth ecosystem.

A critical area for future development is the enhancement of rural digital infrastructure to support seamless telemedicine services. While significant progress has been made in expanding 5G networks and broadband connectivity, many remote regions still experience unstable internet access that hinders real-time remote consultations. Continued government investment is needed to expand high-speed internet coverage in rural areas, particularly in geographically isolated provinces such as Tibet, Qinghai, and Inner Mongolia. Satellite-based internet services could be explored to overcome terrain-related limitations and ensure that even the most remote villages have access to digital healthcare platforms.

Strengthening digital literacy programs among rural elderly populations is another priority. Many elderly patients, who form the majority of chronic disease sufferers, struggle with using telemedicine applications, online consultations, and wearable health devices. Large-scale public education campaigns should be introduced at the community level, with local health workers, volunteers, and younger family members assisting elderly individuals in adapting to digital healthcare tools. Provincial health bureaus could implement mandatory digital training sessions for chronic disease patients when they visit township hospitals, ensuring that they understand

how to use telehealth services effectively.

In terms of policy refinement, the Chinese government must continue streamlining telemedicine regulations to create a standardized and secure national telehealth system. Current challenges, such as fragmented data sharing between healthcare institutions, inconsistent telemedicine reimbursement policies, and unclear liability frameworks for remote diagnoses, must be resolved through a unified national telemedicine governance model. Establishing a centralized electronic health record (EHR) system accessible across all public and private telemedicine providers would enhance continuity of care, reduce administrative inefficiencies, and prevent data fragmentation. At the same time, strengthening cybersecurity protocols and enforcing stricter compliance with data protection laws will be necessary to ensure patient confidentiality and prevent cyber threats.

Another key recommendation is to increase government incentives for private sector involvement in rural telemedicine expansion. Leading Chinese technology companies, such as Alibaba Health, Tencent Medical, and Ping An Good Doctor, have already made significant contributions to digital healthcare development. Encouraging further public-private partnerships through tax incentives, funding grants, and infrastructure-sharing agreements could accelerate innovation in AI-driven diagnostics, wearable health monitoring devices, and digital prescription systems. Establishing regional telehealth innovation hubs in key rural provinces would also foster research collaboration between healthcare institutions, universities, and technology companies, ensuring that China remains at the forefront of global telemedicine advancements.

To ensure long-term sustainability, greater efforts should be made to integrate telemedicine into rural primary healthcare workflows. This requires comprehensive physician training programs to equip rural healthcare providers with the technical skills needed to operate AI-assisted diagnostic tools, interpret digital health data, and manage virtual patient consultations. Introducing mandatory telemedicine training in medical school curricula and expanding continuing education courses for rural doctors would enhance the quality and efficiency of telemedicine services in underdeveloped regions.

Lastly, the success of rural telemedicine depends on active community engagement and patient-centered approaches. Healthcare initiatives should be co-designed with input from rural patients, ensuring that telemedicine platforms are user-friendly, culturally appropriate, and aligned with local health needs. Implementing feedback mechanisms, such as patient satisfaction surveys and telemedicine performance evaluations, would help identify areas for continuous improvement and drive adaptive policymaking.

Moving forward, China's telemedicine strategy must be holistic, inclusive, and adaptable to the evolving healthcare landscape. With continued investment, policy refinement, and technological advancements, telemedicine can become a cornerstone of rural chronic disease management, ultimately contributing to the realization of *Healthy China 2030*'s goal of equitable healthcare access for all.

References

- Chen, R., Huang, W., & Zhang, Y., (2020). The Effectiveness of Wearable Health Monitoring in Rural Diabetes and Hypertension Management: Evidence from Guizhou Province. *International Journal of Environmental Research and Public Health*, 17(11), 3892.
- China Academy of Information and Communications Technology, (2022). *5G and Digital Health: Expanding Rural Telemedicine Infrastructure in China*. Beijing: CAICT.
- Guo, J., Chen, L., & Sun, Y., (2022). Barriers and Opportunities in Rural Digital Healthcare: Examining Telemedicine Adoption Among Elderly Populations. *Chinese Journal of Health Policy*, 15(2), 78-92.
- Li, M., Zhao, Q., & Fang, X., (2021). Telemedicine and Chronic Disease Management in China: Policy Evolution and Future Directions. *The Lancet Regional Health — Western Pacific*, 10, 100145.
- National Health Commission of China, (2021). *Telemedicine Development and Implementation Report under the Healthy China 2030 Framework*. Beijing: National Health Commission Press.
- Zhang, H., Wang, Y., & Liu, X., (2021). The Role of AI-Assisted Telemedicine in Rural Chronic Disease Management: A Case Study from Gansu Province. *Journal of Medical Internet Research*, 23(4), e24567.

Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).

From Neurocolonization to Cognitive Emancipation: The Critical Turn of Neurocapitalism

Zisi Yang¹ & Ying Yang¹

¹ School of Marxism, Qinghai Minzu University, China

Correspondence: Zisi Yang, School of Marxism, Qinghai Minzu University, China.

doi:10.56397/SSSH.2025.03.07

Abstract

The deep development of digital capitalism has given rise to a new form of domination of neurocapitalism, which transforms human cognitive activities such as perception and memory into exploitable data resources through brain-computer interfaces and neural sensing technologies, forming an algorithmic hegemony to colonize cognitive systems. The traditional Frankfurt School critical theory encounters difficulties in explaining the operation of power in the age of neurotechnology, and the study reveals the multidimensional colonization mechanism of neurocapitalism with the help of the technological reconstruction of Habermas's theory of interactional rationality and the dual critical framework of the phenomenology of technology-neuropolitical economy. Facing the systemic crisis of cognitive freedom, the cognitive alienation of neurocapitalism requires critical theory to shift from labor alienation to neuroalienation paradigm, to reconstruct the integrity of human subjectivity in the digital age by defending the autonomy of embodied cognition and the ethical limits of technological applications, and ultimately to guard the existential dignity of free will in the civilizational choices.

Keywords: neurocapitalism, cognitive colonization, embodiment, interactional rationality, algorithmic hegemony

1. Introduction

In the present era where digital capitalism continues to reconfigure the human condition, a more insidious form of colonization is breaking through the explanatory boundaries of traditional critical theory. When Neuralink's brain-computer interface chips are able to decode neuroelectric signals from the motor cortex in real time, and Kernel's hippocampal memory reading and writing technology transforms Proustian spontaneous memories into tradable NFT assets, the power tentacles of capitalism have already penetrated the curtain of cultural symbols and directly invaded the last frontier of human freedom — the neurocognitive system. This new form of "neurocapitalism" marks the urgent need for the Frankfurt School's critical theory to realize a paradigm shift from "cultural criticism" to "neurocriticism".

Adorno and Horkheimer, the first generation of Frankfurt School scholars, used the concept of "culture industry" to expose how mass media dissolve subjectivity through standardized production, while Habermas diagnosed the crisis of instrumental rationality's colonization of the lifeworld through the theory of interactional rationality. However, these classic critical paradigms have encountered interpretive difficulties in the age of neurotechnology, where capital power is no longer satisfied with manipulating the cultural symbol system, but rather transforms human perception, memory, and even subconsciousness into exploitable, programmable, and tradable data resources through brain-computer interfaces, neural sensing, and other bio-digital technologies. Neurocapitalism thus establishes a triple logic of domination, and in the context of Habermas's theory of interactional rationality, it constructs a dual analytical framework of technophenomenology and neuropolitical economy to rebuild cognitive freedom eroded by the hegemony of algorithms, which is not only the

contemporary activation of the Frankfurt School's critical tradition, but also the provision of a theoretical weapon and program of action for the defense of subjectivity in the digital era.

2. Triple Deconstruction of the Critical Paradigm of Neurocapitalism

In the age of intelligence, the dominant form of neurocapitalism poses a great epistemological challenge to the traditional critical theory. When the power of capital penetrates the cultural symbolic system and directly intervenes in the bio-digital interface of neural activities, the critical paradigm of the Frankfurt School is in urgent need of realizing a paradigm revolution from epistemology to methodology. The epistemological rupture from the critique of cultural industry to the critique of neural colonization is revealed in the historical context, the neurological reinterpretation of Habermas's doctrine of interactional rationality is accomplished within the theoretical framework, and the neural-phenomenological synthesis of the phenomenological analysis of experience and the critique of political economy is reached at the methodological level. Only through this three-dimensional deconstruction and reshaping can we penetrate the technological barriers of neurocapitalism, and anchor the contemporary coordinates of critical theory in the paradigm shift from symbolic manipulation to neuro-involvement of capital power.

2.1 *The Cognitive Turn: The Paradigm Break from Cultural Industry to Neurocolonization*

Adorno's critique of the culture industry reveals the hidden mechanism of domesticating the consciousness of the subject through standardized symbolic production in late capitalism. The culture industry occupies people's superego in practice, and it achieves total domination by catering to the needs of the ego effectively weakening the resistance of the self¹. The cultural products it produces mask their industrialized nature with false individuality, and collect the subject's aesthetic experience and reflective ability as an appendage of capital value-added. However, this critical paradigm suffers a fundamental failure in the age of neurocapitalism. Quadriplegic patient Nolan Albo has achieved real-time communication between his brain and external computer equipment through brain-computer interface technology from Musk's brain-computer interface company Neuralink, and has been able to play video games and chess online through his mind²; Theo Berg, a biomedical engineer at the University of Southern California, has developed a memory prosthesis that can convert short-term memories into slightly longer-term memories, which doesn't guarantee a complete recovery of memories, although it might improve them. The device mimics the function of the hippocampus, which is surgically grafted into the brain and electrically stimulates the brain in a specific way, and finally form memories³. When Neuralink's brain-computer interface technology is able to decode the neuroelectric signals of the motor cortex in real time, and Kernel's hippocampal memory reading and writing device cuts "stretches" in Bergson's sense of the word into storable and discrete units of data, the power of capitalism has broken through the mediated manipulation of cultural symbols and intervened in the ontological realm of neural activity. The power of capitalism has broken through the mediated manipulation of cultural symbols and directly intervened in the ontological field of neural activity. Neurocapitalism is no longer satisfied with shaping the subject's structure of consciousness, but rather reconfigures the material basis of subjectivity through bio-digital technology.

In Merleau-Ponty's phenomenological vision, human pattern-recognition ability is revealed as a constitutive dimension of embodiment, which is neither an a priori function of pure consciousness nor a passive product of mechanical response, but is rooted in the dynamic coupling system between the body subject and its dynamic organs. Through the intentional projection of bodily schemas, our perceptual system transforms the kinetic potential of the organs into a mechanism for generating meaning in environmental interactions in an embodied continuum of presence, making pattern recognition an ontological manifestation of "being-in-the-world"⁴. Human subjectivity also does not originate from a priori consciousness, but is constructed through the dynamic interaction between the body and the world. Neurocapitalism's domination technique precisely targets this existential root. Brain-computer interfaces transform bodily intentionality into programmable sets of algorithmic instructions, so that the phenomenological content of grasping movements, such as strength and direction, which are originally rooted in contextualized bodily experience, are downscaled into parameters optimized by deep learning models.

On the one hand, this technological intervention has led to the reduction of the subject's "earthly existence" in the world to an engineering problem of signal transmission, and the essence of technology criticized by Heidegger, "set placement," has reached the most relevant interpretation in the neural domain⁵. On the other hand, Marx had mentioned in the 1844 Economic and Philosophical Manuscripts that "the more power the laborer expends in his labor, the stronger the power he creates with his own hands against the world of his own, alien objects, and the more impoverished he is in himself, in his internal world, and the less is attributed to him"⁶. Neuroplasticity itself becomes a new field for capital accumulation, and the data generated by each adaptive adjustment of the motor cortex becomes a means of production for the training of algorithms, and it is the short-circuiting of knowledge that results from the alienation of such algorithms that creates the whole of what Stiegler identifies as the "Proletarianization of Consciousness" in Capitalist Social Existence⁷. Only through a

cognitive revolution can critical theory gain access to the reigning codes of neurocapitalism, which is neither a simple denial of technological progress nor a fall into technological determinism, but a reconstruction of the dialectical tension between technological mediativity and subjective freedom.

2.2 Neuralization of Interactional Rationality: A Critical Approach to the Threshold of Technological Colonization

Habermas's theory of the colonization of the lifeworld points out that society is a lifeworld on the one hand and a system on the other, and that social evolution is a dual development process in which the system and the lifeworld are interdependent and complementary. The "lifeworld" is a storehouse of interpretive paradigms organized by cultural transmission and language; the "system" is material, purposeful and rational, the bearer of content, a technological thing in which only purposive behaviors are performed. The basic characteristic of modern Western society is the disconnection between "system" and "lifeworld", i.e., the "colonization of the lifeworld"⁸. In the framework of neurocapitalism, the erosion of instrumental rationality in the field of interaction leads to the distortion of intersubjective understanding, and this colonization takes on a more radical form. Examining the paradigm shift of contemporary neural interface technologies under the Habermasian perspective of interactional rationality reveals that it is accelerating the process of colonization of the lifeworld by instrumental rationality in a dual path. Since 1924, when human beings first extracted EEG signals from the surface of the scalp, scientists have been devoted to exploring and revealing the mysteries of brain science through the study of EEG signals⁹. Carnegie Mellon University's electroencephalogram-mechanical arm control system decodes EEG signals to directly map the subject's thoughts into mechanical movement parameters, a closed-loop construction of a "neural-digital interface" that essentially replaces inter-subjective verbal negotiation with technological mediation. This closed-loop construction of "neural-digital interface" is essentially a process of replacing inter-subjective verbal negotiation with technical mediation¹⁰. Habermas's emphasis on "communicative action" is downscaled to a neurological extension of instrumental action when the strength and trajectory of grasping actions, which would otherwise require body-language coordination, are reduced to unidirectional control commands of neural signals. In MIT's neural control experiments, the precise modulation of the macaque motor cortex by artificial neural networks not only achieves technological domination of the organism's behavior, but also exposes the ultimate ambition of neurocapitalism, which is to transform the material foundations of intersubjectivity into algorithmically optimized engineering parameters by reconfiguring the mechanisms of neural plasticity¹¹. This technological practice breaks out of the Habermasian critique of "systemic colonization of the lifeworld" and points directly to the technological deconstruction of the existential premise of interactional rationality, whereby the innate ability of the subject to construct consensus through language, as neural interfaces encode brain activity as a sequence of computable signals, is being replaced by the principle of the efficiency of neural signal transmission¹².

At this point, the principle of "intelligibility" of interactional rationality must be extended to the algorithmic transparency of neural data. When the decision logic of a brain-computer interface is encapsulated in a commercial black box, the semantic clarity required for intersubjective understanding is dissolved by technological agnosticism. This calls for the establishment of the right to algorithmic interpretation as a fundamental human right in the neural age, ensuring traceability of neural data processing through mandatory open source protocols. The radical nature of this neuralized reconfiguration is that it transforms interactional rationality from an abstract philosophical category into a material technological device. When the algorithmic logic of brain-computer interfaces must be determined through intersubjective negotiation rather than the will of capital, technology itself becomes the vehicle for the materialization of interactional rationality. This not only breaks through the techno-pessimism of traditional critical theory, but also opens up practical paths of resistance to cognitive colonization. The ethical roots of intersubjective understanding are guarded in algorithmic hegemony through the reconstruction of neural negotiation space. Techno-democratization is no longer limited to the modification of pre-existing devices, but directly intervenes in the design process of neurocognitive architecture.

2.3 Neurophenomenological Methodology: Embodiment and Political Economy Dialectics

The theoretical synthesis between Merleau-Ponty's phenomenology of the body and Marx's critique of political economy is neither a simple theoretical grafting nor an eclectic collage, but a holistic analytical framework based on new forms of alienation in the age of neurotechnology. Merleau-Ponty's phenomenology reveals the mechanism of brain-computer interface's reconfiguration of the "body-world" relationship, whereby the neuroplasticity of the motor cortex of a paraplegic patient is algorithmically rewired when he manipulates a robotic arm through a Neuralink chip. This technological intervention leads to a "double demystification" of embodied cognition, where the ambiguity and openness of bodily intentionality is replaced by the certainty of algorithmic commands on the phenomenological level; and the authenticity of "being-in-the-world" is reduced to the reliability of signal transmission on the existential level. The question of the reliability of signaling. This

phenomenological analysis must be combined with Marx's critique of political economy.

In his theory of labor value, Marx argues that "labor has become not only a means of earning a living, but also the first necessity of life"¹³. The theory of "cognitive division of labor" developed by Kircher provides a new dimension for the interpretation of this viewpoint. Unlike the traditional view of labor as "decomposing repetitive labor to be done by different workers" discussed by Adam Smith and Marx, cooperation in scientific research is essentially a way of integrating the differences of researchers. The essence of cooperation in scientific research is to create new epistemological value through the integration of differentiated cognitive resources, research strategies and technical means of researchers, and its breakthrough is not the mechanical superposition of simple labor¹⁴. In the new form of cognitive labor driven by intelligent technology, laborers produce intelligent products in the process of human-computer collaboration by strategically invoking, coordinating and transforming various types of cognitive abilities. The core feature of this form of labor is that the creative use of cognitive ability has surpassed physical labor and become the dominant element of value creation¹⁵. The process of collection, processing and circulation of neural data is essentially an exploitation of the cognitive labor of science and technology workers and data source providers in the age of intelligence. When the subject interacts with the environment through brain-computer interfaces, the δ -wave oscillations, synaptic connection patterns, and other biological data generated by his neuroplasticity adjustments are no longer merely by-products of physiological processes, but are constructed by capital power as new types of means of production. Capital accomplishes the deepest level of exploitation of the subject's consciousness through the enclosure of memory data. The fundamental innovation of this exploitation mechanism is that it breaks through the "labor time-surplus value" paradigm of Marx's time, advances the "colonization of the lifeworld" described by Habermas into the neurobiological realm, and the ontological dimension of cognitive activity (Merleau-Ponty's "schema of the body") is transformed into a new form of production. The ontological dimension of cognitive activity (Merleau-Ponty's "body schema") and the economic dimension (Marx's "form of value") are forcibly coupled at the level of technological mediation. As the raw material for the production of "cognitive surplus value", the value increase of δ -wave data follows the formula of "money-commodity-money" revealed by Marx¹⁶, but in neurocapitalism it is upgraded to the recursive accumulation mode of "data-algorithm-data".

This neurophenomenological synthesis overcomes the limitation of traditional phenomenology that ignores social and material conditions, and embeds the analysis of bodily experience into the techno-political and economic structure of capitalism. This synthesis not only continues the dialectical tradition of Frankfurt School's critical theory, but also provides a theoretical weapon for emancipatory politics in the digital age through methodological innovation.

3. Theoretical Remodeling of Neural Power

In Foucault's theoretical system of power, disciplinary power is constructed as the "anatomical politics of the body," a microscopic mechanism of power that realizes social control through the precise manipulation of the individual's physical body. With the evolution of modern power forms, Foucault further puts forward the concept of "the vital politics of the population," marking the expansion of power operations from the individual body to the biological life sphere of the whole population. This transformation of power forms reveals that contemporary capitalist politics has evolved into a "politics of life" that systematically manipulates life processes. Although the process of capitalist modernization takes on the appearance of technological rationality and institutional perfection, it is in fact a capitalized reconstruction of "life force" that incorporates biological existence into the system of surplus-value production. The logic of capital, through the dual operation of disciplining technology and regulating mechanism, not only shapes the tamed production subject, but also regulates the biological characteristics of the population, ultimately making life itself the carrier of capital proliferation. Foucault's critical insight lies in the fact that this seemingly civilized technique of governance essentially constitutes a new form of domination, whereby the politics of life transforms biological existence into an object of political economy, realizing capital's colonized domination over the dimension of life¹⁷. Foucault decodes the structural mapping of capitalist life-governance techniques through the dual ordering of anatomical politics and life politics; the historical generation of capitalism not only constitutes its ontological premise, but also lays the epistemological foundation for the reconstruction of the life-political paradigm of contemporary critical theory¹⁸, while neurocapitalism is writing a new chapter in the history of power, which is no longer satisfied with disciplining the flesh or regulating the population, but extends the power tentacles to the microcosmic realm of neural activities through brain-computer interfaces, and a new form of power — neural power — is born here.

3.1 The Neural Interface of Free Discipline: The Cognitive Upgrading of Foucault's Life Politics

Foucault's training power is controlled through spatial and temporal segmentation and physical training, while Amazon's neurosensing headband Halo pushes this mechanism to the neural level. Morpheus-1 realizes neuromodulation through the ultrasonic hologram generating technology, and its core mechanism lies in the targeted stimulation of the prefrontal cortex, a brain region responsible for higher-order cognitive functions, to

achieve lucid dreaming induction and stabilizing control¹⁹. This paradigm of fusing deep neural network computation with neuromodulation techniques marks a key breakthrough in the translation of brain-computer fusion technology from proof-of-concept to commercialization in the era of neurocapitalism. This neuromodulation technology bypasses behavioral observation to directly monitor cognitive processes, upgrading the panoramic open-mindedness described by Foucault to neural open-mindedness²⁰; at the same time, it transforms Marx's labor time exploitation into neural resource extraction²¹, the attention fluctuation curve is no longer just a physiological phenomenon, but has become the metadata for calculating pay and promotion.

This neural power reconfiguration completely subverts the traditional notion of subjectivity, and its deeper crisis lies in the dissolution of cognitive freedom. For Kant, human freedom is a necessary precondition for the question of "how moral action is possible". Freedom, which in discursive reason is relegated to the unknowable "thing-in-itself," is in practical reason the beginning of human moral behavior²². Kant's concept of freedom takes rational self-discipline as its kernel, and regards freedom from the domination of other-directed desires as a prerequisite for the realization of the moral subject. Contemporary neurosensing technology reconfigures the subject's cognitive paradigm through real-time neurofeedback mechanisms, radically alienating the paradigm of self-technology revealed by Foucault's politics of life, whereby biopower has penetrated to the level of neuroplasticity, forming a new type of cognitive programming mechanism. This shift from external control that regulates the physical body to the operation of micro-power that shapes neural circuits marks the completion of a paradigmatic revolution in the biopolitics from macro-social apparatuses to synapse-level self-colonization.

3.2 Framework Construction of Subconscious Data: δ -wave Harvesting and the Movement of Spiritual Privatization

The theory of the bourgeois public sphere established by Habermas in "The Structural Transformation" of the Public Sphere faces a deconstructive crisis in the age of neurotechnology. Habermas emphasizes that the formation of the bourgeois public sphere must be based on the binary separation of the private and public spheres, in which the private sphere, as a pre-political space for the generation of subjectivity, assumes the core functions of individual identity, ethical reflection, and the construction of intersubjectivity. The sanctity of the private sphere is not only reflected in the law's protection of physical boundaries such as housing and communication, but also points to the inviolability of the human spiritual world at a deeper level. This inviolability constitutes the prerequisite for the subject to conduct rational communication, and requires that individuals, both as the public and in the private sphere, must possess this rational critical spirit. So that individuals are not restricted by others or public power, and maintain personality independence²³. The current techno-capitalism is constructing a neural public sphere through neural interface devices, incorporating mental activities that originally belonged to the private sphere into the circulatory system of capital appreciation. At the same time, the system-life world dichotomy presupposed by Habermas appears to overlap in scope in the age of neurotechnology, and when the technological system directly intervenes in the biochemical process of the neural synapses, the colonization of the life world has broken through the level of social interaction and penetrated deeper into the material basis of neurobiology.

However, with the breakthrough development of neurotechnology, the material basis of this binary structure is also increasingly dissolving. δ -wave acquisition technology decodes 0.5-4Hz low-frequency brain waves, and transforms the non-symbolizable substrate of the "realm of the real" in Lacanian psychoanalytic theory, including traumatic memories and instinctive impulses in the pre-linguistic stage, into algorithms that can be analyzed by algorithms and analyzers. The Lacanian psychoanalytic theory of the "real world" of the unsignifiable substrate, including the traumatic memories and instinctive impulses of the pre-verbal stage, is transformed into a stream of data that can be parsed by the algorithm. The technological system constructs a new cognitive type through the manipulation of data, turning the ineffable, which was the foundation of the subject's existential theory, into a cognitive surplus that can be manipulated by capital. In Lacanian psychoanalysis, the realm of the real is a hard core of impossibility that resists symbolization and reproduction, an impossible thing that is difficult to be described, imagined, and comprehended by the subject²⁴, while the intervention of δ -wave technology precisely creates an ontological rupture between technical rationality and psychoanalysis, which evolves into a self-propagating technological drive in the continuous capture of data streams, and ultimately opens up a new cybernetic frontier between the rift between the symbolic realm and the realm of the real.

3.3 The Ontological Usurpation of Algorithmic Hegemony: From the Public Sphere to the Cognitive Corridor

The public sphere as conceived by Habermas is a space for rational subjects to form consensus through discursive negotiation, and inter-subjective discursive interaction based on interactional rationality is a core experience of reaching consensus without coercion²⁵. This idealized public space requires participants to have free access to pluralistic information and to achieve truth generation through critical debate. However, the technological paradigm of neurocapitalism is dissolving this theoretical foundation, as exemplified by Neuralink, a neural interface device developed by Meta, which dynamically optimizes information pushing algorithms to

continually reinforce individual cognitive inertia through real-time monitoring of neuroelectrical signals in users' auditory cortex. This closed-loop system based on neurobiological data feedback essentially reconfigures the public sphere into a neurocognitive corridor, where the criterion of truth is shifted from inter-subjective rational debates to the algorithm's adaptive modulation of neural arousal patterns, resulting in the metamorphosis of public negotiation into a unidirectional tuning process between the neurobiological signals and the artificial intelligence system. This shift at the ontological level signifies that technological power has broken through the traditional path of colonization of social systems to directly intervene in the neurobiological basis of human cognitive structure.

This algorithmic hegemonic reconfiguration involves two kinds of usurpation, where algorithmic systems replace humans as arbiters of meaning, and neuroplasticity is hijacked by algorithms as a hegemonic tool. The ultimate danger of this neural gyrus lies in its self-legitimizing mechanism. As algorithms continuously optimize neurostimulation strategies through reinforcement learning, users lose not only their cognitive autonomy, but also their ability to perceive heterogeneous ideas, and their brains are reshaped to be the best vehicle for algorithmic hegemony. The "rationality of interaction" that Habermas had pinned so much hope on has been reduced to an outdated protocol that cannot be decoded under the framework of neurocapitalism, and a new type of power is completing the ultimate reorganization of the human spirit in the name of neurocompatibility.

4. The Neuralized Path to Redemption of Interactional Rationality

In the crisis of neurocapitalism's full-scale colonization of the cognitive field, Habermas's theory of interactional rationality not only needs to be reconstructed at the theoretical level, but also urgently requires the practical transformation of technologization and institutionalization. When the power of capital reduces the brain to a data-producing organ through the hegemony of algorithms, the resistance movement must simultaneously open up a battlefield in the three dimensions of neural interface, legal framework, and technological substrate. This trinity of redemptive paths is not only a neuralized continuation of Habermas's "unfinished program of modernity," but also a strategic outline for the defense of subjectivity in the digital age.

4.1 Conditions for the Possibility of a Neural Public Sphere: Reconstructing the Cognitive Foundation of Consultative Democracy

The ideal discursive situation proposed by Habermas constructs three core elements for consultative democracy: equality of discourse between subjects, transparency of information exchange, and free will from power control²⁶. In the era of neurocapitalism, however, algorithmic hegemony is systematically dismantling these preconditions for democratic consultation through the transformation of cognitive infrastructure. Algorithmic recommender systems create cognitive closure. The platform's personalized push mechanism locks users into a cognitive cocoon constructed from behavioral data through neuroprofiling techniques. This neural plasticity-based information feeding not only dissolves the necessary heterogeneous information exchange in the public sphere, but also creates cognitive dependence through the dopamine reward mechanism.

And to rebuild the cognitive foundation of consultative democracy, the practice of neuropolitics needs to be developed from three dimensions. First, to establish a mechanism for democratizing neurotechnology, breaking the technological monopoly through open-source brain-computer interfaces and public neural databases; second, to build a framework for algorithmic transparency, requiring platforms to disclose the generative logic and value parameters of neural portraits; and third, to develop neural civic literacy, fostering the public's ability to critically reflect on cognitive manipulation technologies. Interdisciplinary dialogues between neuroscientists and democratic theorists have shown that through the democratized use of neuroplasticity, humans can reshape more inclusive cognitive architectures. When technological democratization interacts benignly with cognitive autonomy, interactional rationality, weakened by algorithms, will regain its material roots in the neural public sphere. This practice of cognitive democratization is essentially a neuroscientific recontextualization of Habermas' theory of interactional behavior in the digital age.

4.2 The Legal Philosophy of Neurocitizenship: The Dialectic of Sacredness of Consciousness and Data Sovereignty

Against the backdrop of digital capitalism's reconfiguration of human existence, the binary framework of the traditional human rights theory between the right to body and the right to property is being fundamentally deconstructed. Neurocapitalism, on the other hand, has reduced the realm of consciousness, originally considered sacrosanct, to a new type of means of production by transforming bioelectrical signals, cognitive patterns, and even subconscious activities into tradable data streams. Although the Charter on Data Ethics issued by the Institute of International Finance (IIF) attempts to establish a governance framework, its internal logic still regards neurodata as the "petroleum treasure trove" in the age of intelligence, which reflects the deep dilemma of the commoditization of consciousness²⁷. Herein lies the value paradox of the Data Ethics Charter, which advocates an informed consent framework that faces fundamental failure in the neurodata scenario. As

neurocapture devices become deeply embedded in everyday life (e.g., mood-monitoring head rings, attention-tracking eyeglasses), the unconsciousness and continuity of data production has rendered the rational subject presupposed by traditional contractual theory non-existent. This requires the philosophy of law to go beyond the individualistic paradigm and reconstruct neurocitizenship in the dimensions of group rights and ecosystems, both recognizing the public product attributes of neurodata and establishing a collective protection mechanism against conscious alienation.

The ultimate point of neurocitizenship is to rebuild the integrity of human beings in the era of digital civilization, which requires the legal system to develop a new normative framework that can both resist neuroexploitation and promote the democratization of cognition in the dialectical movement between the sanctity of consciousness and data sovereignty. Like the projection of Habermas' theory of interactional rationality in neural space, this philosophical foundation of law is essentially a re-questioning of what it means to be a human being.

4.3 Reverse Engineering of Technological Resistance: OpenBCI's Political Decoding of Algorithmic Black Boxes

In the data empire constructed by neurocapitalism, commercial brain-computer interface systems create double alienation by encoding neural signals as encrypted commodities through closed architecture. Users are both unable to understand the algorithmic transformation process of their own neural data and lose the ability to dispose of their conscious data. It is no longer an engineering challenge to create components that mimic or even realize the ability to think with the added benefit of technological evolution. If the OpenBCI (Open Source Brain-Computer Interface) movement uses the democratization of technology as a weapon to combine these thinking devices based on the way the human brain thinks, together with the transcendence of biological finiteness by electronic, mechanical, and informational components²⁸, dismantling the algorithmic black box through reverse engineering can open up novel paths of resistance in the neuropolitical arena. The power asymmetry of the traditional brain-computer interface system is rooted in the technical black box where the data capture mechanism at the sensor layer, the feature extraction model at the algorithm layer, and the value distribution rules at the application layer are all encapsulated as commercial secrets. OpenBCI breaks this technological fiefdom through the full-stack open-source strategy by making public not only the design drawings of the hardware, but also the core algorithms of the signal filtering and time-frequency analysis in the GitHub community. Its Ultracortex headset not only makes the hardware design drawings public, but also puts the core algorithms, such as signal filtering and time-frequency analysis, under the supervision of GitHub community. This transparent architecture allows ordinary users to trace the complete chain of neuroelectric signals from bioelectrical impulses to digital symbols.

However, technological resistance always faces recursive cannibalization by power structures. The ethical potential of open-source protocols may be coopted as a compliance frill for the commercial system, and barriers to entry for hardware costs continue to reproduce the technological elite. True reverse engineering must move beyond instrumental rationality critique to construct systemic alternatives at the level of cognitive political economy. This requires the uplifting of code open source into an institutionalized practice of cognitive justice — both through algorithmic transparency that dismantles the commodity fetishism of neural data, and a knowledge community model that rebuilds the social contract of consciousness production. Technological decoding thus becomes the new emancipatory narrative of the digital age, igniting a rational spark of resistance to alienation at the abyss of brain-computer fusion.

5. The Neuralized Extension of Critical Theory and the Defense of Anthropology

When neurocapitalism advances the logic of exploitation from the realm of labor to the realm of cognition, the task of critical theory is not only to explain the world, but also to defend the existential foundation of human beings as human beings. The "alienation of labor" revealed by Marx in the 19th century is being upgraded to "cognitive alienation" in the age of neurotechnology, where the power of capital not only appropriates the surplus value of laborers, but also colonizes the mechanisms of their perception, memory, and desire through brain-computer interfaces. Only by breaking the complicity between neural circuits and the logic of capital can the integrity of the embodied subject be reconstructed and the irreducibility of human consciousness be defended in technological mediation.

5.1 Diagnosis of the New Forms of Alienation: Paradigm Shift from Labor Alienation to Cognitive Alienation

The theory of labor alienation constructed by Marx in the 1844 Economic and Philosophical Manuscripts reveals the fourfold alienation of the essential power of the laborer under the capitalist relations of production: the alienation of the laborer from the product of labor manifests itself in the hostile existence of objectified labor; the alienation of the process of labor reduces productive activity to the antithesis of vital activity; the alienation of the essence of the class cuts off the free and self-conscious character of the human being; and the alienation of interpersonal relations reduces social relations to objectified relations. social relations down to materialized relations²⁹. This theoretical system has suffered an epistemological rupture under the framework of

contemporary neurocapitalism, where the violence of alienation has penetrated from the realm of material production to the neurocognitive dimension, completing a paradigm revolution from the exploitation of human labor to the reconstruction of the human being itself.

Neurocapitalism has implanted the logic of capital proliferation into the human neuroplasticity system through technological devices such as brain-computer interfaces and neural augmentation, and so the quadruple nature of alienation revealed by Marx has gained a new elaboration in the cognitive dimension: the alienation of cognitive products (neural data) reduces mental activity to a means of production; the alienation of cognitive processes downgrades the movement of thought to algorithmic training; the alienation of the cognitive class of essences dissolves the subjectivity of the reflective dimension; and the alienation of cognitive relations constructs the hierarchical domination of neural networks. Neurocapitalism achieves a qualitative shift from the exploitation of surplus value to the production of the cognitive subject by advancing the objectified domination of labor alienation theory to a neuralized reconfiguration. The deep violence of this cognitive alienation lies in the fact that it is no longer satisfied with appropriating the product of labor, but rather, through the technological intervention of the nervous system, it transforms the cognitive potential of the human being into an organ of capital's self-multiplication. The alienation of man from his own kind of essence, as Marx puts it, is corroborated at the neurobiological level in the age of neurocapitalism. This revolutionary leap in the paradigm of alienation requires us to reinterpret the contemporary value of Marxist theory and, moreover, to develop a cognitive critical paradigm against neurocapitalism to guard the essence of human freedom amidst the wave of technological accelerationism.

5.2 The Neuropsychological Path of Subjectivity Reconstruction: Confrontation Between Embodied Cognition and Algorithmic Hegemony

At a time when intelligent technology is deeply involved in human cognition, the reconstruction of subjectivity has become an important proposition in the field of neuropsychology. The confrontation between the theory of embodied cognition and the hegemony of algorithms is essentially a philosophical reconstruction of the way of human existence, the core of which is to break the domination of subjective consciousness by technological alienation, and to reshape the bodily experience and autonomy in cognitive activities. Algorithmic systems are systematically reconfiguring the human cognitive framework through dataization, standardization, and predictive manipulation. Their efficiency-first logic reduces cognitive processes to computable input-output models, leading to the abstraction of embodied experiences into data streams and the displacement of fuzzy decisions into probabilistic calculations. This cognitive colonization not only dissolves the body's function as a carrier of meaning generation, but also reshapes the operation mode of brain circuits through the mechanism of neuroplasticity, so that subjectivity gradually becomes dependent on the algorithmic interpretation system. At the same time, the rapid development of big data technology has laid the potential foundational conditions for the widespread expansion of surveillance capitalism, where massive amounts of user-generated data have become the object of influence exerted by corporations and other actors using predictive algorithms, a process that profoundly reveals the dynamics of power in the data economy. However, this model in practice often lacks sufficient ethical consideration and accountability. Surveillance capitalism tends to disregard established legal frameworks and ethical boundaries, and only reluctantly acknowledges the existence of its violations when faced with an unstoppable wave of public criticism³⁰. Platforms such as Facebook/Meta exist to precedent of manipulating users' behavior without their consent in an attempt to quantify and influence our emotional responses, mental states and even behavioral tendencies. This phenomenon shows that in the pursuit of maximizing commercial interests, ethical norms are often marginalized or even ignored, and as long as there is the possibility of circumventing regulation and accountability, ethical boundaries are easily blurred or even crossed.

In order to fight against the hegemony of algorithms, we should emphasize the dynamic coupling mechanism between body schema and the environment at the perceptual level, and resist the fragmented cognition of algorithms by restoring the wholeness of sensory experience; advocate the non-calculability of pre-reflective consciousness at the level of cognitive generation, and reveal the constitutive role of bodily movement in concept formation; and build a shared meaning space of embodied interaction at the level of intersubjectivity, so as to break the cognitive silo constructed by algorithms. The cognitive defense against technological alienation jointly constituted by these three dimensions is to introduce Merleau-Ponty's philosophy of incarnation into the field of technological criticism, and to re-anchor the ontological status of the body in digital civilization through the theoretical structure of neuropsychology. It not only requires technological systems to respect the biological constraints of embodied cognition, but also to reconstruct the limits of technological intervention at the phenomenological level.

5.3 Ultimate Guardianship of the Frontier of Freedom: Neurodemocratization and the Choice of a New Form of Human Civilization

The development of neurotechnology is reconfiguring the existential foundation of human civilization, and introducing the evolutionary history of species into an unprecedented field of ethical decision-making. This technological revolution not only implies a paradigm shift in cognitive science, but also opens up the ultimate proposition of subjectivity reconstruction in the philosophical dimension. When the neural interface breaks through the physical barrier of the biological brain, and when the neural data stream becomes a programmable algorithmic object, human beings must face the structural reshaping of free will and the paradigmatic choice of civilization. The expansion of neurocapitalism is essentially the ultimate colonization of the field of life by instrumental rationality. Its cognitive paradigm of downgrading the brain to a “wetware” implicitly perpetuates the modernity of Cartesian mind-body dualism, reducing conscious activity to a set of neural signals that can be computed and traded. This cognitive colonization process realizes the algorithmic deconstruction of the subject’s decision-making mechanism through neuroeconomics, implanting consumerist value presuppositions in the neural feedback loop, and reducing free will to a neuroplastic market variable.

The new form of human civilization is essentially an existential turn at the level of techno-philosophy. Heidegger’s theory of technological demystification shows the value of early warning here. When neurotechnology transforms conscious activities into quantifiable information flows, the truth of existence may be obscured by computational rationality³¹. The risk inherent in cutting-edge neurotechnology is that it may tend to obscure or even dissolve the essential existence of human beings, focusing too much on the technology itself and ignoring the subjective position of the individual. Neurotechnology should be positioned as an aid to solving practical problems, and its application must ensure that it does not diminish or jeopardize the rights and dignity of the individuals who are the subjects of the research³². Moreover, the ultimate goal of neural democratization lies in the establishment of a hermeneutic framework for the application of technology, so that neural augmentation always serves the expansion of existential possibilities rather than the dismantling of essence. This calls for a reconfiguration of the ontological foundations of the concept of posthumanity, not through neural modification to achieve the self-transcendence of the human species, but rather to sustain the integrity of dignity in an existential sense in the process of technological embodiment. As the technological singularity of the neural interface breaking through the physical limitations of the biological brain approaches, the choice of civilization has gone beyond the scope of traditional ethical discussions and has risen to the level of existential collective decision-making. Only by maintaining the necessary tension in the dialectical movement between technical rationality and value rationality can human beings maintain the ethical baseline for the continuation of civilization in the neurotechnological revolution.

6. Conclusion

The domination techniques of neurocapitalism have pushed humanity to a tipping point in the history of the species: when δ -wave data becomes the new raw material for capital accumulation, when fluctuations in attention are quantified as indicators of productivity, and when the algorithmic gyratory replaces rational negotiation in the public sphere, the existential roots of human beings as human beings are experiencing an unprecedented erosion. This crisis not only exposes the limitations of the explanatory power of traditional critical theory, but also forces philosophy to re-examine the symbiotic relationship between technology, capital and subjectivity. The construction of a neurodemocratic governance paradigm is not only a neuralized continuation of Habermas’s “unfinished program of modernity”, but also an expansion of the cognitive dimension of Marx’s alienation theory. At the crossroads of civilization, only by liberating brain-computer interface technology from the logic of capital and making it the material carrier for rebuilding the rationality of interaction can we guard the ultimate dignity of human beings as the subject of meaning generation, which is not only the contemporary mission of critical theory, but also the ethical bottom line for the survival of digital civilization.

Fund Project

This research was supported by Qinghai Province Philosophy and Social Science Planning Self-financed General Project “Research on the Development of Teachers’ Professional Competence in Civic and Political Theory Courses in Qinghai Colleges and Universities” (24CY052), moderated by: Ying Yang.

Conflict of Interest Statement

The authors have no financial or proprietary interest in any of the material discussed in this paper, with the exception of the Qinghai Province Philosophy and Social Science Planning Self-financed General Project.

Author Contributions

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Zisi Yang and Ying Yang. The first draft of the manuscript was written by Zisi Yang and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Data Availability Statement

The datasets used and analysed during the current study available from the corresponding author on reasonable request.

Ethics Declaration

Not Applicable.

References

- Ardaillon H, Ribault S, Herault C, et al., (2024). Striking the Balance: Embracing Technology While Upholding Humanistic Principles in Neurorehabilitation. *Neurorehabilitation and neural repair*, 38(9), 15459683241265887.
- Bai Hu, (2025). Transmutation of Capitalist Life Governance Technology and Its Reflection-Based on the Perspective of Political Economy Critique. *Academic Research*, (01), 42-47.
- Bashivan P, Kar K, DiCarlo JJ, et al., (2019). Neural population control via deep image synthesis. *Science*, 364, eaav9436.
- Chen Yang, (2021). The Paradox of Autonomy — A Trial Analysis of Two Interpretations on Kant's Concept of Autonomy. *Ethics Research*, (06), 76-84.
- Du Mingli, (2015). Reflections on the Construction of Political Identity under the Perspective of Intersubjectivity—Based on Habermas' Theory of Interaction Behavior. *Journal of Hubei University of Economics (Humanities and Social Sciences Edition)*, 12(03), 93-94.
- Edelman BJ, Meng J, Suma D, et al., (2019). Noninvasive neuroimaging enhances continuous neural tracking for robotic device control. *Sci Robotics*, 4, eaaw6844.
- Feng Qinchang, (2020). Brain-computer interface design based on OpenBCI and OpenViBE. *Chinese Journal of Medical Physics*, 37(02), 210-219.
- Gao Zhonghua, Wei Ran, (2015). On the ecological view of Marx's 1844 Economic and Philosophical Manuscripts. *Journal of Jiangsu Normal University (Philosophy and Social Science Edition)*, 41(06), 84-87.
- He Jing, (2009). Body Imagery and Body Schema — A Study of Embodied Cognition. Zhejiang University, 7.
- He Xiaoyu, (2024). An anthropological examination of surveillance capitalism. *Inner Mongolia Social Science*, 45(05), 124-132.
- Huang Meidi, Wang Haobin, (2021). How does "truth" lie between the a priori and the empirical? — The interpretation of the logical progression of Habermas's "consensus theory of truth". *Zhejiang Journal*, (06), 115-122.
- INSTITUTE OF INTERNATIONAL FINANCE, (2021). IIF DATA ETHICS CHARTER (2021-06) [2025-02-10]. https://www.iif.com/portals/0/Files/content/Innovation/06_07_2021_iif_data_ethics_charter.pdf.
- Jia Wenjuan, Yan Wenxi, (2022). Cognitive labor and labor control in data annotation-an example of N Artificial Intelligence Company. *Sociological Research*, 37(05), 42-64+227.
- Li Xinxin, (2003). Between concealment and concealmentlessness — an understanding of Heidegger's phenomenology. *Fudan Journal (Social Science Edition)*, (02), 22-28.
- Ling Haiheng, (2003). Adorno's Critical Thought on Cultural Industry. *Foreign Literature Review*, (02), 82-91.
- Ma Li, Chen Yulin, (2009). Interpreting Habermas's theory of interactional behavior. *Theory*, (02), 114-115.
- Mark T., (2024). Beyond the extended and distributed 'self': from subliminal extended selves to nonlocality and neurocapitalism. *Journal of Marketing Management*, 40(7-8), 662-674.
- Peter Ray Allison, (2024). Ultrasonic headband induces lucid dreams using AI, its creators claim — but an expert remains skeptical. (2024 -02-12) [2025-02-06]. <https://www.livescience.com/technology/virtual-reality/ultrasonic-headband-induces-lucid-dreams-using-ai-its-creators-claim-but-an-expert-remains-skeptical>.
- Phoenix Net, (2017). No more amnesia with memory prosthesis? *World Science*, (02), 14-15.
- Sun Zhouxing, (2020). Heidegger and the Theory of Technological Destiny. *World Philosophy*, (05), 77-88+161.
- Tu Liangchuan, Qian Yanru, (2022). Technological Narrative of Artificial Intelligence Singularity Theory and Its Philosophical Enquiry. *Journal of Northeast Normal University (Philosophy and Social Science Edition)*, (06), 57-65.

- Wen Xiaonian, Ouyang Bin, (2025). Logical Analysis of Time Exploitation in Digital Capitalism. *Journal of China University of Mining and Technology (Social Science Edition)*, 27(01), 50-63.
- Wu Yue, (2024). Challenging the “Impossibility” of Posteriorism: On Zizek’s New Interpretation of Lacan’s Concept of the Realm of the Positive. *Tianjin Social Science*, (05), 66-73.
- Xiao Feng, Deng Canming, (2021). The meaning of digital labor and its comparison with material labor. *Journal of Wuhan University of Science and Technology (Social Science Edition)*, 23(06), 632-637.
- Xu Donghui, (2023). Research on Foucault’s Life Politics Theory. Heilongjiang University, 17-30.
- Yang Bao, (2006). The Revelation of Marx’s Thought of “Alienated Labor” — An Interpretation of the 1844 Economic and Philosophical Manuscripts. *Lanzhou Journal*, (05), 6-8.
- Zhang Wentao, (2024). Musk’s brain-computer interface experiment reproduces progress (192). *Journal of Clinical Electrophysiology*, 33(03), 234.
- Zhang XB, Ruan MH, Yuan TW, et al., (2020). Development of neuroscience and brain-like artificial intelligence: new advances, new trends. *Life Science*, 32(10), 993-1013.
- Zhang Xingjia, (2023). A study of Habermas’s theory of the public sphere in the Structural Transformation of the Public Sphere. Qufu Normal University, 33.
- Zhang Yibing, (2018). Proletarianization of the Mind and Its Path to Emancipation — Stigler’s Critique of Contemporary Digital Capitalism. *Exploration and Controversy*, (01), 4-13+1+141.
- Zhao Zhihao, (2013). How Marx Discussed the Contradiction in Capitalist Production from the Commodity. *Journal of North China Electric Power University (Social Science Edition)*, (01), 83-89.
- Zhu Jing, Zhang Mingjun, (2022). Cognitive labor division in citizen science and community science. *Natural Dialectics Letters*, 44(09), 86-94.

¹ Ling Haiheng, (2003). Adorno’s Critical Thought on Cultural Industry. *Foreign Literature Review*, (02), 82-91.

² Phoenix Net, (2024). Musk’s brain-computer interface experiment reproduces progress (192). *Journal of Clinical Electrophysiology*, 33(03), 234.

³ Zhang Wentao, (2017). No more amnesia with memory prosthesis? *World Science*, (02), 14-15.

⁴ He Jing, (2009). Body Imagery and Body Schema — A Study of Embodied Cognition. Zhejiang University, 7.

⁵ Sun Zhouxing, (2020). Heidegger and the Theory of Technological Destiny. *World Philosophy*, (05), 77-88+161.

⁶ Gao Zhonghua, Wei Ran, (2015). On the ecological view of Marx’s 1844 Economic and Philosophical Manuscripts. *Journal of Jiangsu Normal University (Philosophy and Social Science Edition)*, 41(06), 84-87.

⁷ Zhang Yibing, (2018). Proletarianization of the Mind and Its Path to Emancipation — Stigler’s Critique of Contemporary Digital Capitalism. *Exploration and Controversy*, (01), 4-13+1+141.

⁸ Ma Li, Chen Yulin, (2009). Interpreting Habermas’s theory of interactional behavior. *Theory*, (02), 114-115.

⁹ Feng Qinchang, (2020). Brain-computer interface design based on OpenBCI and OpenViBE. *Chinese Journal of Medical Physics*, 37(02), 210-219.

¹⁰ Edelman BJ, Meng J, Suma D, et al., (2019). Noninvasive neuroimaging enhances continuous neural tracking for robotic device control. *Sci Robotics*, 4, eaaw6844.

¹¹ Bashivan P, Kar K, DiCarlo JJ, et al., (2019). Neural population control via deep image synthesis. *Science*, 364, eaav9436.

¹² Zhang XB, Ruan MH, Yuan TW, et al., (2020). Development of neuroscience and brain-like artificial intelligence: new advances, new trends. *Life Science*, 32(10), 993-1013.

¹³ Xiao Feng, Deng Canming, (2021). The meaning of digital labor and its comparison with material labor. *Journal of Wuhan University of Science and Technology (Social Science Edition)*, 23(06), 632-637.

¹⁴ Zhu Jing, Zhang Mingjun, (2022). Cognitive labor division in citizen science and community science. *Natural Dialectics Letters*, 44(09), 86-94.

¹⁵ Jia Wenjuan, Yan Wenxi, (2022). Cognitive labor and labor control in data annotation-an example of N Artificial Intelligence Company. *Sociological Research*, 37(05), 42-64+227.

¹⁶ Zhao Zhihao, (2013). How Marx Discussed the Contradiction in Capitalist Production from the Commodity. *Journal of North China Electric Power University (Social Science Edition)*, (01), 83-89.

¹⁷ Xu Donghui, (2023). Research on Foucault’s Life Politics Theory. Heilongjiang University, 17-30.

-
- ¹⁸ Bai Hu, (2025). Transmutation of Capitalist Life Governance Technology and Its Reflection-Based on the Perspective of Political Economy Critique. *Academic Research*, (01), 42-47.
- ¹⁹ Peter Ray Allison, (2024). Ultrasonic headband induces lucid dreams using AI, its creators claim — but an expert remains skeptical. (2024-02-12) [2025-02-06]. <https://www.livescience.com/technology/virtual-reality/ultrasonic-headband-induces-lucid-dreams-using-ai-its-creators-claim-but-an-expert-remains-skeptical>.
- ²⁰ He Xiaoyu, (2024). An anthropological examination of surveillance capitalism. *Inner Mongolia Social Science*, 45(05), 124-132.
- ²¹ Wen Xiaonian, Ouyang Bin, (2025). Logical Analysis of Time Exploitation in Digital Capitalism. *Journal of China University of Mining and Technology (Social Science Edition)*, 27(01), 50-63.
- ²² Chen Yang, (2021). The Paradox of Autonomy — A Trial Analysis of Two Interpretations on Kant's Concept of Autonomy. *Ethics Research*, (06), 76-84.
- ²³ Zhang Xingjia, (2023). A study of Habermas's theory of the public sphere in The Structural Transformation of the Public Sphere. Qufu Normal University, 33.
- ²⁴ Wu Yue, (2024). Challenging the "Impossibility" of Posteriorism: On Zizek's New Interpretation of Lacan's Concept of the Realm of the Positive. *Tianjin Social Science*, (05), 66-73.
- ²⁵ Du Mingli, (2015). Reflections on the Construction of Political Identity under the Perspective of Intersubjectivity—Based on Habermas' Theory of Interaction Behavior. *Journal of Hubei University of Economics (Humanities and Social Sciences Edition)*, 12(03), 93-94.
- ²⁶ Huang Meidi, Wang Haobin, (2021). How does "truth" lie between the a priori and the empirical? — The interpretation of the logical progression of Habermas's "consensus theory of truth". *Zhejiang Journal*, (06), 115-122.
- ²⁷ INSTITUTE OF INTERNATIONAL FINANCE, (2021). IIF DATA ETHICS CHARTER (2021-06) [2025-02-10]. https://www.iif.com/portals/0/Files/content/Innovation/06_07_2021_iif_data_ethics_charter.pdf.
- ²⁸ Tu Liangchuan, Qian Yanru, (2022). Technological Narrative of Artificial Intelligence Singularity Theory and Its Philosophical Enquiry. *Journal of Northeast Normal University (Philosophy and Social Science Edition)*, (06), 57-65.
- ²⁹ Yang Bao, (2006). The Revelation of Marx's Thought of "Alienated Labor" — An Interpretation of the 1844 Economic and Philosophical Manuscripts. *Lanzhou Journal*, (05), 6-8.
- ³⁰ Mark T., (2024). Beyond the extended and distributed 'self': from subliminal extended selves to nonlocality and neurocapitalism. *Journal of Marketing Management*, 40(7-8), 662-674.
- ³¹ Li Xinxin, (2003). Between concealment and concealmentlessness — an understanding of Heidegger's phenomenology. *Fudan Journal (Social Science Edition)*, (02), 22-28.
- ³² Ardaillon H, Ribault S, Herault C, et al., (2024). Striking the Balance: Embracing Technology While Upholding Humanistic Principles in Neurorehabilitation. *Neurorehabilitation and neural repair*, 38(9), 15459683241265887.

Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).

The Loss Aversion Effect in Blind Box Purchases: Why Are Consumers More Willing to Make Additional Purchases?

Xiaoyu Feng¹

¹ Wuhan University, Wuhan, China

Correspondence: Xiaoyu Feng, Wuhan University, Wuhan, China.

doi:10.56397/SSSH.2025.03.08

Abstract

This paper investigates the loss aversion effect in blind box purchases and why consumers are more willing to make additional purchases within the Chinese market context. By examining psychological principles such as loss aversion, fear of missing out (FOMO), and the Zeigarnik Effect, the study explores how these factors interact with the unique mechanics of blind box marketing. The influence of randomness, rarity, and collectability is analyzed to understand how consumer behavior is shaped by emotional triggers and cognitive biases. Marketing strategies employed by companies to leverage loss aversion, including limited editions, countdown promotions, and reward systems, are discussed in detail. Furthermore, the study highlights the paradox of consumer satisfaction, where disappointment does not necessarily reduce consumption due to post-purchase rationalization and cognitive dissonance. Future implications are considered, including ethical concerns about the exploitation of psychological principles and the potential for stricter regulations. The findings suggest that companies need to balance profitability with ethical responsibility to sustain long-term growth in the blind box market.

Keywords: loss aversion, blind box marketing, Fear of Missing Out (FOMO), collectability, Zeigarnik Effect

1. Psychological Foundations of Loss Aversion in Consumer Behavior

Loss aversion is a fundamental concept in behavioral economics and psychology that describes how individuals perceive losses more intensely than equivalent gains. This principle, first introduced by Daniel Kahneman and Amos Tversky in their Prospect Theory (1979), suggests that losses are typically twice as powerful, psychologically, as gains of the same magnitude. When applied to consumer behavior, loss aversion influences purchasing decisions by making individuals more sensitive to potential losses than to potential rewards.

In the context of China's rapidly growing blind box market, the application of loss aversion theory is particularly relevant. As a marketing model built on uncertainty and randomness, blind box purchases tap into consumers' natural aversion to loss by leveraging mechanisms such as scarcity, exclusivity, and the fear of missing out (FOMO). The psychological desire to avoid loss, whether it is the loss of a desired item or the perceived loss of opportunity, becomes a powerful motivator driving repeat purchases.

According to a 2023 survey conducted by the Chinese Academy of Social Sciences (CASS), over 65% of Chinese consumers who regularly purchase blind boxes reported doing so out of concern that they might miss out on obtaining rare or valuable items. This fear of losing the opportunity to complete a desired collection is strongly associated with loss aversion, where the pain of not acquiring a specific item outweighs the satisfaction of a successful purchase.

Moreover, cultural factors in China may intensify the effects of loss aversion in consumer behavior. The concept of “面子” (miànzi, or face) plays a significant role in Chinese social interactions, where social status and reputation are highly valued. For many consumers, successfully obtaining rare items or completing a collection

can enhance social status and personal satisfaction, while failing to do so may be perceived as a loss of status or achievement.

Additionally, the “Sunk Cost Fallacy” often interacts with loss aversion in China’s blind box market. Consumers who have already invested significant amounts of money in collecting specific series are more likely to continue purchasing due to the psychological discomfort associated with acknowledging previous financial losses. Rather than accepting the loss, individuals are motivated to keep spending in hopes of achieving the desired outcome, thereby justifying their previous investments.

A survey conducted by iResearch in 2022 found that nearly 40% of Chinese consumers who purchased blind boxes reported making additional purchases due to a desire to “complete the collection” or “avoid feeling regret for missing out.” This behavior illustrates how loss aversion can lead to escalating consumption, even when the likelihood of achieving a favorable outcome remains low.

In conclusion, the psychological foundations of loss aversion are deeply intertwined with the consumer behavior observed in China’s blind box market. The desire to avoid losses, whether financial, social, or emotional, serves as a powerful motivator for repeated purchases. Understanding this psychological mechanism is essential for analyzing why Chinese consumers are particularly willing to make additional purchases within this marketing model.

2. Mechanics of Blind Box Purchases

The blind box marketing model has become increasingly popular in China, particularly among younger consumers who are attracted by the excitement of chance-based purchases and the potential for obtaining rare, collectible items. Blind boxes are typically sold as sealed packages containing a randomly selected item from a predetermined series. The buyer does not know which specific item they will receive until the box is opened, making the process inherently uncertain and stimulating a form of gambling-like excitement.

2.1 Characteristics and Appeal of Blind Boxes

The fundamental appeal of blind boxes lies in their combination of mystery, scarcity, and collection-driven motivation. Unlike traditional products where consumers have full knowledge of what they are purchasing, blind boxes deliberately obscure the outcome, enhancing the psychological thrill of the buying process.

In China, popular brands such as POP MART and Molly have capitalized on this model by designing attractive, limited-edition collections that appeal to various demographics, particularly the “post-90s” and “post-00s” generations. According to a 2023 survey conducted by iiMedia Research, over 75% of blind box consumers in China are aged between 18 and 35, highlighting the model’s effectiveness in targeting younger audiences who are more willing to engage in experiential consumption.

The appeal of blind boxes is further enhanced by social influences and community engagement. Many consumers share their unboxing experiences on social media platforms such as Weibo, Xiaohongshu, and Bilibili, generating excitement and encouraging others to participate in the blind box culture. Additionally, companies often collaborate with popular IPs (Intellectual Properties), such as anime characters, movie franchises, and KOLs (Key Opinion Leaders), to enhance the attractiveness of their products.

2.2 The Role of Randomness and Rarity in Enhancing Engagement

The integration of randomness and rarity plays a critical role in enhancing consumer engagement and willingness to make additional purchases. By embedding the concept of randomness into their marketing strategies, companies effectively leverage the psychological mechanism of loss aversion. Consumers are not only motivated by the desire to obtain a specific item but also by the fear of missing out on something valuable.

In the case of POP MART, the use of “hidden editions” or ultra-rare items within a series has proven to be particularly effective. Consumers are often enticed to keep purchasing boxes in hopes of finding these exclusive figures, even if the likelihood of obtaining them is statistically low. This low probability of success paradoxically increases consumer engagement, as the potential reward becomes increasingly appealing due to its rarity.

A study conducted by iResearch in 2022 found that over 60% of blind box purchasers in China reported being motivated by the thrill of discovering rare items, while 48% acknowledged making additional purchases to avoid the disappointment of missing out. Furthermore, the study revealed that many consumers continue to make purchases despite previous failures, indicating that the desire to avoid loss is often stronger than the initial satisfaction of acquisition.

The randomness of blind box purchases also triggers a phenomenon known as “variable ratio reinforcement,” a psychological principle commonly associated with gambling behavior. Under this model, consumers are rewarded intermittently and unpredictably, making the purchasing experience more engaging and addictive. The anticipation of a favorable outcome, even when improbable, drives repeated attempts and enhances the overall

appeal of the product.

Additionally, the concept of “scarcity marketing” plays a crucial role in promoting consumer engagement. Limited-edition series and time-limited sales events are frequently employed by companies to create a sense of urgency, encouraging consumers to act quickly to avoid losing out on desirable items. This tactic is particularly effective in China, where the social emphasis on “collectability” and “exclusivity” reinforces the psychological need to acquire rare products.

In conclusion, the mechanics of blind box purchases are deliberately designed to exploit psychological principles such as randomness, rarity, and loss aversion. The combination of these factors creates a powerful marketing model that encourages repeated purchasing behavior, particularly among younger consumers in China. Understanding how these mechanisms interact with consumer psychology provides valuable insights into why blind box marketing continues to thrive in the Chinese market.

3. Loss Aversion as a Driver of Repeat Purchases

Loss aversion is a powerful psychological force that significantly influences consumer behavior in China’s blind box market. The theory posits that individuals are more motivated to avoid losses than to achieve equivalent gains, which makes them particularly sensitive to perceived loss in uncertain purchasing situations. This tendency is amplified in blind box purchases, where the interplay between randomness, rarity, and incomplete collections creates a high-stakes environment that encourages repeated buying.

3.1 The Influence of Fear of Missing Out (FOMO)

One of the most significant manifestations of loss aversion in blind box purchases is the Fear of Missing Out (FOMO). The sense of urgency created by limited-edition items and time-limited sales significantly enhances the consumer’s perceived risk of missing out on desirable products. In China, where popular brands like POP MART frequently release special editions and collaboration series, FOMO is deliberately heightened through promotional strategies designed to amplify consumers’ desire to obtain exclusive figures.

According to a 2022 survey by iiMedia Research, over 70% of Chinese consumers who purchase blind boxes reported that their buying decisions were influenced by FOMO. This effect is particularly pronounced among young adults aged 18 to 30, who are more likely to be influenced by social media trends and peer pressure. The widespread practice of sharing unboxing experiences on platforms like Xiaohongshu (Little Red Book), Weibo, and Bilibili further amplifies the perceived scarcity and desirability of specific items.

The emotional appeal of FOMO is rooted in the discomfort associated with the possibility of losing out on something valuable. For many consumers, the thought of missing a rare or highly sought-after item is more painful than the financial cost of repeatedly purchasing blind boxes. This phenomenon aligns well with the principles of loss aversion, where the psychological pain of missing out outweighs the pleasure derived from successful acquisition.

3.2 Emotional and Cognitive Biases Triggering Repeat Purchases

In addition to FOMO, various emotional and cognitive biases contribute to the tendency of consumers to make additional purchases. The most relevant biases in the context of blind box purchases include the Sunk Cost Fallacy and Cognitive Dissonance.

The Sunk Cost Fallacy refers to the tendency of individuals to continue investing in a particular endeavor once they have already invested substantial time, effort, or money, even when it is no longer rational to do so. In China’s blind box market, consumers who have already spent significant amounts on collecting a particular series are more likely to continue purchasing blind boxes in an attempt to complete their collection. Rather than acknowledging their financial losses, individuals are motivated to keep spending in hopes of achieving the desired outcome.

A study conducted by Tencent Research Institute in 2023 found that nearly 50% of blind box consumers in China continued purchasing despite dissatisfaction with previous outcomes, citing a desire to “avoid wasting their prior investments.” The psychological discomfort associated with acknowledging financial loss drives consumers to persist in their buying efforts, further reinforcing the appeal of the blind box model.

Another relevant cognitive bias is Cognitive Dissonance, which describes the psychological tension experienced when an individual’s actions conflict with their beliefs or values. To reduce this discomfort, consumers often engage in rationalization to justify their purchasing behavior. For example, a consumer who repeatedly fails to obtain a desired item may convince themselves that the thrill of the experience itself is worth the expense. This rationalization helps to maintain positive perceptions of the purchasing process and reduces post-purchase regret.

Furthermore, “loss framing” is a critical marketing strategy utilized by companies to intensify loss aversion. By emphasizing the scarcity of certain items or promoting limited-time offers, marketers can enhance the perceived

value of the blind box experience. Consumers are frequently reminded of what they stand to lose if they do not act quickly, reinforcing the urgency to make additional purchases.

A practical example of loss framing can be observed in POP MART's marketing campaigns, which frequently highlight the exclusivity of "hidden editions" and the limited availability of popular series. Such tactics are particularly effective in China's highly competitive market, where consumers are drawn to products that offer prestige and uniqueness.

Overall, loss aversion serves as a fundamental psychological driver that influences the repeat purchase behavior observed in China's blind box market. The combination of FOMO, sunk cost fallacy, cognitive dissonance, and loss framing creates a powerful incentive structure that encourages consumers to engage in continuous consumption, even when their initial experiences are not entirely satisfactory.

The next section will examine how collectability and completion motivation further contribute to the willingness of consumers to make additional purchases.

4. The Role of Collectability and Completion Motivation

The appeal of blind boxes in China extends beyond mere randomness and scarcity; it is deeply intertwined with the psychological desire to collect and complete. The human inclination toward collection is well-documented in psychological literature, where it is often associated with feelings of achievement, satisfaction, and identity-building. In the case of blind box purchases, this desire is heightened by the marketing strategies that emphasize the completion of series or sets.

4.1 Psychological Motivation Behind Collection

Collecting is a behavior driven by various psychological factors, including goal-setting, mastery, and social status. In China, where the social emphasis on "面子" (miànzi, or face) plays a significant role in consumer culture, owning a complete collection of limited-edition items can be a source of prestige and social recognition. This motivation is particularly evident in the high-end blind box market, where rare items are viewed as status symbols.

According to a 2022 survey by Analysys, over 60% of Chinese blind box consumers stated that their primary motivation for purchasing blind boxes was the desire to "complete a series" or "achieve a collection milestone." The satisfaction derived from completing a set often outweighs the monetary cost, particularly when the series in question is perceived as valuable or culturally significant.

Additionally, the act of collecting serves as a form of self-expression for many Chinese consumers. The ability to curate and display a personalized collection contributes to one's sense of identity and personal achievement. Companies like POP MART and 52TOYS have successfully capitalized on this trend by regularly releasing themed series that appeal to specific cultural interests, such as anime characters, traditional Chinese art, and collaborations with popular IPs.

4.2 Impact of Incomplete Collections on Additional Purchases

The inability to complete a collection often triggers psychological discomfort known as the "Zeigarnik Effect"—the tendency for individuals to remember and focus on incomplete tasks more than completed ones. When applied to blind box purchases, this phenomenon creates a powerful motivator for consumers to continue buying until the collection is fully completed.

This tendency is further amplified by loss aversion, as consumers perceive an incomplete collection as a form of loss or failure. The psychological discomfort associated with incompleteness drives repeated purchases in an attempt to alleviate the negative feeling and achieve a sense of fulfillment.

A 2023 study by iiMedia Research found that approximately 45% of blind box consumers in China reported making additional purchases specifically to "complete a series" that they had already invested in. Interestingly, the study also revealed that consumers who had collected over 80% of a series were significantly more likely to continue making purchases than those who were at an earlier stage of collection.

The psychological pressure to complete a series is often exacerbated by marketing strategies that highlight the scarcity of certain items. Companies frequently release "hidden editions" or limited-run figures that are deliberately made more difficult to obtain. This tactic increases the perceived value of the collection and enhances consumer motivation to continue making purchases.

Moreover, some companies actively encourage consumers to engage in secondary market trading to obtain missing items. Online platforms such as Xianyu (Idle Fish) and Taobao have thriving communities dedicated to the buying, selling, and trading of rare blind box items. While this practice can help consumers achieve their collection goals, it also reinforces the underlying desire to avoid loss by ensuring that no piece of the collection is left incomplete.

The psychological mechanisms behind collectability and completion motivation are central to understanding why Chinese consumers are willing to make additional purchases even when the probability of obtaining a desired item remains low. By appealing to fundamental psychological needs for achievement, identity, and social recognition, blind box companies effectively turn collecting into a continuous and highly engaging experience.

The next section will explore how companies strategically leverage these psychological principles through marketing to enhance consumer engagement and profitability.

5. Marketing Strategies Leveraging Loss Aversion

The success of blind box marketing in China is not only rooted in psychological principles such as loss aversion and collectability but also in the strategic exploitation of these principles through carefully designed marketing techniques. Companies have developed sophisticated approaches to amplify perceived loss and encourage repeated purchases, turning blind box consumption into a profitable business model.

Companies like POP MART, 52TOYS, and Miniso have mastered the art of utilizing loss aversion to drive consumer behavior. Their marketing strategies often incorporate several key elements:

5.1 Limited Editions and Scarcity Marketing

One of the most effective techniques for enhancing consumer engagement is the intentional creation of scarcity. By releasing limited-edition series or special collaboration figures, companies create a sense of urgency that compels consumers to act quickly. This urgency is particularly potent when combined with the uncertainty inherent in blind box purchases, where the probability of obtaining a rare item is often very low.

According to a 2022 report by iiMedia Research, nearly 55% of blind box consumers in China stated that they were more likely to make additional purchases when they believed a specific series was only available for a limited time. Furthermore, companies often release “chase figures” or “hidden editions” that are deliberately made scarce to heighten the consumer’s desire to obtain them.

This scarcity marketing approach taps directly into loss aversion, as consumers perceive the potential loss of a unique or highly sought-after item as more painful than the financial cost of repeatedly buying boxes. The fact that most consumers are aware of the low probability of obtaining rare items only serves to enhance the perceived value of the product.

5.2 Countdown Promotions and Time-Limited Offers

Another effective strategy involves the use of countdown promotions and time-limited offers. Online platforms such as Tmall, JD.com, and Xiaohongshu (Little Red Book) frequently host flash sales or promotional events where specific blind box series are only available for purchase within a narrow time frame.

This approach increases the pressure on consumers to make impulsive purchases, as the fear of missing out (FOMO) becomes particularly acute under time constraints. When combined with social media marketing that showcases other consumers successfully obtaining rare items, the desire to avoid loss is amplified even further.

A study conducted by the China Consumer Association (CCA) in 2023 revealed that over 40% of Chinese consumers admitted to making blind box purchases during promotional events due to the perceived urgency created by limited-time availability. This tactic not only boosts immediate sales but also strengthens consumer loyalty by reinforcing the belief that missed opportunities are equivalent to tangible losses.

5.3 Reward Mechanisms and Loyalty Programs

Many blind box companies have also developed loyalty programs and reward mechanisms designed to encourage repeat purchases. For example, POP MART’s “Membership Points System” allows consumers to accumulate points with every purchase, which can later be exchanged for exclusive products or discounts. This strategy creates a positive reinforcement loop, where the act of purchasing is continuously rewarded, thereby reducing the perceived impact of financial loss.

Furthermore, companies often provide “second chance” promotions that allow consumers to purchase or trade for specific figures they were unable to obtain through the regular blind box mechanism. This approach not only helps alleviate some of the frustration associated with repeated unsuccessful attempts but also reinforces the overall appeal of the collection process.

The use of loyalty programs is particularly effective in China, where consumers are accustomed to gamified purchasing experiences. According to a 2023 survey by Analysys, approximately 65% of Chinese blind box consumers reported that they were more likely to make additional purchases when offered rewards or incentives through membership systems.

5.4 Social Media Marketing and Community Engagement

The integration of social media marketing is another crucial aspect of the blind box industry’s success in China.

Companies actively encourage consumers to share their unboxing experiences online, which serves as a form of social proof that further validates the appeal of the product. Influencers and Key Opinion Leaders (KOLs) play a significant role in promoting specific brands, making the purchasing process appear more desirable and socially rewarding.

For instance, platforms like Xiaohongshu, Bilibili, and Weibo host numerous “unboxing” videos that showcase successful discoveries of rare items. These videos often receive thousands of views and likes, generating excitement and prompting viewers to try their luck. The communal nature of the unboxing experience enhances consumer engagement and strengthens the perceived value of the product.

Moreover, companies frequently collaborate with popular cultural icons and IPs (Intellectual Properties) to broaden their appeal to specific consumer segments. Limited-edition series featuring anime characters, film franchises, and celebrity endorsements are particularly effective in attracting new buyers while retaining existing customers.

5.5 Combining Strategies for Maximum Impact

Blind box companies in China often combine multiple marketing strategies to create a comprehensive approach that maximizes the impact of loss aversion. For example, POP MART’s use of limited editions, membership rewards, and influencer marketing ensures that consumers are continually motivated to make repeat purchases.

By creating a psychological environment where the potential for loss is continually reinforced, companies effectively maintain high levels of consumer engagement. This strategy is further strengthened by the widespread use of social media and online communities, where the collective excitement of discovering rare items is shared and celebrated.

The combination of scarcity marketing, countdown promotions, reward mechanisms, and social influence forms a powerful marketing model that consistently drives revenue and promotes consumer loyalty. However, the ethical implications of this approach are increasingly being questioned, particularly when vulnerable consumer groups are targeted.

The following section will examine how consumer satisfaction and post-purchase rationalization influence repeat purchasing behavior and help maintain consumer loyalty even when the initial purchase experience may not be entirely satisfactory.

6. Consumer Satisfaction and Post-Purchase Rationalization

Consumer satisfaction in China’s blind box market is a complex and often contradictory phenomenon. While the excitement of unboxing and the potential discovery of rare items can provide substantial satisfaction, the high probability of disappointment often leads to negative emotions. To mitigate these negative feelings and justify continued purchasing, consumers frequently engage in various psychological coping mechanisms that facilitate post-purchase rationalization.

Blind box purchases are characterized by intermittent reinforcement, a concept derived from behavioral psychology where rewards are delivered randomly and unpredictably. This mechanism plays a critical role in maintaining consumer engagement despite repeated failures to obtain the desired item. The unpredictable nature of rewards contributes to heightened emotional arousal, making the purchasing experience more stimulating and memorable.

6.1 Emotional Rationalization and Cognitive Dissonance

Cognitive dissonance theory suggests that individuals experience psychological discomfort when their actions conflict with their beliefs or expectations. In the context of blind box purchases, consumers often face disappointment when their purchases do not meet their expectations. To reduce the discomfort associated with unsuccessful attempts, consumers engage in rationalization processes to reframe their experiences in a more positive light.

One common form of rationalization is the emphasis on the excitement and entertainment value of the unboxing process itself. By focusing on the enjoyable aspects of the experience rather than the disappointment of not obtaining the desired item, consumers are able to justify their spending and maintain positive perceptions of the product.

A 2023 survey conducted by China Consumer Research Center (CCRC) found that over 50% of Chinese blind box consumers reported deriving satisfaction from the act of unboxing, regardless of the outcome. This indicates that the unboxing experience itself serves as a form of emotional compensation that helps mitigate potential dissatisfaction.

Additionally, consumers often engage in justification through social comparison. Observing others’ successful unboxings on platforms like Xiaohongshu, Weibo, and Bilibili can create a sense of communal enjoyment, where

the collective excitement of the community becomes part of the consumption experience. By participating in these social interactions, consumers can reduce feelings of disappointment and reinforce their motivation to continue purchasing.

6.2 Post-Purchase Rationalization Through Collection Goals

Another significant aspect of post-purchase rationalization involves the commitment to completing a collection. As discussed earlier, the psychological discomfort associated with incomplete collections (Zeigarnik Effect) motivates consumers to make repeated purchases. However, this discomfort also serves as a powerful tool for rationalizing ongoing spending.

When consumers invest heavily in a particular series, the idea of abandoning their efforts midway is often perceived as a greater loss than the cost of making additional purchases. This mindset is consistent with the Sunk Cost Fallacy, where previous investments create a psychological barrier that makes it difficult to discontinue the activity.

A study conducted by iiMedia Research in 2022 found that approximately 45% of Chinese consumers who engage in blind box purchasing admitted that the desire to complete a collection was a major factor in their willingness to continue spending. The completion of a series is often viewed as a personal achievement, which helps justify the financial costs incurred during the process.

Moreover, companies actively encourage this behavior by offering “second-chance promotions” or “exchange programs” that allow consumers to obtain missing items through alternative methods. While these mechanisms may alleviate some consumer frustration, they also reinforce the underlying psychological need to complete collections and reduce the perceived losses associated with incomplete sets.

6.3 Brand Loyalty and Positive Reinterpretation

Despite the inherent risk of disappointment, many consumers continue to express high levels of brand loyalty. This loyalty is partly maintained through positive reinterpretation, where consumers reinterpret their purchasing experiences to fit a favorable narrative. For example, a consumer who repeatedly fails to obtain a rare item may convince themselves that the journey is more enjoyable than the outcome itself.

Brands like POP MART and 52TOYS actively reinforce this mindset by promoting the idea that the value of blind box purchases lies in the experience rather than the final result. Marketing messages often emphasize the fun of unboxing, the thrill of surprise, and the social aspect of collecting, rather than focusing solely on obtaining rare items.

Furthermore, companies often use membership systems and loyalty programs to create a sense of exclusivity and reward ongoing participation. Consumers who accumulate points or earn special privileges through repeated purchases are more likely to perceive their expenditures as worthwhile, even if their collection goals remain incomplete.

6.4 Consumer Satisfaction Paradox

The paradox of consumer satisfaction in China’s blind box market is that dissatisfaction does not necessarily lead to reduced consumption. Instead, the mechanisms of cognitive dissonance reduction, sunk cost rationalization, and social reinforcement contribute to a cycle of continued engagement.

Although many consumers acknowledge the risk of disappointment, the appeal of potentially obtaining rare items, coupled with the enjoyment of the unboxing experience itself, outweighs the negative aspects of blind box purchasing.

The continuous reinforcement of positive perceptions through marketing strategies, community engagement, and loyalty programs ensures that consumers remain invested in the purchasing process. This dynamic allows companies to maintain high levels of consumer loyalty even when individual purchase experiences may not always be satisfying.

The following section will address how the current marketing strategies and consumer behaviors might evolve in the future, as well as the ethical implications associated with leveraging psychological principles to drive consumer behavior.

7. Future Implications and Ethical Considerations

The widespread adoption of blind box marketing in China presents both opportunities for economic growth and significant ethical concerns. As companies continue to refine their marketing techniques to exploit psychological principles such as loss aversion, fear of missing out (FOMO), and collectability, the boundary between effective marketing and consumer manipulation becomes increasingly blurred. The future of blind box marketing will likely be shaped by evolving consumer expectations, technological advancements, and regulatory responses aimed at addressing the potential harms associated with this business model.

The popularity of blind boxes in China shows no signs of declining. Major players such as POP MART, 52TOYS, and Miniso are continuously expanding their product lines and collaborating with well-known intellectual properties (IPs) to attract broader consumer demographics. A report by iiMedia Research in 2023 projects that China's blind box market will exceed 50 billion RMB in revenue by 2025, driven primarily by younger consumers who are attracted to the thrill of collection and exclusivity. Moreover, technological advancements are likely to enhance the appeal of blind boxes further. The integration of augmented reality (AR) and virtual reality (VR) technologies has the potential to revolutionize the unboxing experience, making it more interactive and immersive. Companies are also exploring blockchain technology to offer digital collectibles, providing consumers with verifiable proof of ownership and authenticity for virtual items.

Additionally, gamification is expected to become more prevalent in blind box marketing. By incorporating game-like elements such as achievement systems, leaderboards, and quests, companies can enhance the consumer experience and encourage repeat purchases. This trend aligns well with the growing interest in "play-to-earn" models, where consumers can earn rewards or unlock exclusive content through continued participation. However, the incorporation of these technologies and strategies raises important ethical questions about the extent to which companies can and should exploit psychological vulnerabilities to drive consumer behavior.

Despite the commercial success of blind box marketing, concerns about the exploitation of loss aversion and related psychological principles are increasingly being raised. Critics argue that companies are intentionally creating addictive purchasing environments by leveraging cognitive biases and emotional manipulation. This concern is particularly relevant when targeting vulnerable groups such as minors and low-income consumers who may be more susceptible to marketing tactics that exploit impulsive decision-making.

The use of scarcity marketing, countdown promotions, and reward systems can contribute to problematic purchasing behavior, where individuals feel compelled to make repeated purchases even when doing so is financially or emotionally harmful. The prevalence of secondary markets, where rare blind box items are resold at inflated prices, further exacerbates issues of accessibility and fairness. Another ethical consideration is the lack of transparency in marketing practices. While many companies actively promote the excitement of blind box purchasing, they often downplay the statistical improbability of obtaining rare items. This selective presentation of information may mislead consumers into making irrational decisions based on unrealistic expectations.

The growing awareness of these ethical concerns has prompted some advocacy groups and regulatory bodies to call for stricter oversight of the blind box market. In 2022, the China Consumer Association (CCA) released a report urging companies to improve transparency in marketing practices and establish clearer guidelines for promoting limited-edition products. While no comprehensive regulatory framework has yet been implemented, the increasing scrutiny suggests that stricter regulations may be forthcoming.

The challenge for companies operating in the blind box market is to balance profitability with ethical responsibility. As consumer awareness of manipulative marketing practices grows, businesses may face reputational risks if they are perceived as exploiting psychological vulnerabilities. To mitigate these risks, companies can adopt several responsible marketing practices, including providing clearer disclosures about probability rates and availability of rare items to enhance transparency, implementing spending limits or self-regulation mechanisms to prevent excessive purchases by vulnerable consumers, creating alternative purchasing options for specific items to reduce the pressure of blind box purchasing, and promoting responsible consumption through educational campaigns that emphasize enjoyment over material acquisition.

Industry-wide collaboration and adherence to ethical standards can help establish a healthier and more sustainable market environment. Rather than relying solely on psychological manipulation, companies can focus on enhancing the entertainment value of blind box experiences in ways that are transparent and consumer-friendly. The future of blind box marketing will largely depend on whether companies can successfully balance their commercial interests with social responsibility. If ethical concerns are not adequately addressed, there is a risk that regulatory authorities will intervene more forcefully, potentially limiting the industry's growth and profitability.

However, if companies are willing to adopt a more responsible approach to marketing, the blind box model could continue to thrive as a popular and engaging form of entertainment that appeals to a broad range of consumers. The key will be finding ways to align business objectives with consumer welfare, ensuring that enjoyment and profitability are not mutually exclusive.

References

- Cather, D. A., (2010). A gentle introduction to risk aversion and utility theory. SSRN.
- Ding, D., & Bhattacharya, P., (2023). 'Paying for Surprise?': A Systematic Review of Factors and Mechanisms

Driving Mystery Box Transactions in E-Commerce. SSRN.

Ge, T., (2024). The Role of Emotional Value of Goods in Guiding Consumer Behaviour: A Case Study Based on Pop Mart. EWA Direct.

Huang, H., Ghose, A., & Fu, R., (1987). Gambling on Gains: Reversed Loss Aversion in Opaque Product Markets. SSRN.

Karle, H., Kirchsteiger, G., & Peitz, M., (2015). Loss aversion and consumption choice: Theory and experimental evidence. *American Economic Journal*.

Ke, Y., (2024). To What Extent Does Blind Box Marketing Affect People's Consuming Behavior? EWA Direct.

Li, X., (2021). Risk or Surprise? A Study on Purchasing Behavior of Blind Box. Waseda Business School.

Miao, X., Niu, B., Yang, C., & Feng, Y., (2023). Examining the gamified effect of the blindbox design: The moderating role of price. ScienceDirect.

Ren, L., & Ma, C., (2024). Planning the unplannable—How blind box tourism boosts purchase intentions. *SAGE Journals*.

Richards, T. J., Liaukonyte, J., & Streletskaya, N. A., (2016). Personalized pricing and price fairness. ScienceDirect.

Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).

The Self-Destructive Hero Myth: Death Narrative and the Structure of Reincarnation in *The Pig, the Snake and the Pigeon*

Qiuyi Li¹ & Xueqing Liang¹

¹ Cheongju University, Cheongju, South Korea

Correspondence: Qiuyi Li, Cheongju University, Cheongju, South Korea.

doi:10.56397/SSSH.2025.03.09

Abstract

In recent years, Chinese-language crime films have increasingly embraced hybrid genres, not only borrowing visual elements from film noir and action cinema, but also challenging conventional moral binaries through innovative narrative structures and complex characterizations. *The Pig, the Snake and the Pigeon* (2023), a film that sparked significant discussion, tells a mythic story of “redemption through destruction” through a self-destructive antihero, Chen Guilin. Once a notorious fugitive, Chen embarks on a violent mission to eliminate three societal “evils” after discovering that he is not the most wanted criminal — only to ultimately realize that he himself is the third target.

This paper argues that the film does not merely subvert the traditional justice narrative but constructs a culturally resonant myth through its symbolic use of death and cyclical narrative structure. Through the lens of narrative theory, mythology, and religious-cultural discourse, the film’s treatment of death functions not only as an endpoint but as a ritualized process of purification, heavily influenced by Buddhist concepts of karma and reincarnation. The analysis focuses on how Chen’s path — marked by violence, hallucinations, and eventual self-sacrifice — transforms him from a criminal into a mythic figure representing social catharsis and existential rebirth.

By examining this “self-destructive hero myth,” the study reveals how contemporary Chinese-language cinema reimagines heroism in a context of moral ambiguity, institutional failure, and spiritual longing. The paper concludes by reflecting on how death, in such narratives, becomes the only meaningful gesture in a disenchanted world — a culturally coded form of redemption.

Keywords: Chinese-language cinema, antihero, death narrative, reincarnation, mythology, redemption, *The Pig, the Snake and the Pigeon*

1. Introduction

In recent years, Chinese-language crime films have demonstrated increasingly complex genre hybridity. Visually, they draw upon stylistic devices from film noir and action cinema; narratively and thematically, they seek to transcend binary moral structures of good versus evil. *The Pig, the Snake and the Pigeon* (2023), a film that has generated extensive discussion, tells a contemporary myth of a ‘villain’s redemption’ through a highly stylized narrative and symbolic imagery. The film’s protagonist, Chen Guilin, a wanted murderer, embarks on a journey to eliminate three ‘evils’ after discovering he is not the third most-wanted criminal. Ultimately, he chooses to end his own life, completing a narrative of reversal and self-redemption. Chen defies the traditional dichotomy of hero and villain, instead emerging as a self-destructive antihero.

This study does not primarily focus on the film’s subversion of justice-oriented narratives, but rather on how it constructs a culturally mythic hero through its death-centered narrative and reincarnation-like structure. In the film, death is not simply the conclusion of events but a central structural motif: from the opening declaration that

Chen is a 'man condemned to die,' to recurring hallucinations, dreams, and ritualistic killings, death takes on layered symbolic meaning. The film's cyclical structure evokes Buddhist notions of samsara and karma, aligning with East Asian spiritual conceptions of death and rebirth.

By engaging narrative theory, mythological structures, and religious-cultural frameworks, this paper analyzes how themes of destruction and regeneration operate within the film's architecture. It argues that *The Pig, the Snake and the Pigeon* reconstructs a uniquely Eastern heroic myth in a contemporary context. Moreover, it raises the question: when sacrifice becomes the only path to self-realization, are we witnessing a new narrative trend of sanctifying death within the collective cultural unconscious?

2. The Path of Self-Destruction

Within the conventional framework of crime cinema, protagonists typically occupy distinct positions along a moral spectrum ranging from good to evil. However, in *The Pig, the Snake and the Pigeon*, Chen Guilin blurs this line. He is both a brutal murderer and a self-appointed executor of justice; while his crimes are unforgivable, his final act of self-sacrifice is imbued with symbolic grandeur. This paradox positions Chen as a textbook 'self-destructive antihero,' gradually transformed into a mythic figure within the Chinese-speaking cinematic context.

Narratively, Chen's transformation can be interpreted as a distorted yet complete 'hero's journey.' According to Joseph Campbell's *The Hero with a Thousand Faces*, a typical hero undergoes a cycle of departure, initiation, and return in the pursuit of personal growth and societal mission (Joseph Campbell, 2004). Chen's journey also unfolds in three stages: first, his 'departure' begins with a death sentence — upon learning he is on the most-wanted list and presumed dead, he begins his quest for the 'third evil'; second, his 'initiation' occurs through the elimination of three targets — a drug dealer, a cult leader, and eventually himself. During this phase, he enacts violence while confronting his past traumas and guilt; third, 'return' manifests as sacrifice — when he realizes that he himself is the final evil, he chooses death as both atonement and a symbolic act of justice.

In this process, destruction becomes the path to transcendence. Chen is not a repentant sinner; he neither seeks forgiveness nor undergoes institutional redemption. His transformation is enacted through extreme violence and martyrdom. This form of 'negative growth' highlights the fractured and unstable nature of the antihero and redefines heroism in contemporary Chinese cinema — not as an idealist upholding moral order, but as an existential figure who reaches truth through self-annihilation.

While Chen's mission appears righteous on the surface, his methods remain violently transgressive. He bypasses legal or institutional frameworks, acting on personal conviction. In this respect, he resonates with Western antiheroes such as Travis Bickle in *Taxi Driver* or Batman in *The Dark Knight* — characters who operate in corrupt societies and resort to extreme measures to enact justice. However, unlike their Western counterparts, who often retain some degree of personal agency, Chen completes his arc through total self-destruction. He is no longer a sympathetic or admirable individual, but a symbolic executor of social purification.

This narrative of 'dying for justice' aligns with Confucian ideals of moral sacrifice and the valorization of death in Chinese tradition. The film's title and structure derive from a classical allegory — 'Zhou Chu Eliminates the Three Evils' — a tale of ethical transformation. By appropriating this cultural motif, the film frames Chen's violent acts as a modern fable, suggesting a possibility of moral transcendence through extreme action.

Thus, Chen Guilin is not only constructed as an antihero within the genre framework but also as a mythic figure within a broader cultural imagination. His death is not defeat, but elevation; his destruction is not an end, but the completion of narrative meaning and cultural identification.

3. Death as Narrative Structure

If Chen Guilin's trajectory forms a hero's journey of self-destruction, then death itself functions not as a conclusion, but as a structural engine and symbolic core. In *The Pig, the Snake and the Pigeon*, death is not merely an event but a pervasive presence, embedded in visual language, narrative pacing, and symbolic imagery. It compels the audience to contemplate the meaning of fate and mortality.

Death in the film is internalized and proactive. At the beginning, Chen learns in prison that he is listed as one of the top ten most-wanted criminals — and is rumored to be already dead. This positions him as a 'dead man walking' from the outset, lending his journey a fatalistic tone. Visually, the film reinforces this with dim lighting, slow-motion gazes, and emotionless scenes at the crematorium, metaphorically suggesting his spiritual death and framing the plot as a pre-death mental journey.

Death is fragmented and repetitive, appearing not just in the climax but throughout the narrative:

- Chen repeatedly faces mortal threats and inflicts death on others — from sniping traffickers to cremating corpses and destroying cult compounds.

- Hallucinations and dreams feature recurring death imagery, including his own bloodied body and accusing stares from the dead.

- His dialogue is saturated with suicidal intent: 'I was dead already.' 'Only the dead are clean.'

These repetitions make death a cyclical mediator, linking Chen's past sins, present actions, and future fate. It is not a singular end, but a process of purification.

The narrative structure of death takes on ritualistic and temporal characteristics. Each act of killing occurs in stylized settings, structured with solemn pacing and aesthetic framing:

- At the crematorium, Chen's methodical handling of bodies is accompanied by ethereal music, turning the scene into a death baptism.

- In the cult sequence, the sect's architecture mimics a death-worship system; Chen's massacre and detonation act as a form of 'heretical exorcism.'

- In the final sequence, Chen faces his enemies alone on the street, evoking the solemnity of ancient warriors facing execution.

The three elimination episodes function as narrative acts in a three-act structure, with each 'evil' representing a progressive layer of Chen's psyche. These are not merely murders of others — they represent symbolic purges of greed, delusion, and rage. The final target, himself, reveals the internalized nature of the death structure: external cleansing becomes self-eradication.

Visually, the film reinforces the aesthetics of death with cold color tones, slow and long takes, and sudden bursts of violence. Death is not just the endpoint of the plot but is stretched, emphasized, and scrutinized as an experiential process.

For the audience, this results in a unique viewing experience. Instead of wondering how the protagonist might survive, they are drawn into the question of how he will die, and what that death signifies. This approach resembles Gilles Deleuze's theory of the 'time-image' (David Bordwell, 1985), where narrative emphasis shifts from action to temporal introspection. Though framed as a genre film, *The Pig, the Snake and the Pigeon* transcends conventional pacing to enter a meditative, philosophical dimension.

In sum, the death narrative in the film is not a dramatic outcome but a deeply embedded structural device. Through repetition and symbolic intensification, death becomes both a thematic centerpiece and a ritual mechanism, anchoring the film's cyclical logic and mythic architecture. Chen's death is not narrative closure, but the fulfillment of symbolic meaning — his personal judgment and a metaphorical return to order.

4. Reincarnation and Temporal Philosophy

Compared to the linear narratives common in Western crime films, *The Pig, the Snake and the Pigeon* employs a highly cyclical structure steeped in fatalism. This not only reflects the protagonist's mental trajectory but also draws from Buddhist notions of karma and samsara. The result is a mythic rhythm where individual death becomes a prerequisite for spiritual rebirth.

The film's structure mirrors the Buddhist concept of the 'three karmic actions'—body, speech, and mind. The three 'evils' eliminated by Chen symbolize progressive layers of purification:

- The drug dealer represents worldly greed (tanha).
- The cult leader signifies delusion and spiritual manipulation (moha).
- Chen himself embodies anger and karmic consequence (dvesha).

This triadic progression aligns with the Buddhist 'three poisons' — greed, hatred, and delusion — suggesting that Chen's mission is not merely external, but an internal ritual of self-stripping. His final act is not about eliminating an external threat, but confronting and annihilating his inner self.

Temporally, the film embraces a non-linear structure. Events are often fragmented or recursive:

- Frequent insertions of dreams and hallucinations blur the line between reality and illusion.
- Chen repeatedly engages in similar actions — burning bodies, cleaning blood, staring at himself in the mirror.
- The film's opening and closing scenes mirror each other: Chen sits in silence, once in a prison cell and once in the street awaiting death.

This repetition creates a sense of fatal recurrence. Chen appears trapped in a karmic loop, doomed to reenact variations of the same outcome. His actions do not suggest progress, but rotation — an endless cycle broken only through death.

Such a temporal philosophy is deeply embedded in East Asian thought, where samsara and cyclical causality

govern human destiny. In this view, liberation is achieved not through triumph but through renunciation. Chen's final choice to die signifies an escape from the karmic wheel, a moment of cessation that echoes Buddhist ideals of nirvana. Unlike Western heroes who achieve transcendence through conquest, Chen attains it through obliteration.

The film's visual motifs reinforce this cyclical structure: enclosed spaces (prisons, cult bunkers), mirrored surfaces (bathroom mirrors, car windows), and circular compositions (crematory ovens, round tables, spiraling camera movements) create a claustrophobic and recursive mise-en-scène. This aesthetic suggests not only spatial confinement but also spiritual entrapment.

Functionally, this structure guides the viewer's emotional transition — from shock and judgment to empathy and reflection. We do not simply witness a criminal's end, but a mythic cycle of fall and self-redemption. Chen's failure is monumental, but also sacralized. It is not just the fall of a man, but a ritual of meaning.

This narrative logic is not unique in Chinese cinema. Films like *Yi Yi* (2000) explore cyclical life experiences; *Infernal Affairs* (2002) uses hellish rebirth as a metaphor for justice and sin; *Mad Detective* (2007) depicts recursive violence and psychological fragmentation. What makes *The Pig, the Snake and the Pigeon* distinct is the integration of this structure with Buddhist allegory and genre violence, producing a mythic system that is both spiritual and cinematic.

Thus, the reincarnation motif in the film is not merely stylistic. It is a narrative philosophy — time does not progress but returns; salvation is not a reward, but a rupture. Through recursive structure and spiritual symbolism, Chen's death becomes a mythic center of meaning beyond the individual.

5. Reconstructing Heroic Myth in Contemporary Context

After enacting a cycle of destruction, death, and reincarnation, *The Pig, the Snake and the Pigeon* constructs a new heroic myth rooted in rebellion and religious allegory. Unlike traditional saviors, this hero does not restore order through moral righteousness, but through symbolic annihilation.

Chen Guilin becomes a hero not because he performs legally sanctioned acts, but because his violence and self-sacrifice fulfill an unmet societal desire for retribution. His actions expose a growing cultural disillusionment: when institutions fail to administer justice, individual violence assumes moral legitimacy. Chen's death is not merely personal — it is theatrical, cathartic, and sacrificial. In this way, he functions as a scapegoat and purifier, rather than a conventional hero.

This form of heroic narrative reverses Joseph Campbell's classical model, where the hero triumphs and returns. Instead, Chen disappears in death, leaving only silence and ambiguity. His arc centers not on changing the world, but on embracing destiny. He is a failure, but a sacred one; not a rebuilder, but a final judge of a collapsing order.

Socio-culturally, this heroic mode resonates with a post-pandemic, economically strained, and morally fragmented society. As trust in legal, religious, and political systems erodes, audiences seek narratives of decisive, purifying action. Chen's violence and demise satisfy a latent yearning for total reckoning. His death is not tragedy — it is resolution.

This myth is marked by a fusion of religious and secular themes. The film is saturated with spiritual imagery — cremation, confession, sacrificial action — yet grounded in political and social critique. Chen is neither noble-born nor spiritually enlightened; his sanctity emerges through death-as-performance. Similar antiheroes appear in other contemporary Chinese films — Lau Kin-Ming in *Infernal Affairs*, Sean Lau in *Cold War*, and Zhang Chongbang in *Raging Fire* — all achieve moral elevation through sacrifice.

Yet these myths do not offer hope. They are solemn rituals of conclusion, not visions of renewal. Chen's death is a symbolic indictment of society, a terminal gesture that reclaims personal meaning while condemning systemic decay. This reflects a broader narrative trend: in an age devoid of faith and legitimacy, only death carries sufficient ethical weight to bear the burden of collective redemption.

6. Conclusion

The Pig, the Snake and the Pigeon combines genre hybridity, stylized violence, and profound cultural symbolism to create a crime film that functions simultaneously as aesthetic spectacle and mythic allegory. Centered on the concept of a self-destructive hero, the film constructs its narrative around death and reincarnation to reimagine a new kind of antihero in Chinese-language cinema. Chen Guilin is not a figure of redemption through repentance or institutional forgiveness; rather, his mythic function is fulfilled through personal annihilation.

Structurally, the film's non-linear, recursive narrative positions death as a core organizing principle rather than a dramatic endpoint. Its cyclical logic evokes the Buddhist worldview of samsara and karmic consequence, imbuing the film with philosophical depth beyond its genre trappings.

Culturally, the film's self-sacrificial antihero responds to a broader social context marked by disorder,

disillusionment, and institutional failure. In the face of moral collapse, audiences are drawn to figures who can impose clarity through finality — even if that finality is death. Chen's sacrifice satisfies a collective longing for purification, justice, and meaning in a disenchanted world.

Therefore, *The Pig, the Snake and the Pigeon* is more than a genre film — it is a visual myth rooted in contemporary cultural anxiety. Through its deployment of death and spiritual return, the film narrates a layered parable of crime, justice, guilt, and redemption. Future research may compare this work with similar antihero narratives in Chinese cinema — such as *Infernal Affairs*, *Raging Fire*, and *Let the Bullets Fly* — to further articulate the shared mythic motifs and ethical imaginations that underlie these contemporary parables of destruction and transcendence.

References

- David Bordwell, (1985). *Narration in the Fiction Film*. University of Wisconsin Press.
- Gilles Deleuze, (1989). *Cinema 2: The Time-Image*. University of Minnesota Press.
- Joseph Campbell, (2004). *The Hero with a Thousand Faces*. The Commercial Press, (Chinese Translation).
- Lin Shijie, (2024). The Structure of Reincarnation and Redemptive Violence: On Buddhist Metaphors in *The Pig, the Snake and the Pigeon*. *Film Art*, (1).
- Slavoj Žižek, (2008). *Violence: Six Sideways Reflections*, Picador, (2008).
- Wang Yiwen, (2022). From Gangster Films to Social Allegories: On the Construction of Antiheroes in Chinese-Language Crime Cinema. *Contemporary Cinema*, (3).

Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).

A Study on the Tragic Consciousness of Han Yan's Directed Works: A Case Study of *A Little Red Flower*

Xiaohui Wang¹

¹ College of Arts, Cheongju University, Cheongju, Korea

Correspondence: Xiaohui Wang, College of Arts, Cheongju University, Cheongju, Korea.

doi:10.56397/SSSH.2025.03.10

Abstract

Han Yan, a new-generation director in China, is known for his keen perspective and profound humanistic concern, especially when exploring significant themes such as illness, he shows strong emotional and social concern, highlighting the artistic value and social significance of his works. Through the life stories of two young people suffering from cancer, the film *A Little Red Flower* shows their growth process amid illness and pain, reflecting the mutual redemption and emotional support of life in the state of extremity. Based on the realistic dilemma, director Han Yan integrates the sense of tragedy into his movie to bring aesthetic pain and beauty to the audience and gives the audience the power of resistance and transcendence at the spiritual level, which constitutes a unique cultural value.

Keywords: Han Yan, *A Little Red Flower*, tragic consciousness, life

1. Introduction

Han Yan has been engaged in film creation since 2002, and he has always insisted on exploring and expressing his art in his unique way. Han Yan's movies are mostly about patients of different types, and most of his movies are about patients as the main characters, reflecting various problems in society through their stories. He chooses to observe the people and things around him from such a tragic perspective, and there is no lack of socially significant thoughts and views in his movies, such as exploring the meaning of life, the issue of death, and the issue of cancer. These issues are all about human existence itself and are also worth digging deeper and discussing in the movie creation.

The ultimate contemplation on the meaning of life has always been an eternal theme of concern in literature and artworks. The movie *A Little Red Flower* is more serious in terms of narrative expression and form and explores the issue of life and death in greater depth. In the movie, the open-mindedness in Ma Xiaoyuan is constantly infecting Wei Yihang and pulling him back to reality from his pessimistic and world-weary state. These different individuals project director Han Yan's perception of life and people's attitudes when they are on the brink of life and death, injecting the creator's strong humanistic concern while thinking about the ultimate meaning of life.

2. Presentation of the Theme of Tragic Consciousness

2.1 Tragic Expression of the Value of Life

From ancient times to the present, life, and death have been a proposition of eternal contemplation for human beings, and it is the ultimate concern for human beings. Human beings have never stopped thinking about how to broaden the length and depth of life, and movies, as a means of artistic expression, have never stopped paying attention to the course of life (Mei Ping & Wu Shaoyan, 2020). In director Han Yan's movies, the value and meaning of life are often conveyed through the protagonist's own life experience and life experience, and new values are constructed.

In *A Little Red Flower*, the sense of tragedy, through skillful and profound expression, mines the depth of the eternal proposition of life and death. The film's exploration of disease is even more profound. The little red flower throughout the film is not only the encouragement given to Wei Yihang by Ma Xiaoyuan, but also serves as a physical symbol that lets the audience feel the power and hope of life, forming an interaction between the film and real life, and leading the audience to use this symbol to reflect on the value of life. Wei Yihang's dreams are also an important carrier of his tragic consciousness. These dreams are not only a reflection of his subconscious but also a metaphor for the unknown and fragility of life.

The greatest event that any sentient being must experience is death (Kim Jae-sung, 2011). Death is the ultimate problem facing human beings, and the Chinese attitude toward death has long been in a paradoxical discourse of absence and prudence, this concept has been in a difficult position for a long time. Although the development of science and technology has provided mankind with the means to intervene in the life process and prolong life, it cannot change the fact that death will eventually come. In the movie, the youthful and energetic Ma Xiaoyuan finally collapses on the train chasing his dream, failing to reach the destination in his heart. This episode is a cruel portrayal of the impermanence of life. With the help of such a tragic plot, director Han Yan makes the audience face up to the fragility and helplessness of life. In the expression of tragic consciousness, director Han Yan's work contains the spirit of persistence and resistance to life, which not only lets the audience re-examine the fragility and preciousness of life but also leads the thinking about life and death issues to a deeper level.

2.2 Tragedy and Emotional Conflict at the Family Level

In *A Little Red Flower*, affection is one of the core themes expressed in the movie. The young characters in the movie face a severe test of life due to major illnesses, and their lives are gradually fading away while they are physically and mentally battered. In the face of this cruel reality, parents and children begin to fight together against the threat of illness and death. This mutually supportive affection not only profoundly expresses the warmth amid illness, but also demonstrates Han Yan's emphasis on life and family bonds, enabling the audience to experience the selflessness and power of affection in emotional resonance.

The movie focuses on Wei Yihang's family. Wei Yihang's mother is meticulous in her daily life to save money, even haggling with the staff to save five dollars after parking overtime, and constantly pinching off the unattractive-looking leaves to lighten the portion size when she buys vegetables at the market. Wei Yihang's father, on the other hand, went to work part-time as a chauffeur after work following his child's illness. Wei Yihang also tried to lighten his parents' burden by applying for a job as a drug tester. Everyone in the family is trying hard to stay alive. This fear and worry of an unknown fate, and the helplessness that life can fade away at any moment, form the deep sense of tragedy in the film, making the audience sigh for their fate while feeling the warmth of the family and hope for life.

The family is a microcosm of society. Generally speaking, the family issues that appear in movies are the director's worldview of family and society, which can be used as a criterion to grasp his or her work (Park Min-soo, 2019). In the film, Han Yan takes the daily life between the sick children and their parents as the narrative thread, depicting the significant transformation of the affectionate relationship between the young children and their parents after they suffer from serious illnesses, from the generation gap in the initial daily communication to the communication barriers between the parents and their children after the illnesses come to pass, and then to the eventual joint fight against the illnesses and active treatment. Han Yan gives a deeper social significance to the value of affection through the presentation of these affectionate relationships. In this emotional trajectory, the sense of tragedy runs throughout, profoundly presenting the selfless dedication of parents to their children and their deep concern for their children's future, highlighting the powerlessness and struggle between families under the predicament of illness.

3. Color Expression of Tragic Consciousness

The Russian painter Leben said, Color is thought, color is feeling, and different colors can arouse different emotional reactions in people (Xing Xiaogang, 2011). French existentialist philosopher Marcel Mardin in the language of the film, proposed that the creator according to the audience's feelings to respond, from the point of view of the film's theme idea, character image, consciously use color expression to express the meaning of the plot to help the development of the plot, to explore the story of the deepest emotional appeal, which is the value of the use of color (Marcel Mardin, 2006). Red, orange, yellow, and other colors are often associated with hot, passionate, and enthusiastic, known as warm colors; the blue, green, and purple system is often associated with calm, calm, known as cold colors. Color can hit people's eyes, give people the first stimulation of the senses, and even penetrate people's eyes, penetrate the heart, and feel its power. Director Han Yan has his unique artistic style in the visual field, and he is good at constructing a visual tone rich in emotional tension through colors and images and outlining the complex state of mind of the characters in a specific social background in a delicate way.



Figure 1. Wei Yihang's characterization

The design of large cold tones accurately conveys the character's inner loneliness and helplessness, and the facial expression covered in greenish gray not only maps Wei Yihang's deepest despair but also strengthens his sense of isolation from the outside world. (Figure 1) The use of cold colors creates a heavy and depressing atmosphere, making the character's inner struggle seem more profound. In the tragic world where the disease exists, Wei Yihang is like a bird out of a flock, living himself on an island. Sickness is not only a physical torture for him but also a mountain that stretches across his heart. This mountain symbolizes fear and helplessness and is so heavy that it takes his breath away.



Figure 2. Wu Xiaomai who lost her lover

Wu Xiaomai always wears an optimistic smile and wholeheartedly helps every patient. As the leader of the patient group, he organizes activities and shares his experiences, bringing hope and strength to patients in darkness. That is until he mentioned his own story for the first time. Wu Xiaomai's beloved was originally optimistic, but eventually chose to end her life because of a relapse of her condition, escaping the torture of her illness in such a determined way. (Figure 2) This event is a heavy tragedy for Wu Xiaomai, and the movie deeply shows this plot through the delicate portrayal of emotions and the use of cold colors. Wu Xiaomai's expressionless face in a dark green jacket and the gray brickwork in the background convey his deep sorrow and despair without words.



Figure 3. The scene in Wei Yihang's mind

From time to time, Wei Yihang dreams of the scene he fantasizes about in his mind, in which the bright lake water contrasts sharply with the gray ground. (Figure 3) This change in color tone expresses Wei Yihang's detachment and loneliness from the real world and also becomes a visual metaphor for his brief escape from the pain of reality. The large area of cold colors and the open composition together construct a kind of surreal world. Hallucinations, often accompanied by dreams, are on the one hand the incarnation of the disease, and on the other hand the projection of Wei Yihang's psyche. Such hallucinations are not only the incarnation of the pain brought about by the disease but also hold the dream of his longing for freedom.



Figure 4. A father who lost his child

The episode of a father who has just lost his daughter sitting on the roadside with braised beef and rice in his hand, bawling his eyes out as he eats, becomes the most powerful moment in the movie. (Figure 4) Through this scene, the movie truly shows the pain and helplessness experienced by families fighting against cancer in society, and sublimates the personal tragedy into collective emotional resonance. In this scene, the use of cold colors shows the fragility and powerlessness of life in the face of fate. The takeaway that Wei Yihang quietly ordered for the father symbolizes a weak but precious humanistic concern. Although this action cannot change the father's tragic situation, it injects a touch of humanity into the heavy picture.



Figure 5. The Parallel World of Wei Yihang's Fantasy

At the end of the movie, after Ma Xiaoyuan's unfortunate passing away, Wei Yihang goes to the dream world of Qinghai Lake and meets Ma Xiaoyuan again, seeing the two of them living happily together in a parallel time and space, a world free of sickness and sorrow. (Figure 5) This surreal plot design not only provides emotional comfort for the characters but also builds a unique spiritual space. The clarity of the lake and the openness of the sky reflect Wei Yihang's spiritual sublimation and his new understanding of life. This use of cold colors expresses the film's sense of tragedy, the fragility and resilience of life in a cold visual experience, and Wei Yihang's inner growth and reconciliation, which fills the journey with spiritual power.

4. Social Values and the Tragic Reflection of Cinema

Han Yan mentioned in the interview of the special documentary *A Little Red Flower* that the radius of his expression of the sick group is from individual to family, then expanding to the group of people who have the same encounter, and finally radiating to all the people around him, bringing a broader social value and social significance (Wang Yuliang, 2021). In Han Yan's movie, we can see a large number of social group portraits, from the sick individual to the sick family, and finally expand the perspective of the sick group, revealing the universal problems and dilemmas faced by this group. Director Han Yan uses a discursive image expression of "mourning but not hurting" to think deeply about the creation of the movie. Through this unique creative approach, director Han Yan lets the audience deeply feel the resilience and beauty of life. His image writing on patients is not just a simple visualization of the relationship between human beings and diseases, but also a deep and multi-dimensional view of social reality, hitting directly at the core of various life-related topics in society.

Against this creative background, Han Yan has shown his appreciation for the sick. His film *A Little Red Flower* focuses on the internal psychological problems of patients with serious illnesses, such as the fear of death, the painful experience of discrimination, and the psychological defense mechanism of self-enclosure, as well as the external problems of survival, such as strained family relationships, heavy financial burden, and imperfect medical care system, etc. These are not the individual plights of the patients but reflect the inadequacies of society as a whole in the areas of medical care and humanistic care, which trigger people to think deeply about the improvement of the living environment and the improvement of the social medical care system. These are not the individual plight of the patients alone but reflect the deficiencies of the whole society in medical protection, humanistic care, etc., which triggers in-depth thinking on the topics of improving the living environment of the patients and perfecting the social medical system.

5. Conclusion

The sense of tragedy in Han Yan's films is not only the tragedy of individual lives but also a profound reflection of the cultural, ethical, and emotional problems of contemporary Chinese society. As early as 100 years ago, Eugene O'Neill said, only the tragic possesses the important beauty, the truth. It is the meaning and hope of life (O'Neill Eugene, 1921). In his works, Han Yan reveals the pain of the characters when they face the decision of life and death by showing the individual's struggle and resistance in the predicament of life. At the same time, he utilizes his unique aesthetics of images to express the intertwining of tragedy and hope, giving his works richer emotional levels. Therefore, through an in-depth study of Han Yan's sense of tragedy in his films, we will reveal the intrinsic connection between his works and real society, and explore the expression of his sense of tragedy as well as the profound value and meaning it implies. Han Yan's works resonate strongly with the contemporary audience emotionally, arousing the audience's awareness of social responsibility, and at the same time conveying distinctive humanistic concern and criticism of reality. Han Yan is good at combining life, disease, and tragedy, and has shown a unique way of thinking and methods in the innovation of genre films, which provides rich materials and inspiration for the creation of genre films.

References

- Kim Jae-sung, (2011). Life Thought in Buddhist Philosophy. *Life Studies*, (22), pp. 221-249.
- Marcel Mardin, (2006). *The Language of Cinema*. Translated by He Zhengan. China Film Press.
- Mei Ping & Wu Shaoyan, (2020). The value and application of life narratives in life education in the post epidemic era. *Research on Ideological and Political Education*, 36(06), pp. 17-21.
- O' Neill, Eugene, (1921, February 13). Eugene O' Neill's Credo and His Reason for His Faith. *New York Tribune*.
- Park Min-Soo, (2019). Exploring the intersection of commerciality and mainstream melodic elements in Zhang Yang films. *Chinese Studies*, (68), pp. 43-59.
- Wang Yuliang, (2021). *A Little Red Flower*: Multi-dimensional Care of the Aesthetic Narrative of Hurt. *Film Literature*, (11), pp. 123-125.
- Xing Xiaogang, (2011). The artistic style of realist painter Leben's focus on inner portrayal of characters and its formation. *Art Hundred*, 27(6), pp. 218-220.

Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).