

BICCS 2024

8th Busan International Conference on China Studies

Studies on Emerging Technology for Korea-China Humanities and Social Science in the Era of AI

Date : July 2-4, 2024

Venue: Haeundae Kolon Seacloud Hotel, Busan,
South Korea

Hosted By



ICS

Institute of China Studies

PIONEER

부산대학교 국립대학육성사업



BICCS 2024

Welcome to the 2024 8th Busan International Conference on China Studies (BICCS).

On behalf of the organizing committee of BICCS 2024, we are honored to welcome each of you. The Institute of China Studies at Pusan National University will host the 2024 8th Busan International Conference on China Studies (BICCS) on the theme of "Studies on Emerging Technology for Korea-China humanities and Social Science in the Era of AI" in Busan, on July 3rd.

The last seven conferences presented research achievements in various fields, including politics, economics, business management, history, language, culture, literature and law, all of which provided a good opportunity to understand Chinese society and culture. We hope that outstanding papers in these fields will be presented and shared at this conference to provide a better forum for discussion.

We would like to inform you that the papers presented at this conference will be granted an opportunity to be published to the Journal of China Studies(JCS) 2024 Special Issue through a quick and impartial review(Fast-track).

We would like to ask for your interest and participation, and we look forward to seeing you at the conference.

Sincerely,

Conference Chair	Dokyung Kwon (Pusan National University)
Operation Chair	Kim, Eunmi (Pusan National University)
Organization Chair	Ziyan Yao (Pusan National University)
Program Chair	Zhang, Chenglong (Kookmin University)

Program

Date : July 2 – 4, 2024

Venue : Haeundae Kolon Seacloud Hotel, Busan, South Korea

July 2 , 2024 (Tuesday)

15:00-18:00	Opening and Greeting
18:00-19:00	Editorial Board Meeting
19:00-	Welcome Dinner

July 3 , 2024 (Wednesday)

10:00-10:30	Registration	
10:30-12:00	Digital Business and Marketing	
	Session Chair : Yao, Ziyang (Pusan National University)	
	Factors Influencing the Perceived Helpfulness of Online Reviews: Exploring the Interaction between Textual and Visual Cues	Yao, Ziyang (Pusan National University)
	Development of Future Energy Education Program Using Generative AI in Virtual Space	Kim, Myeungseok (Uiduk University)
	The Use of Large Language Models for the Analysis of Textual Data	Kim, Eunmi (Pusan National University)
	The Effects of Consumer Choice for Donation in Cause Related Marketing: Focusing on Consumer Price Perception	Song, Jae-Do (Chonnam National University)
12:00-12:30	E-Learning at-Risk Group Prediction Considering the Semester and Realistic Factors	Zhang, Chenglong (Kookmin University)
	Welcome Remark – Kwon, Dokyung (Pusan National University)	
	Congratulatory Remarks – Hong, Taeho (ICS Director)	
12:30-14:00	Lunch	

Program

Date : July 2 – 4, 2024

Venue : Haeundae Kolon Seacloud Hotel, Busan, South Korea

July 3 , 2024 (Wednesday)

14:00–15:15	Business	
	Session Chair : Zhang, Chenglong (Kookmin University)	
	The Effect of Psychological Empowerment on Turnover Intention : A Focus on the Dual Mediating of Job Crafting and Job Satisfaction	Wang, Yu-Li Choi, Suheyong (Pusan National University)
	Green Transformational Leadership in the Chinese Internet Industry: Mediating Roles of Green Innovation and Creativity in Enhancing Environmental Performance	Jiaming Hu, Li, Yannan (KyungHee University)
	Reality and Prospect of US-China Strategic Competition	Kim, Jih-Un (Chungnam National University)
	Advancing protection motivation theory through online privacy practices in China	Jianbo Wang, Kim, Jongki (Pusan National University)
15:15–15:30	The Impact of Digital Transformation on Green Innovation Efficiency : The Moderating Role of Management Capability	Yang Jing Jing Lee, Eonseong (Pusan National University)
	Coffee / Tea Break	
	Humanities	
	Session Chair : Kwon, Dokyung (Pusan National University)	
	襯字對元散曲語言風格的影響	Chen, Yan-Jun (National Changhua University of Education)
	針對中國籍韓語學習者的中韓慣用語比較研究	Yang, Fang (Pusan National University)
15:30–16:45	為研究北京宣南和清朝知識分子的試論	Kim, Seung-Ryong (Pusan National University)
	從「多向同理性未了」出發：臺灣文化／地景的多重脈絡詮釋	Chiu, Yi-Hsuan (National Changhua University of Education)
16:45–17:00	Coffee / Tea Break	

Program

Date : July 2 – 4, 2024

Venue : Haeundae Kolon Seacloud Hotel, Busan, South Korea

July 3 , 2024 (Wednesday)

Politics & Society

Session Chair : Sung, Haengnam (Pusan National University)

17:00-
18:15

China's Economic Direction and Risks through the 2024 Two Sessions

Kim, Sunjin
(Dong-A University)

U.S.-China Strategic Competition and Two-Track Hedging Strategy of China

Seo, Chang-Bae
(Pukyong National University)

A Study on the Impact of Social and Technological Confidence on the Intention to Accept Technology-Based Self-Service: A Comparative Study of Korean and Chinese Active Seniors

Sung, Haengnam
Hong, Taeho
(Pusan National University)
Shin, Jae-ik
(Gyeongsang National University)

An empirical study on the impact of the Russia-Ukraine war on the connectivity between oil and stock markets

Li Na, Jung, Dae Sung,
(Gwangju University)

US-China Trade War, Uncertainty, and the Financial Markets connectivity

Li Hong,
Jung, Dae Sung,
(Gwangju University)

18:15-18:45

Closing Ceremony

19:00 -

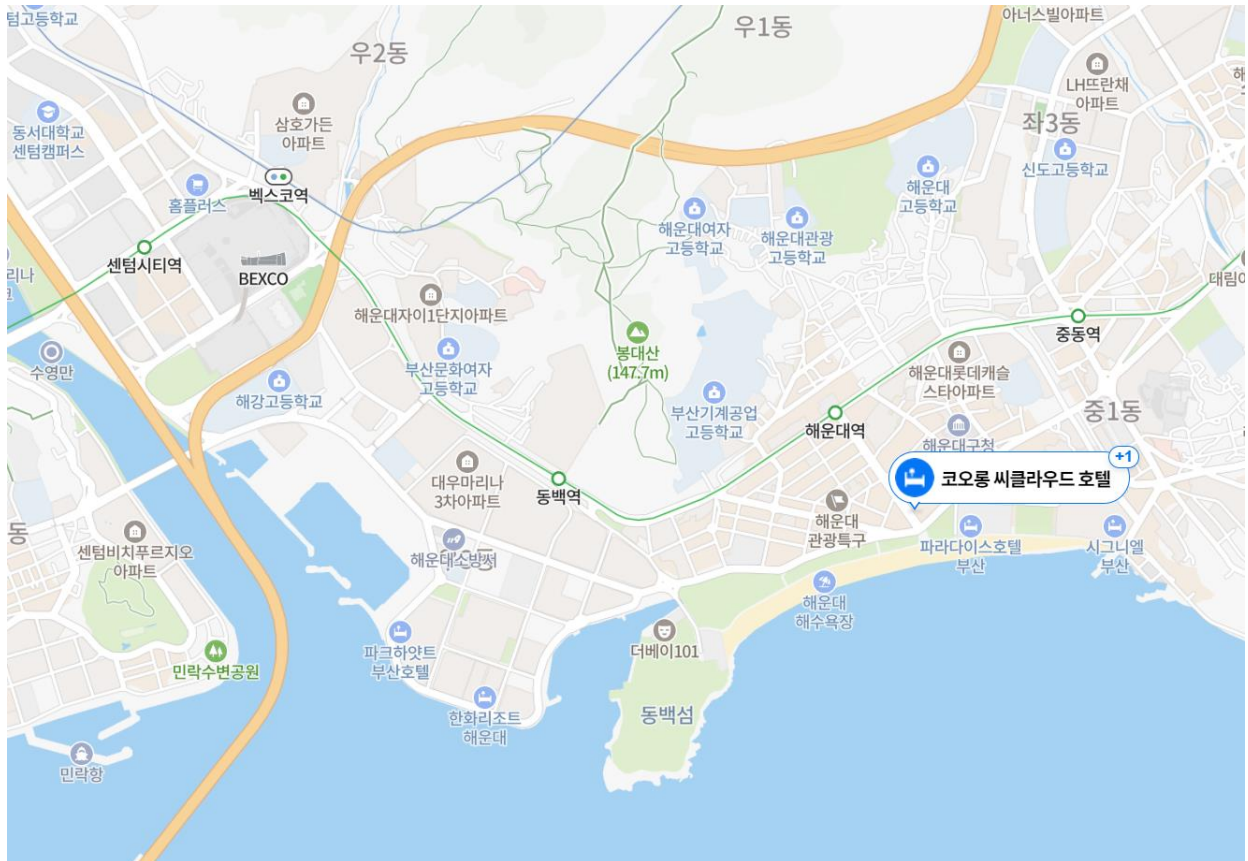
Dinner

July 4 , 2024 (Thursday)

10:00-12:00

Korean Culture Exploration - Busan Cinema center

Direction



Address : Heaundae Kolon Seacloud Hotel
287 Haeundaehaebyeon-ro, Haeundae-gu, Busan

Contact : 051-933-1000



Webpage : <https://pnuchinese.pusan.ac.kr>

2024

8TH BUSAN INTERNATIONAL
CONFERENCE ON CHINA STUDIES



**STUDIES ON EMERGING
TECHNOLOGY FOR KOREA-CHINA
HUMANITIES AND SOCIAL
SCIENCE IN THE ERA OF AI**

| PROCEEDING |

Hosted By



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Institute of China Studies



부산대학교 국립대학육성사업



SESSION 1

DIGITAL BUSINESS & MARKETING



최근 개인 MIS 연구 소개 및 향후 관심 방향

장청룡(Zhang Chenglong)

국민대학교 경영대학
johnzhang@kookmin.ac.kr

최근 개인 MIS 연구 소개 个人研究概述

AI-ED 教育AI

Artificial intelligence in education

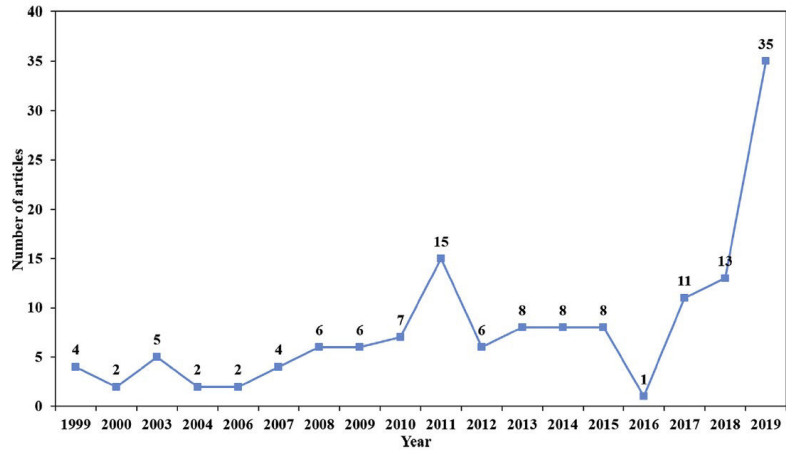
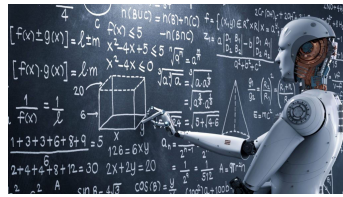
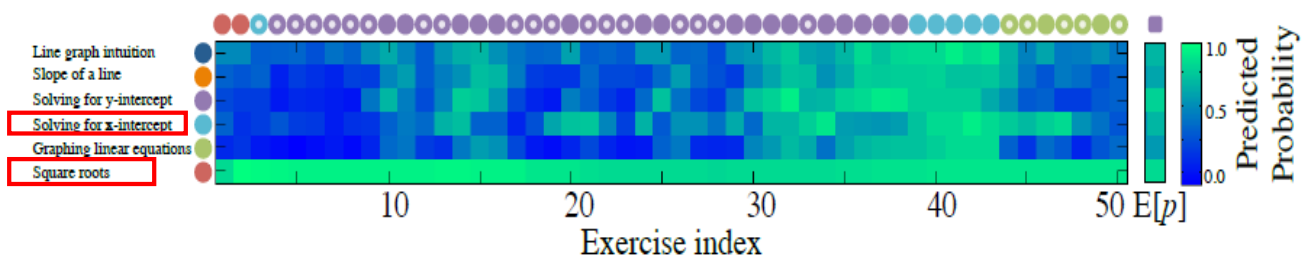


Fig. 1. The number of articles on AI-ED in six widely-acknowledged SSCI journals related to educational technology during the period 1999–2019.

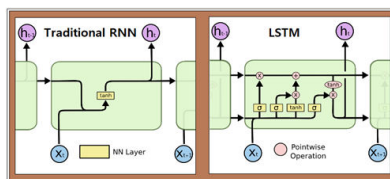
Knowledge Tracing

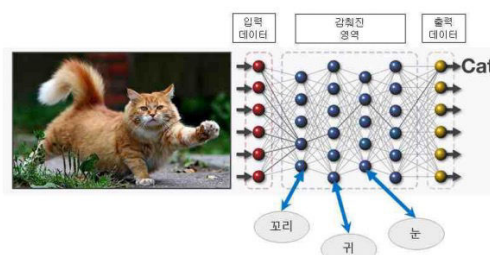
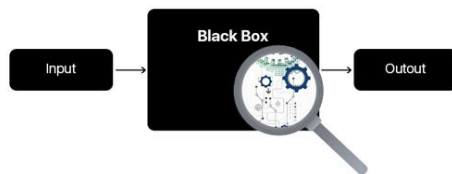
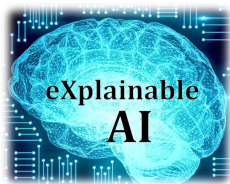
Deep Knowledge Tracing (DKT by RNN/LSTM) (2015)

Exercise attempted: ● correct, ● incorrect



first answers two square root problems correctly and then gets a single x-intercept exercise incorrect. In the subsequent 47 interactions the student solves a series of x-intercept, y-intercept and graphing





<그림 2-7> 설명 가능한 Label Tagging(한국정보화진흥원, 2018)

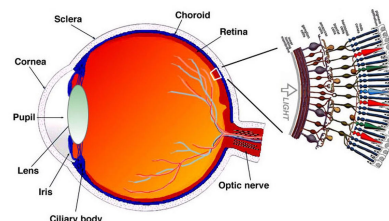
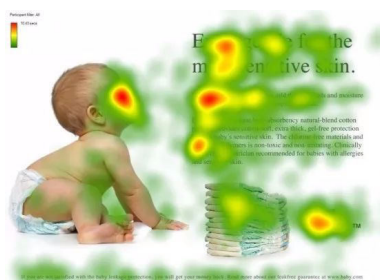


Fig. 1.1. A drawing of a section through the human eye with a schematic enlargement of the retina.

Where do you attention?

视网膜结构也有许多层
망막의 층 구조

E-Learning at-Risk Group Prediction Considering the Semester and Realistic Factors

Chenglong Zhang ¹ and Hyunchul Ahn ^{2,*}

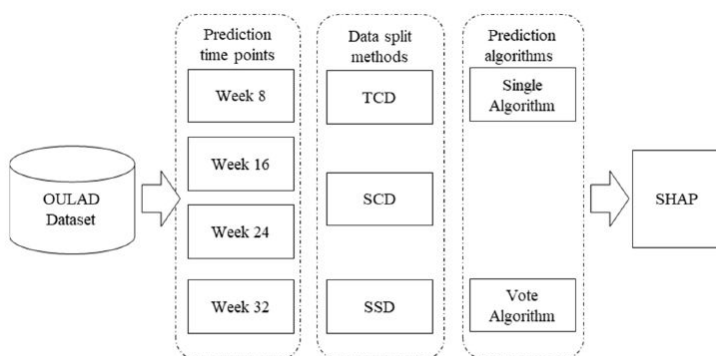
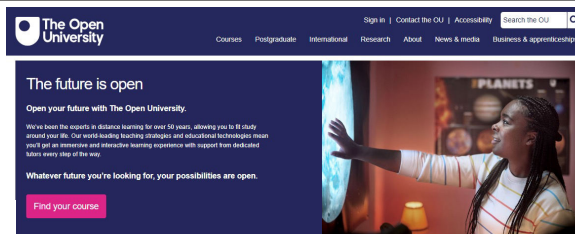


Figure 2. Research framework.



目标: 通过LMS数据进行At Risk 学生预测
数据: OULAD 公开数据

목표: 학습시스템 LMS 데이터를 통하여
at-risk 위험군 학생 예측
데이터: OULAD 공개 데이터

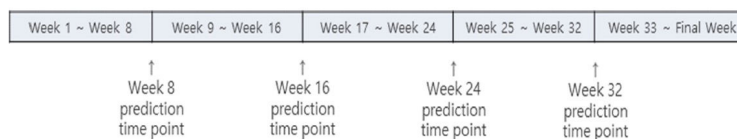
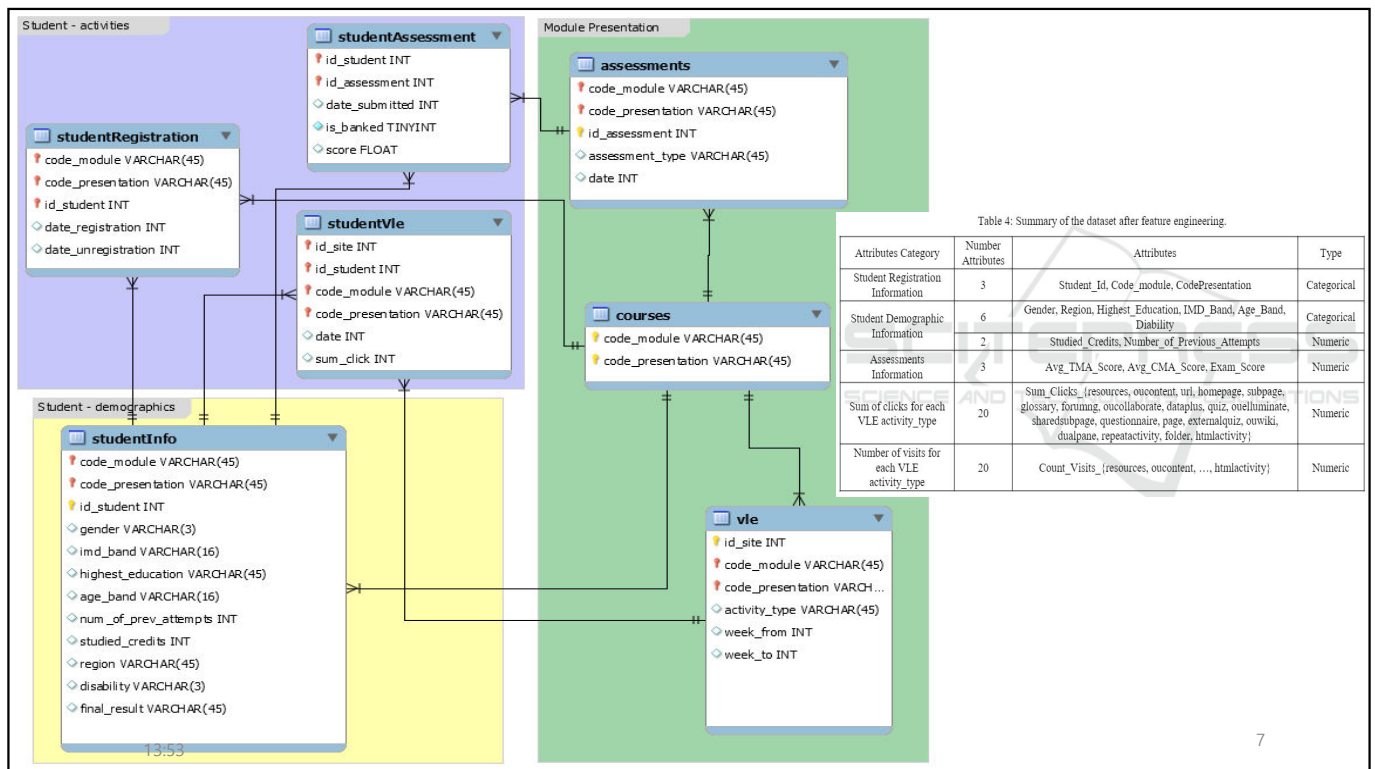


Figure 6. Prediction time points.



Open University Learning Analytics dataset

- 7 modules
- OU during 2013 and 2014

studentAssessment.csv
 studentVle.csv
 assessments.csv
 courses.csv
 studentInfo.csv
 studentRegistration.csv
 vle.csv



Table 3: Summary of the OULAD dataset before feature engineering.

Data File	No of Records	Description	Attributes
courses	22	Information about the courses	code_module, code_presentation, module_presentation_length
studentInfo	32593	Contains demographic information about the student	code_module, code_presentation, id_student, gender, region, highest_education, imd_band, age_band, num_of_prev_attempts, studied_credits, disability, final_result
studentRegistration	32593	Registration of the student for a course presentation	code_module, code_presentation, id_student, date_registration, date_unregistration
assessments	196	Assessments for every course presentation	code_module, code_presentation, id_assessment, assessment_type, date, weight
studentAssessments	173740	Assessments submitted by the students	id_assessment, id_student, date_submitted, is_banked, score
vle	6365	Online learning resources and materials	id_site, code_module, code_presentation, activity_type, week_from, week_to
studentVle	1048575	Student interaction with the VLE resources	code_module, code_presentation, id_student, id_site, date, sum_click

(VLE): Virtual Learning Environment

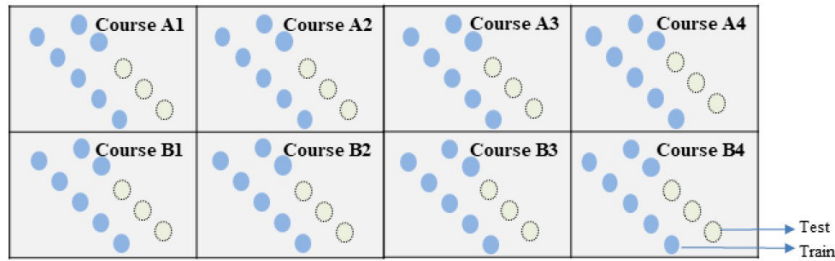


Figure 3. Data split method of previous research.

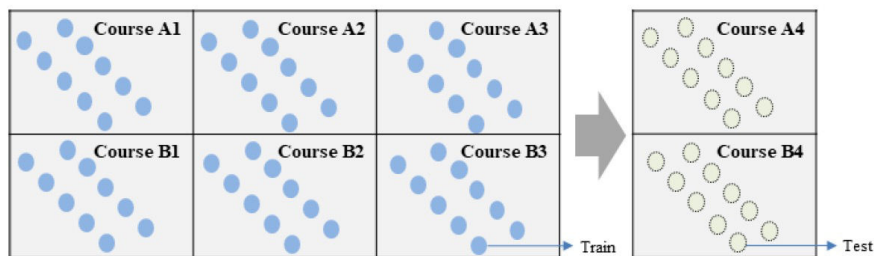


Figure 4. Data split method in this study.

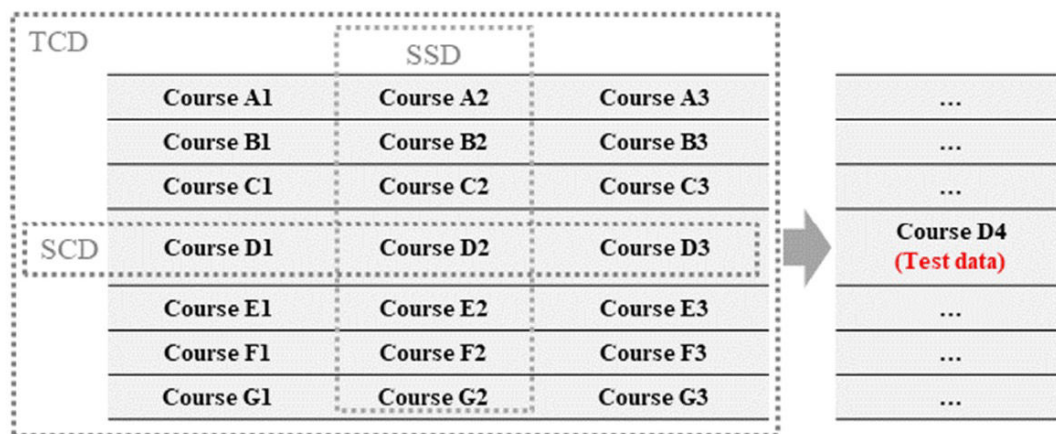


Figure 5. Three kinds of training data schemes.

TCD :uses the course data of total previous semesters

SCD : uses the same course data from all the previous semesters

SSD: uses data from a particular previous semester with the same semester

Table 4. Three kinds of training data schemes.

	Semester 2013-B	Semester 2013-J	Semester 2014-B	Semester 2014-J
Course AAA	(TCD)	(TCD)	(TCD)	(Test data)
Course GGG	(TCD)	(TCD)	(TCD)	
	Semester 2013-B	Semester 2013-J	Semester 2014-B	Semester 2014-J
Course AAA	(SCD)	(SCD)	(SCD)	(Test data)
Course GGG				
	Semester 2013-B	Semester 2013-J	Semester 2014-B	Semester 2014-J
Course AAA		(SSD)		(Test data)
Course GGG		(SSD)		

Table 5. Table of algorithms.

Algorithm	GB	Bagging	XGB	AdaBoost	RF	LR	SVM	KNN
	Vote-5 (XGB, RF, bagging, AdaBoost, GB)					Vote-3 (LR, SVM, KNN)		
	Vote-8 (LR, SVM, KNN, XGB, RF, bagging, AdaBoost, GB)							

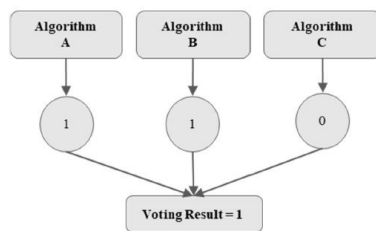


Figure 1. Voting classifier algorithm.

	Positive	Negative	
Predicted Label	True Positive (TP)	False Positive (FP)	Positive
	False Negative (FN)	True Negative (TN)	Negative
	True Label		

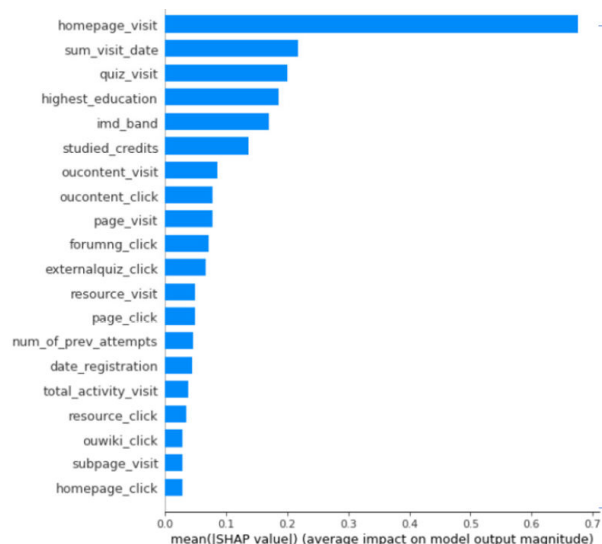
Table 6. Experiment variables.

Type	Variable
Demographic data (independent variables)	Studied_Credits
	Number_of_Previous_Attempts
	Highest_Education
	IMD_Band
	Age_Band
	Gender
	Region
	Disability
VLE activity data (independent variables)	Date_registration
	The number of clicks for each 20 VLE activity variables
	The number of visits for each 20 VLE activity variables
	The number of clicks for all the VLE activity variables
	The number of visits for all the VLE activity variables
Dependent variable	The number of visit days
	Final_result

Table 7. F1 scores using different experiment methods.

Algorithm	Week 8 (F1)			Week 16 (F1)			Week 24 (F1)			Week 32 (F1)		
	TCD	SCD	SSD	TCD	SCD	SSD	TCD	SCD	SSD	TCD	SCD	SSD
LR	0.732	0.702	0.742	0.754	0.745	0.776	0.829	0.777	0.774	0.802	0.841	0.807
SVM	0.688	0.730	0.728	0.743	0.752	0.766	0.781	0.794	0.798	0.817	0.831	0.825
KNN	0.690	0.733	0.723	0.737	0.750	0.750	0.772	0.803	0.767	0.806	0.833	0.806
XGB	0.706	0.685	0.709	0.769	0.758	0.768	0.780	0.779	0.797	0.817	0.832	0.835
RF	0.712	0.682	0.738	0.770	0.750	0.785	0.796	0.777	0.809	0.820	0.821	0.839
Bagging	0.712	0.643	0.741	0.765	0.756	0.780	0.781	0.733	0.803	0.821	0.816	0.839
AdaBoost	0.722	0.666	0.745	0.761	0.748	0.767	0.757	0.784	0.781	0.778	0.781	0.819
GB	0.733	0.658	0.759	0.782	0.749	0.788	0.793	0.771	0.798	0.808	0.797	0.836
Vote-3	0.720	0.735	0.745	0.760	0.775	0.779	0.793	0.805	0.800	0.824	0.838	0.830
Vote-5	0.724	0.675	0.745	0.783	0.760	0.788	0.797	0.787	0.812	0.824	0.833	0.840
Vote-8	0.719	0.674	0.747	0.776	0.756	0.788	0.788	0.787	0.803	0.814	0.828	0.837
Average	0.714	0.689	0.738	0.764	0.754	0.776	0.788	0.782	0.795	0.812	0.823	0.828

Note: **Bolded values** show the best performance for each period. F1 means F1 Score, the harmonic mean of precision and recall. TCD means prediction using the total course data from all previous semesters. SCD means prediction using only data from the same course in all previous semesters. SSD means prediction using only a particular previous semester with the same semester code.



SHAP value summary plot in global perspective of the GB algorithm in SSD method at week 8.

Figure 8. SHAP value ranking method.

SHAP value ranking method

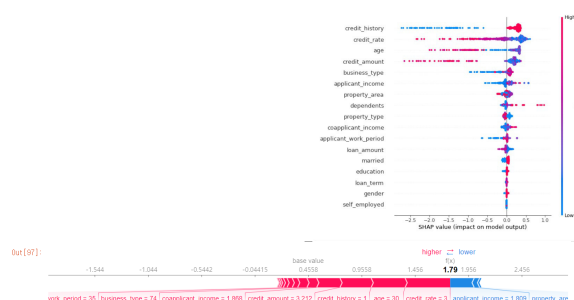


Table 9. SHAP value ranking table of XGB and GB using the SSD method at week 8.

Feature	Course DDD		Course GGG	
	XGBoost	GB	XGBoost	GB
homepage_visit	Top 1	Top 1	Top 1	Top 2
external_quiz_click	Top 2	Top 2		Top 10
quiz_visit	Top 7	Top 3		Top 6
sum_visit_date	Top 4	Top 4	Top 6	Top 4
highest_education	Top 6	Top 5	Top 3	Top 3
studied_credits	Top 5	Top 6	Top 2	Top 1
imd_band	Top 9	Top 7	Top 5	Top 5
ouwiki_click	Top 8	Top 8		
forumng_click		Top 9		
resource_visit		Top 10		Top 8
page_visit				Top 9
resource_click				Top 7
oucontent_click			Top 10	
date_registration			Top 7	
homepage_click	Top 3		Top 4	
total_activity_click	Top 10		Top 8	

Table 10. SHAP value ranking table for the GB algorithm using the SSD method at week 8.

Feature	AAA	BBB	CCC	DDD	EEE	FFF	GGG
homepage_visit	Top 1	Top 1	Top 1	Top 1	Top 1	Top 1	Top 2
external_quiz_click			Top 10	Top 2	Top 10		Top 10
quiz_visit	Top 3	Top 2	Top 2	Top 3	Top 2	Top 2	Top 6
sum_visit_date	Top 2	Top 4	Top 5	Top 4	Top 5	Top 3	Top 4
highest_education	Top 4	Top 3	Top 4	Top 5	Top 3	Top 4	Top 3
studied_credits	Top 6	Top 5	Top 3	Top 6	Top 4	Top 5	Top 1
imd_band	Top 5	Top 6	Top 6	Top 7	Top 6	Top 6	Top 5
ouwiki_click				Top 8			
forumng_click	Top 10	Top 7		Top 9		Top 7	
resource_visit		Top 8	Top 9	Top 10	Top 7		Top 8
page_visit	Top 9	Top 9	Top 8		Top 9	Top 8	Top 9
resource_click		Top 10					Top 7
oucontent_click	Top 8					Top 10	
page_click							
oucontent_visit	Top 7				Top 8	Top 9	
quiz_click			Top 7				

Discussion

Universities can use the machine-learning-based prediction model proposed in this study to measure student dropout risk in real time and alert teachers. This study confirmed that accurately predicting dropout rates using students' online learning behaviours is feasible. Furthermore, informing teachers that the number of **homepage visits, quiz visits, cumulative days visited, total credits taken, and the multiple deprivation index (IMD) band of the student's residence** are the main predictors of dropout rates will encourage them to pay more attention to these features.

Moreover, this study found that the relative prediction accuracy of the algorithms could **differ between the first half of a semester and the second half of a semester**. This finding suggests that the best method for predicting the dropout rate may differ between the first and second half of the semester. This study did not explore the specific reasons for this difference, although teachers can be mindful of it in their practice.

핵심 변수:

홈페이지 방문 횟수, 퀴즈 방문 횟수, 누적 방문 일수, 총 이수 학점, 학생 거주지의 다중 빈곤 지수(IMD)

主页访问量、作业访问量、累计访问天数、总学分, 学生居住地的多重贫困指数 (IMD) 等级

Explaining the Translation Error Factors of Machine Translation Services Using Self-Attention Visualization

Self-Attention 시각화를 사용한 기계번역 서비스의 번역 오류 요인 설명

Zhang, Chenglong ; Ahn, Hyunchul

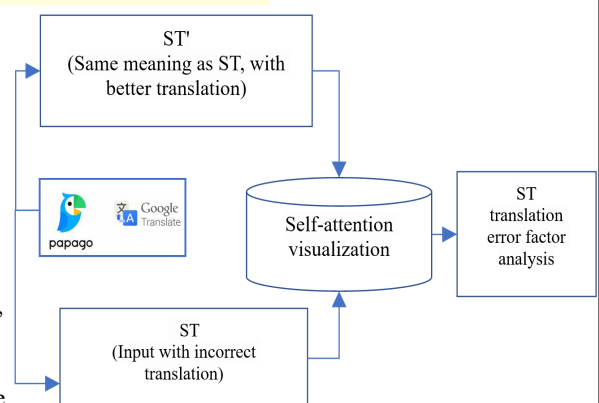
Methods

ST(Source Text) → TT(Target Text)

In the study, the input statement was marked as ST (source text), and the translation statement of was marked as TT (target text).

The research method is as follows:

1. Collect input ST which found strange translation results.
2. Analyzes the reason of the translation error, use ST and TT.
3. Based on the cause of the analysis, modified to an new input statement ST' which the meaning does not change as much as possible, but translated better. The translation of ST' is marked as TT'.
4. The two input statements ST and ST' are analyzed using Self-Attention visualization, and inferred by examining the difference in the Attention path.



Research Model

Research environment

exBERT: A Visual Analysis Tool to Explore Learned Representations in Transformer Models

Self-Attention Visual Platform:	exBert (from IBM & Harvard, 2019)
Data:	3,000 Kor-Chn Corpus Sentence
Experiment Period:	2021.07-09
MT Algorithm:	XLM-RoBERTa-base (a multilingual analysis model improved BERT, 100 languages, 250002-vocab, 2.5TB. 12 layers 10 Attention heads.)

The self-attention technique is a basic analysis method of the Transformer-based BERT algorithm, and is currently used in translation services [such as Papago and Google translation](#). Although the input Self-Attention visualization used in this study is a little different from the actual translation services, but both of them are BERT-based methods and have many similarities.

Example: Different with/without Special Symbols :

한국어 감지 ▼

⇒

중국어(간체) ▼

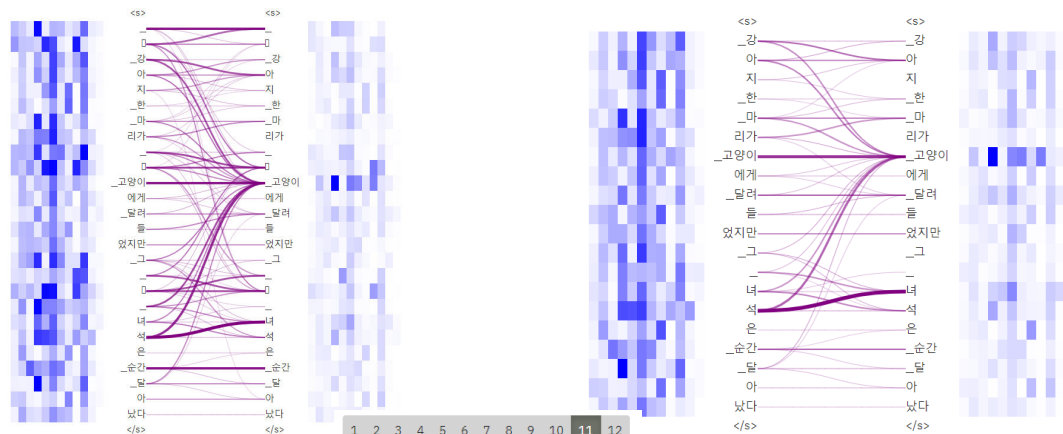
강아지 한 마리가 고양이에게 달려들었지만 그 녀석은 순간 달아났다

×

강아지小狗扑向 고양이猫, 那家伙一瞬间就跑掉了

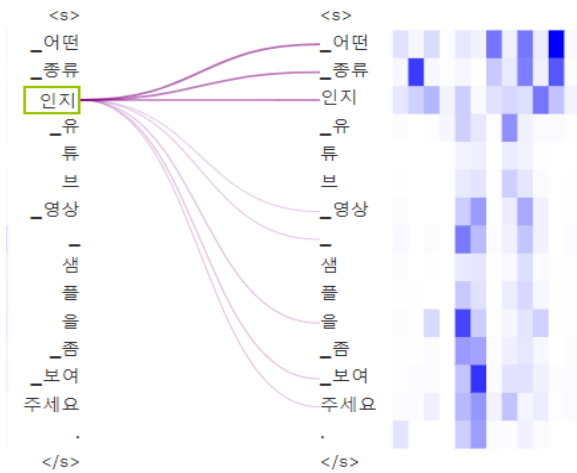
강아지 한 마리가 고양이에게 달려들었지만 그 녀석은 순간 달아났다

강아지 한 마리가 고양이에게 달려들었지만 그 녀석은 순간 달아났다

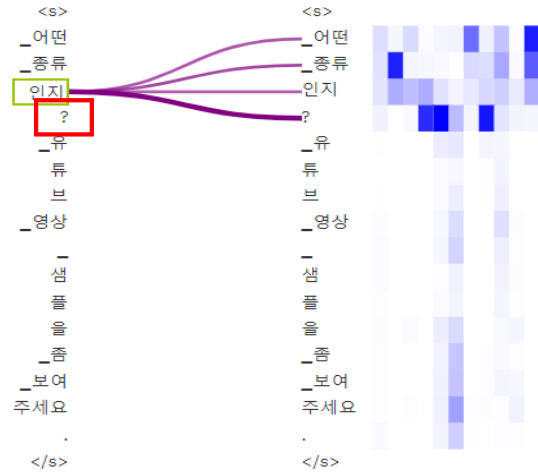


Type1: symbols missing error

Original ST: What kind of (video) Please show me some sample of youtube video ?



A. ST1, Layer 8



B. ST1', Layer 8

■ ST1: 어떤 종류인지 유튜브 영상 샘플을 좀 보여주세요.

■ TT1: 展示一下YouTube视频样本。(유튜브 동영상 샘플을 보여주세요.
× 번역 오류[원문 내용 빠짐])

(Show me some sample of youtube video.) ×
13:53

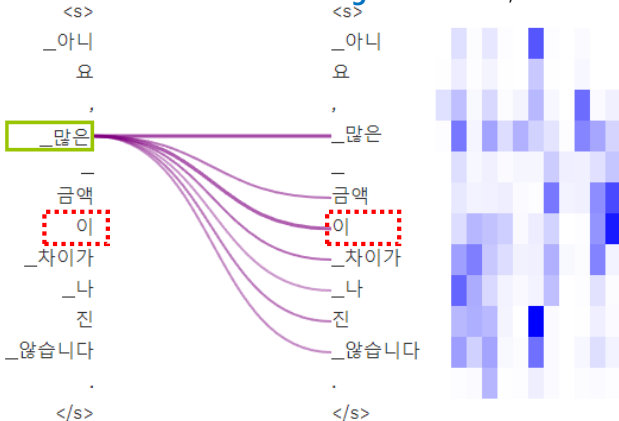
■ ST1': 어떤 종류인지? 유튜브 영상 샘플을 좀 보여주세요.

■ TT1': 什么种类? 展示一下YouTube视频的样本。(어떤 종류인가요?
Youtube 동영상 샘플을 보여주세요. 거의 정확한 번역)

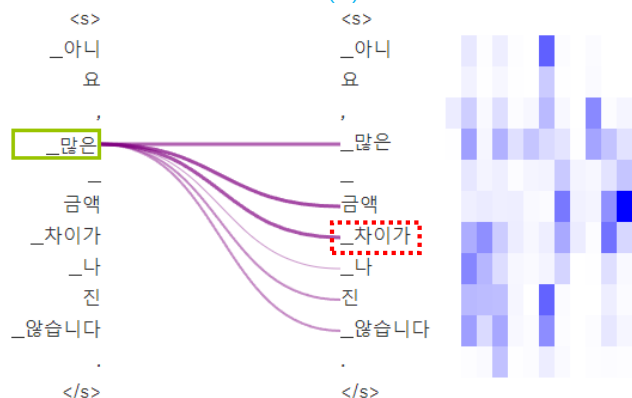
(What kind of ...? Show me some sample of youtube video.) ×
21

Type2: grammar error

Original ST: No, there is not much difference in amount (is).



A. ST2 (Layer 9)



B. ST2' (Layer 9)

ST2: 아니요, 많은 금액이 차이가 나진 않습니다.

TT2: 不, 很多金额没有差异。(아니요, 많은 금액은 차이가 없습니다. × 번역 오류[중국어 문맥 순서 이상])
(No, much amount is not difference.) ×

ST2': 아니요, 많은 금액 차이가 나진 않습니다.

TT2': 不, 没有太多金额差异。(아니요, 많은 금액 차이는 나진 않습니다. 거의 정확한 번역)
(No, (there is) not much difference in amount)

Input Sentence 아니요, 많은 금액이 차이가 나진 않습니다.

Filters Hide Special Tokens ☒ Show top 70% of att:

Layer 1 2 3 4 5 6 7 8 9 10 11 12

Selected heads: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Select all heads Unselect all heads

You focus on one token by **click**. For bidirectional models, you can mask any token by **double click**.
You can **toggle** a head by a **click** on the heatmap columns.
Tokens on the *left* attend to tokens on the *right*.

아니요, 많은 금액이 차이가 나**진** 않습니다. X
아니요, 많은 금액이 차이가 나**지** 않습니다. X

Input Sentence 아니요, 많은 금액이 차이가 나진 않습니다.

Filters Hide Special Tokens ☒ Show top 70% of att:

Layer 1 2 3 4 5 6 7 8 9 10 11 12

Selected heads: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Select all heads Unselect all heads

You focus on one token by **click**. For bidirectional models, you can mask any token by **double click**.
You can **toggle** a head by a **click** on the heatmap columns.
Tokens on the *left* attend to tokens on the *right*.

아니요, 많은 금액이 차이가 나**지**는 않습니다. V
아니요, 많은 금액**의** 차이가 나진 않습니다. V

한국어 감지 ▼

아니요, 많은 금액이 차이가 나진 않습니다.

⇒

중국어(간체) ▼

不, 很多金额没有差异。

13:53

8th Busan International Conference on China Studies

23

공동 연구: Collaborative research

Comparison of Carbon Emissions out of Model Training with Structured Business Data

정형 비즈니스 데이터를 사용한 모델 학습에서의 탄소 배출량 비교. (김지혁, 장청룡, 박웅)

J Intell Inform Syst 2024 March: 30(1): 277~294

〈그림 1〉 인공지능 모델 학습 중 탄소 배출량 측정 모델

13:53

8th Busan International Conference on China Studies

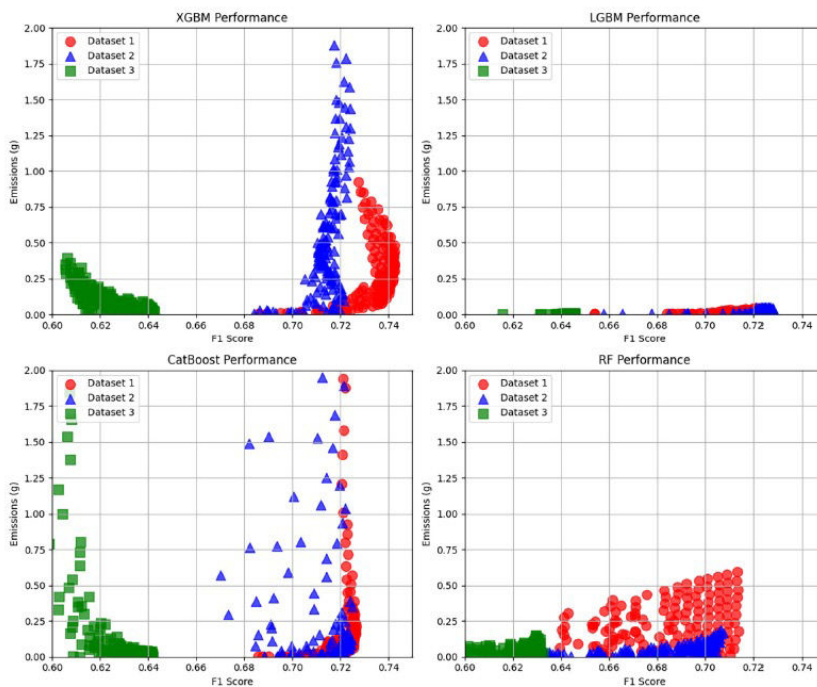
24

〈표 1〉 실험 데이터 세트 요약

설명		데이터 수	변수
Dataset 1	전자상거래 고객 행동 데이터	총 1,000,000건 (y=0 500,000건 y=1 500,000건)	6 (Numerical 2 Categorical 4)
Dataset 2	마케팅 제의 응답 데이터	총 67,546건 (y=0 33,773건 y=1 33,773건)	507 (Numerical 483 Categorical 24)
Dataset 3	고객 이탈 데이터	총 165,034건 (y=0 130,113건 y=1 34,921건)	10 (Numerical 6 Categorical 4)

〈표 2〉 실험에 사용된 하이퍼파라미터

XGBoost, LightGBM	n_estimators	max_depth	learning_rate	min_child_weight
GridSearch	100, 200, 300	3, 6, 9	0.001, 0.01, 0.1	1, 5, 10
RandomSearch				
BayesianOPT	100~300	3~9	0.001~0.1	1~10
Optuna				
Catboost	-	-	-	min_child_samples
GridSearch	-	-	-	5, 50, 100
RandomSearch				
BayesianOPT	-	-	-	5~100
Optuna				
Random Forest	-	-	min_samples_leaf	min_samples_split
GridSearch	-	-	8, 12, 18	8, 16, 20
RandomSearch				
BayesianOPT	-	-	8~18	8~20
Optuna				



〈그림 5〉 분류모델별 하이퍼파라미터 변동에 따른 탄소 배출량 및 F-1 score 분포

〈표 3〉 Dataset 1에서 하이퍼파라미터 최적화 도구별 성능 및 탄소 배출량

	F-1 Score	Emissions(g)	Duration(s)
GridSearch	0.7399	27.6042	2857.323
RandomSearch	0.7384	24.1354	2498.738
BayesianOPT	0.7393	32.9364	3412.706
Optuna	0.7371	17.6782	1829.980

〈표 4〉 Dataset 2에서 하이퍼파라미터 최적화 도구별 성능 및 탄소 배출량

	F-1 Score	Emissions(g)	Duration(s)
GridSearch	0.7236	46.5224	4792.101
RandomSearch	0.7280	38.2956	3949.512
BayesianOPT	0.7266	50.7967	5241.690
Optuna	0.7286	25.6775	2649.848

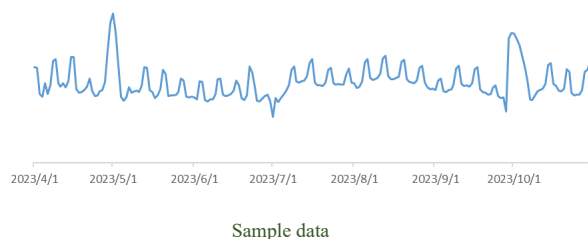
〈표 5〉 Dataset 3에서 하이퍼파라미터 최적화 도구별 성능 및 탄소 배출량

	F-1 Score	Emissions(g)	Duration(s)
GridSearch	0.6391	8.6880	899.629
RandomSearch	0.6382	7.7865	803.882
BayesianOPT	0.6400	7.8470	810.585
Optuna	0.6431	3.8585	398.368

Working Paper: 旅游预测

Daily tourism demand forecasting with iTransformer model

Jiahui Huang , Chenglong Zhang



The daily domestic tourist arrivals to Hangzhou from January 1, 2023, to April 30, 2024.

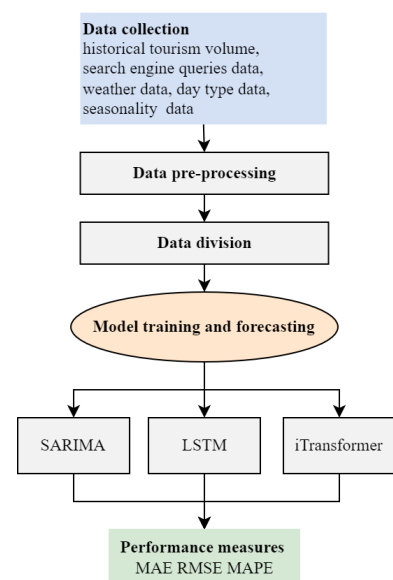
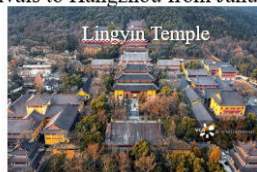
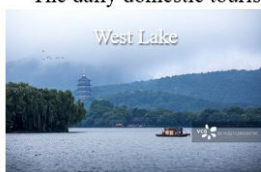


Figure 1. The research framework

+CNN, +RNN....

Literature review

Liu Y, Hu T, Zhang H, et al. itransformer: Inverted transformers are effective for time series forecasting[J]. arXiv preprint arXiv:2310.06625, 2023.

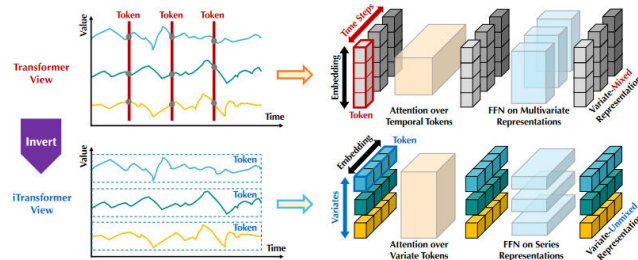


Figure 2: Comparison between the vanilla Transformer (top) and the proposed iTransformer (bottom).

Transformer embeds the temporal token, which contains the multivariate representation of each time step.

iTransformer embeds each series independently to the variate token, such that the attention module depicts the multivariate correlations and the feed-forward network encodes series representations.

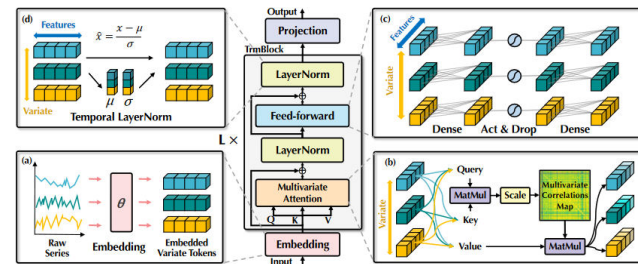


Figure 3: Overall structure of iTransformer, which shares the same modular arrangement with the encoder of Transformer.

(a) Raw series of different variates are independently embedded as tokens.

(b) Self-attention is applied to embedded variate tokens with enhanced interpretability revealing multivariate correlations.

(c) Series representations of each token are extracted by the shared feedforward network.

(d) Layer normalization is adopted to reduce the discrepancies among variates.

Data and methodology

Table 1 Description of the variables.

Variable name	Description of factors	Variable type	Dummy variables representation
Historical Tourism demand	Volume of tourist	Numeric	/
Search engine queries	Baidu Index of keywords	Numeric	/
Weather conditions	Bad weather (heavy/moderate rain/snow)	Dummy	0
	Fair weather (light rain/snow, shower and snow shower)	Dummy	1
	Fine weather (sunny, cloudy, and overcast)	Dummy	2
Temperature	maximum temperatures	Numeric	/
	minimum temperatures	Numeric	/
	Weekday (no days off)	Dummy	0
Day type	Weekend (two days off)	Dummy	1
	Long weekend (three days off)	Dummy	2
	Long holiday (five or seven days off)	Dummy	3
Seasonality	Off seasons (1 November to 31 March)	Dummy	0
	Peak seasons (1 April to 31 October)	Dummy	1

향후 연구 Future research

- AI의 탄소 배출
- AI의 신뢰성
- AI의 응용 및 사용태도

Thanks



SESSION 2

BUSINESS



Green Transformational Leadership in the Internet Industry: Mediating Roles of Green Innovation and Creativity in Improving Environmental Performance

Jiaming Hu, Kyung Hee University
Yannan Li, Kyung Hee University

Abstract

The rapid expansion of the Internet and digital sectors has undeniably driven global economic growth and expanded commercial opportunities. However, this growth is not without its share of environmental challenges. The increased electronic waste and higher energy consumption by data centers have raised serious climate change concerns, underlining the urgent need for sustainable solutions in these sectors.

This study explores improving environmental performance in China's Internet industry, focusing on the benefits of green transformational leadership. It particularly examines how green innovation and creativity mediate the impact of green transformational leadership on employees' environmental performance. An online survey was conducted from September 16 to December 16, 2023, collecting 416 responses, with 368 valid data sets (an 88.5% response rate) to achieve the research objectives. This study utilized SPSS 26 and AMOS 24 to verify the reliability and validity of variables, model fit, and hypothesis testing. The findings show that green transformational leadership significantly improves green innovation, creativity, and environmental performance. Furthermore, green innovation and creativity play critical roles in mediating the relationship between green transformational leadership and environmental performance, and the distinction between innovation and creativity in corporate management is further emphasized and clarified.

These results suggest that adopting green transformational leadership in the rapidly evolving Internet and digital business environment is significant for addressing climate change, reducing electronic waste, and lowering energy consumption, providing empirical evidence for advancing sustainable development.

Keywords: Green transformational leadership, Green innovation, Green creativity, Environmental performance

1. Introduction

The rapid spread of the Internet and digital sectors has considerably boosted global economic growth by expanding company prospects and creating local jobs. However, this growth has increased the production and use of electronic equipment, resulting in significant e-waste generation, including hazardous substances such as lead and mercury, which pose potential threats to both the environment and human health (Olanrewaju et al., 2021; Grace et al., 2019). In addition, the large number of data centers and servers on the Internet is increasing their energy consumption and greenhouse gas emissions, which hurt climate change (Singh et al., 2020). Consequently, the Internet business must restructure its organizational rules in order to offset these negative consequences and enable the transition to sustainable development (Longoni et al., 2018). At the same time, growing corporate awareness of eco-friendliness and increasing stakeholder pressure are driving the Internet industry to reassess environmental measures, which are seen as increasingly important for gaining institutional legitimacy and improving its long-term competitiveness (Li et al., 2020).

To achieve sustainable development goals and a green environment, the Internet industry must implement green methods such as green marketing, human resource management, supply chain, innovation, and creativity. Several institutional variables influence organizational goals, including human capital, market and business considerations, infrastructure, technology, knowledge, and creativity (Song et al., 2020). green transformational leadership (GTL) is critical for improving organizations' environmental performance (Li et al., 2020). According to these experts, green transformational leadership indirectly influences environmental performance via a process mediated and modulated by various factors, including green human resource management approaches (Roscoe et al., 2019). However, the direct relationship between green transformational leadership and environmental performance remains to be discovered.

Past studies have demonstrated the mutual benefits of integrating green creativity into a company's development process, aligning with societal and environmental interests (Abdeen, 2008). Unlike traditional creativity, green creativity places a premium on the environmental friendliness and sustainability of products, services, and behaviors (Mi et al., 2019). This practical application of green creativity can be a driving force for businesses and society in achieving environmental sustainability. Similarly, green innovation is a crucial tool in addressing global ecological sustainability and gaining a competitive edge (Awan et al., 2023).

As environmental degradation increases, the integration of ecological issues by companies into their strategic plans has become key to sustainable performance (Daily et al., 2007). In this regard, the adoption of green innovation is most appropriate. Achieving environmental performance requires an active ecological strategy within the enterprise, as it has a dual role in reducing environmental burdens and supporting economic development and technological modernization (Yang & Yang, 2019). In this situation, implementing green innovation is particularly relevant. To achieve environmental performance, the firm must implement an active environmental strategy that fulfills the twin objective of lowering ecological burdens while promoting economic development and technical modernization

(Xian et al., 2023). Organizations and strategy scholars have recently expressed a strong interest in understanding the relationship between green innovation and performance (Singh et al., 2022). This study looks at the relationship between green innovation and environmental performance.

The goal of this research is to investigate GTL's impact on the Internet sector, specifically its effects on green creativity, innovation, and environmental sustainability. Furthermore, this study investigates the mediating roles of green creativity and innovation in the relationship between GTL and environmental performance in the Internet industry. As a result, we predict that the direct linkages between GTL, green innovation, and green creativity in improving environmental performance will become clearer, ultimately contributing to reducing environmental damage in the Internet business.

2. Literature Review

2.1 GTL and Green Innovation

Leaders must take a transformative strategy in response to marketplace developments (Bass, 1985). GTL is crucial in modern business environments as it inspires and motivates followers, manages change, influences perceptions and values, and fosters innovative thinking and problem-solving skills (Azim et al., 2019; Černe et al., 2018). GTL has emerged as the primary leadership style for attaining sustainability goals at both the national and organizational levels (Fatoki, 2023). GTL inspires employees to adopt sustainable behaviors that benefit the organization, society, and the environment (Cop et al., 2021; Mukonza & Swarts, 2019). It can also help to build new knowledge and ideas, increasing the potential for green innovation (Mittal & Dhar, 2016; Awan et al., 2021). This leadership style encourages green innovation by incorporating current market knowledge and trends, securing financial resources, implementing advanced green technologies, and educating staff to carry out innovative processes (Chen et al., 2014). Song et al. (2020) argue that GTL is an essential component of achieving environmental sustainability. According to Cop and Alola (2021), GTL fosters innovation by encouraging employees to think creatively, make new connections, and adopt green practices and regulations. Furthermore, Effective GTL promotes innovation of green products (Xie & Zou, 2019). As a result, we propose that GTL, which values and inspires its people, can unlock their potential for green innovation and assist them in developing breakthrough technology. Based on these conversations, we can hypothesize that:

Hypothesis 1: GTL has a positive influence on Green Innovation.

2.2 GTL and Green Creativity

Transformational leadership is a leadership approach in which leaders identify desired changes while inspiring and motivating people to realize a goal (Zhou et al., 2018). Previous research indicated that the elements of

transformational leadership have global universality (Avolio et al., 1999). This leadership style has four dimensions: "intellectual stimulation, individualized consideration, charisma, and inspiration," all of which have a major impact on employee behavior inside an organization (Ullah et al., 2022). Green transformational leaders encourage followers' initiative and creative thinking (Mi et al., 2019 ; Canova et al., 2020 ; Elshaer et al., 2021), which strengthens their commitment to the organization's goals and vision and increases their willingness to contribute creative ideas for sustainable development. Furthermore, transformational leaders foster an inventive environment that encourages followers to propose creative ideas for the organization (Mittal & Dhar, 2015). Amabile and Pillemer (2012) contended that management and leadership, which correspond to the fourth component of creativity, could serve as catalysts for creativity.

Furthermore, Sabri (2022) proposed that employees are more likely to be creative and inventive when supervisors motivate and support new ideas, offer a sense of positive challenge, and define an innovative vision. Thus, GTL seeks to guide and motivate employees to engage in green creativity (Saira, 2021). GTL focuses on building an open environment that encourages fresh information and values the entrepreneurial spirit. This strategy will raise employees' proactive awareness, allowing them to question traditional values and beliefs, producing innovative green creativity (Amabile et al., 2012; Xu et al., 2022). Based on this understanding, we present the following hypothesis:

Hypothesis 2: GTL has a positive influence on green creativity.

2.3 Green Innovation and Environmental Performance

Green innovation improves a company's overall success (Bass, 2014; Kraus et al., 2020). It is strongly related to the organization's environmental management goal and considerably improves environmental performance (Singh et al., 2022). Furthermore, green product and process innovations reduce the negative environmental consequences of business operations and improve the firm's financial and social performance by reducing waste and costs (Adegbile et al., 2017). green innovation is a critical driver of environmental performance, notably in lowering harmful pollutants. This reduction reduces compliance costs during severe contact between the corporation and government authorities, consumers, or non-governmental organizations (NGO), permitting practical demands for environmental performance (Canova & Manganelli et al., 2020). According to Carrion-Flores and Innes, R (2010), green innovation should not solely be considered a company's response to stakeholder pressures through proactive organizational practices and aspirations to improve environmental performance to gain a competitive advantage. Putting a strong emphasis on green product innovation, process innovation, and management innovation will help firms save money, improve environmental efficiency, increase productivity, and improve product quality. These aspects directly contribute to gaining a competitive edge (Ullah et al., 2021; Porter et al., 1995). According to Chen et al. (2006), GIs serve as resources for enterprises seeking to improve their environmental performance. Using the

Resource-Based View(RBV), we predict that green product and process innovations are significant resources for improving environmental performance and fostering goodwill among critical stakeholders. Therefore, we suggest the following hypothesis:

Hypothesis 3: Green innovation has a positive influence on environmental performance.

2.4 Green Creativity and Environmental Performance

Green innovation improves economic and environmental performance while also reinforcing green behavior. Creativity promotes adopting green initiatives and practices that enhance the effectiveness of environmental management systems (Singh et al., 2020). Environmental performance is essential for improving environmental protection and boosting green growth, giving enterprises a competitive edge (Song et al., 2020). When employees at all levels link their green ideas with the organization's objective of sustainable development, the company's performance improves dramatically. green creativity is also essential for transforming an organization's proactive environmental plan into tangible green performance (Elshaer et al., 2021). Organizations should prioritize creativity to manage innovative performance effectively. To satisfy social and environmental goals, managers should develop new ideas for green products and processes that will ultimately improve product performance. Creative ideas and methods increase the profitability of inventive new items (Schlegelmilch et al., 1996). According to research, green creativity considerably impacts green product environmental performance (Cheng, 2019). Green creativity is critical for decreasing environmental damage and is advantageous for businesses seeking to fulfill their environmental goals (Song et al., 2020). A culture of creativity fosters an environment conducive to increasing a company's environmental commitment and lowering its negative environmental impact (Chen & Chang, 2013; Aeknarajindawat & Jernsittiparsert, 2019). Based on the above discussions, we hypothesize that:

Hypothesis 4: Green creativity has a positive influence on environmental performance.

2.5 GTL and Environmental Performance

GTL is primarily concerned with attaining the organization's environmental goals and increasing employee understanding and motivation to achieve these goals, hence preserving Corporate Environmental Performance (Porter et al., 1995; Chen et al., 2006). Transformational leaders improve organizational performance in various ways, including altering employee behavior and attitudes, increasing employee engagement, and improving economic health (Li et al., 2020). Organizational activities can only succeed with the leadership's support, which drives organizational sustainability (Bhatti et al., 2022). Furthermore, GTL improves performance in green product creation by articulating a broad environmental vision, establishing environmental standards, and inspiring followers to achieve these environmental goals (Sroufe, 2017). Particularly in the manufacturing industry, there is a greater emphasis on environmental performance, using eco-friendly techniques to offset adverse environmental impacts.

As public awareness of environmental challenges rises, customers prefer products and organizations prioritizing environmental sustainability (Jia et al., 2018; Bass et al., 2014). Cop et al. (2021) found that GTL increases environmental work engagement and improves environmental performance. GTL encourages employees, fosters corporate innovation, and stimulates followers' inventive solutions for solving environmental challenges. Transformational leadership improves green and innovative performance (Mittal, 2016; Yang & Yang, 2019). Based on the preceding discussions, we suggest the following hypothesis:

Hypothesis 5: GTL has a positive influence on environmental performance.

2.6 The Mediating Role of Green Innovation

According to previous research, GTL has fueled green innovation and improved organizational performance in environmental efforts. However, these research fields require a comprehensive and pragmatic approach to analyzing organizations' experiences, especially when essential stakeholders are involved in eco-friendly management practices (Tang et al., 2018). Furthermore, green innovation is important for increasing corporate performance (Niazi et al., 2023; Singh et al., 2019; El-Kassar et al., 2019; Kammerer et al., 2009). Renwick et al. (2013) urge that firms consider prospective employees' environmental knowledge, values, and views during recruitment. This includes aligning with employees' ecological viewpoints, ethics, and awareness to ensure that new hires from green recruitment and selection procedures effectively contribute to the company's environmental goals. Green innovation is a vital resource influencing environmental performance; consequently, a firm can use it to meet its environmental management goals (Mandal, 2021). Green innovation and product innovation considerably reduce an organization's negative impacts while improving performance through cost savings, reduced waste, and more effective resource use (Del et al., 2018). Pham et al. (2020) advocated for green training and development programs that teach employees about waste management, energy efficiency, recycling, and green workplace analysis, as well as implementing eco-friendly responsibilities, objectives, and performance management system evaluations to improve environmental performance. Karabulut and Hatipoğlu (2020) found that green processes and product innovation can lower a company's environmental footprint. They increase a company's social, environmental, and financial performance by drastically reducing expenses and waste while conserving resources, time, and money (Fatoki et al., 2023). Based on these findings, we offer the following hypothesis:

Hypothesis 6: Green Innovation plays a mediating role between GTL and Environmental Performance.

2.7 The Mediating Role of Green Creativity

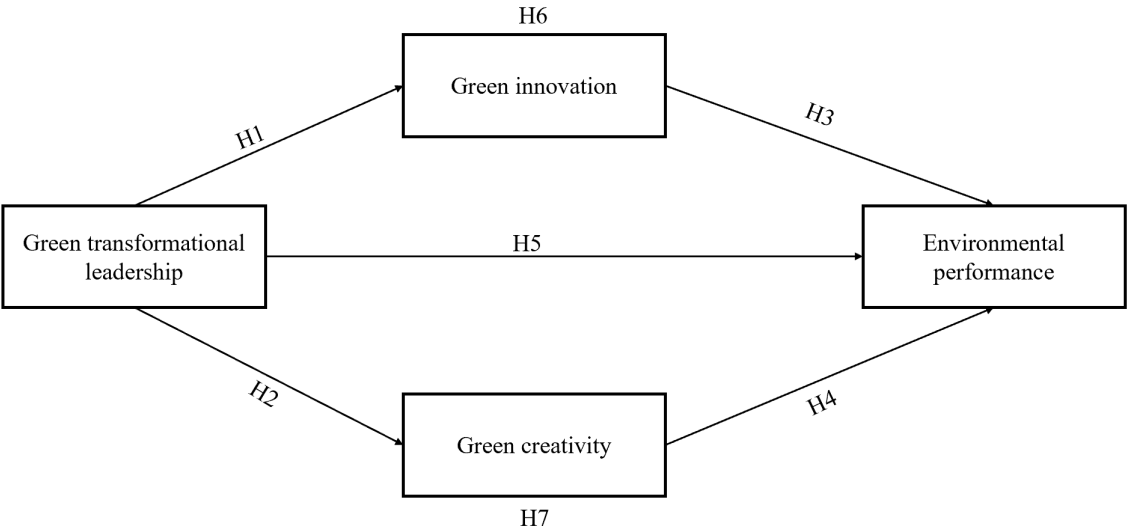
GTL entails inspiring people to meet environmental expectations. Green creativity, a significant driver of environmental performance (Jia et al., 2018), enables individuals to generate new and practical ideas for building eco-friendly products and services (Constantine et al., 2016). Previous research has demonstrated that green

creativity improves a company's environmental performance and is an essential factor in the success of innovative projects within an organization (Yu & Ching, 2013), Green creativity allows employees to generate unique and beneficial ideas while benefiting from a corporate culture that encourages such innovation (Singh et al., 2022). As a result, green creativity acts as an intermediate in the interaction between GTL and environmental performance. GTL indirectly influences environmental performance through green creativity, encouraging employees to learn new skills and technology and stimulating them to use creative green practices, hence increasing the sale of environmentally friendly products (Li et al., 2014; Zhang et al., 2011).

Furthermore, GTL can persuade employees to prioritize the company's green objectives over individual goals. The refore, when leaders support employees' creative and innovative ideas, it generates new green ideas (Song et al., 20 22). Based on these findings, the study suggests the following hypothesis :

Hypothesis 7: Green creativity plays a mediating role between GTL and Environmental Performance.

The research model is depicted in Figure 1.



<Figure 1> Research model

3. Methods

3.1 Sample and Data Collection

To verify the impact of GTL on environmental performance through green creativity and innovation, this study predominantly surveyed individuals engaged in internet-related work in China's Jiangsu, Guangdong, and Heilongjiang provinces. The surveyed companies encompassed foundational services, commercial applications,

communication entertainment, internet media, and shared economy sectors, with job roles spanning product, operations, technology, marketing, and administration. Empirical testing was conducted to examine how GTL enhances the environmental performance of these employees through green creativity and innovation. Through online surveys, 416 samples were collected from September 16, 2023, to December 16, 2023, spanning three months. The surveyed companies were highly supportive, allowing employees to complete the survey during working hours, resulting in the retrieval of 368 usable data points, yielding an effective response rate of 88.5%. The demographic profile of the respondents is outlined in Table 1. As indicated, 45.7% of the respondents were female, 48.4% were aged between 25 and 35, 53.3% held undergraduate degrees, 30.4% worked in technical positions in the internet sector, 24.2% were employed in interactive entertainment companies, and 46.2% worked in companies with staff sizes ranging from 51 to 250 employees. Furthermore, 39.4% of respondents had 3 to 6 years of work experience in their current roles. Overall, the characteristics of these samples indicate a relatively young, well-educated workforce with relatively short tenures in the internet industry.

<Table 1> The demographic characteristics of the interviewees

	Categories	N	%
Gender	Male	200	54.3
	Female	168	45.7
	~25	79	21.5
Age	25~35	178	48.4
	36~45	84	22.8
	45 ~	27	7.3
Education	~High school & College	95	25.8
	Bachelor	196	53.3
	Master	75	20.4
	Doctor	2	0.5
Career	~2year	78	21.2
	3~6year	145	39.4
	6~8year	97	26.4
	8year	48	13.0
	~	67	18.2
	basic services	67	18.2
Industry	Commercial applications sector	86	23.4
	Communications and Entertainment	89	24.2
	Internet media sector	58	15.8
	Sharing economy sector	68	18.5
functional areas	product	34	9.2
	operations	100	27.2
	technology	112	30.4
	market	85	23.1
	administrative	37	10.1
Corporate size	~10	38	10.3
	10~50	91	24.7
	51~250	170	46.2
	~250	69	18.8

3.2 Measures

GTL = Green transformative leadership: Green transformative leadership refers to a leadership approach that promotes sustainable development and environmental actions within an organization. It emphasizes leaders guiding

the organization toward sustainable development by advocating and practicing environmental awareness, fostering sustainable operations, and promoting green innovation. This type of leadership not only focuses on the organization's economic performance but also emphasizes social responsibility and environmental protection. It strives to reduce negative environmental impacts while achieving organizational goals, promoting ecological balance and societal well-being (Cop et al., 2021). Chen and Chang (2013) designed the 6-item GTL scale, which we used in this study. The scale has responses ranging from 1 (strongly agree) to 5 (strongly disagree). Examples of this include: "The leader provides a clear environmental vision to project members (e.g., zero carbon emissions or carbon neutrality, sustainable use of resources, environmentally friendly products and services)" as well as "The leader commits to guiding project members towards achieving shared environmental goals" as well as "The leader motivates project members to meet environmental targets."

GC = Green Creativity: Green creativity refers to the use of imagination and innovation to design environmentally friendly and sustainable solutions, promoting the coordinated development of society, economy, and environment. It focuses on seeking new paths and solutions for sustainable development through creativity and imagination, not only considering the environment but also including social and economic factors (Xu et al., 2022). Furthermore, this study evaluates green creativity using the same 6-item scale developed by Chen and Chang (2013), with response possibilities ranging from 1 (strongly agree) to 5 (strongly disagree). Example items from the scale include "Our company proposes new methods to achieve green environmental goals," "Our company proposes new green concepts to improve environmental performance," and "Our company promotes and advocates new green concepts to others."

GI = Green Innovation: Green innovation refers to innovative activities aimed at promoting sustainable development by reducing environmental impact through means such as technology and design. Green innovation emphasizes considering ecological factors in designing products, services, or processes to reduce their impact on the environment (Kraus et al., 2020). Furthermore, green innovation is assessed using an 8-item scale developed by Chen (2006) and others, with responses ranging from 1 (strongly agree) to 5 (strongly disagree). Sample items from the scale include "Our company chooses materials for product development or design that generate the least pollution" and "Our company's production processes effectively reduce emissions of harmful substances in waste." A scale developed by Fernando and Wah (2017), consisting of 4 questions, is also included. One of the sample items is "Our company is committed to adopting green technologies to the greatest extent possible."

EP = Environmental Performance: Environmental performance refers to the impact that an organization has on the environment through its daily operations and business activities, as well as the measures it takes to manage and mitigate these impacts. Environmental performance assessment aims to quantify and evaluate the environmental impacts of an organization, providing the basis and guidance for the development and implementation of environmental management strategies and the execution of environmental protection measures (Singh et al., 2020). This study assessed environmental performance using six items from Melnyk (2003) and Daily (2007), among

others. Response ratings ranged from 1 (strongly agree) to 5 (strongly disagree). Some of the sample scale items are "Our company's green management internally reduces waste," "Our company's green management reduces the procurement of non-renewable materials, chemicals, and components," and "Green management contributes to enhancing our company's reputation." VI. Analyses and Results.

4. Results

4.1 Measurement Reliability and Validity Assessment

This study used an exploratory factor analysis (EFA) followed by a confirmatory factor analysis (CFA) to determine the measuring instruments' reliability and validity. The EFA results, shown in Table 2, revealed four different components that correlate to the theoretical constructs under research. All measured variables exhibited loadings of 0.50 or greater, thus demonstrating the requisite internal consistency for hypothesis testing (notably, loadings of 0.40 or above are generally considered significant). Cronbach's alpha coefficients were calculated for each element to assess the scales' reliability, producing the following results: GTL (0.898), GI (0.951), GC (0.900), and EP (0.900). Cronbach's alpha values for all components exceeded the benchmark value of 0.70, indicating a high level of internal consistency among the items on each scale. As a result, the questionnaires are deemed very dependable for use in our research.

<Table 2>Results of exploratory factor analysis

Item	1	2	3	4	Cronbach's alpha
GI5	.782	.186	.118	.164	
GI12	.780	.178	.130	.132	
GI7	.772	.134	.135	.178	
GI8	.772	.154	.148	.136	
GI4	.771	.110	.198	.091	
GI10	.768	.136	.164	.146	.951
GI3	.764	.199	.165	.129	
GI11	.762	.086	.130	.143	
GI9	.761	.143	.133	.145	
GI6	.754	.130	.134	.169	
GI2	.751	.170	.186	.099	
GI1	.748	.119	.169	.169	
GC6	.175	.795	.156	.095	
GC4	.180	.766	.184	.166	
GC3	.168	.762	.092	.235	.900
GC5	.214	.757	.177	.128	
GC2	.173	.752	.148	.173	
GC1	.208	.739	.189	.176	
EP1	.147	.179	.794	.151	
EP3	.202	.131	.790	.199	
EP6	.232	.116	.776	.153	.900
EP5	.155	.178	.760	.098	
EP2	.240	.149	.735	.107	

EP4	.221	.196	.721	.100	
GTL4	.170	.167	.134	.790	
GTL3	.151	.215	.103	.774	
GTL5	.227	.136	.075	.765	.898
GTL1	.169	.143	.147	.761	
GTL6	.183	.153	.175	.761	
GTL2	.201	.145	.180	.733	

Notes. N=368 *p< .05, **p< .01. GTL= Green transformational leadership, GI=Green innovation, GC= Green creativity, EP= Environmental performance

Additionally, the reliability and validity of the constructs were assessed through confirmatory factor analysis (CFA) on a proposed four-component model. The results of the CFA are summarized in Table 3, indicating satisfactory model fit indices ($\chi^2/df = 1.646$, $p < 0.001$; RMR = 0.048; GFI = 0.864; CFI = 0.964; TLI = 0.961; IFI = 0.964; NFI = 0.914; RMSEA = 0.042). All factor loadings were highly significant ($p < 0.001$), suggesting strong evidence for the hypothesized relationships between constructs. The composite reliability scores for GTL (0.898), Green Innovation (0.951), Green Creativity (0.900), and Environmental Performance (0.900) all exceeded the commonly accepted threshold of 0.70, indicating high internal consistency. Moreover, the Average Variance Extracted (AVE) values for these constructs (GTL = 0.595; Green Innovation = 0.619; Green Creativity = 0.601; Environmental Performance = 0.600) were all above the recommended level of 0.50, demonstrating adequate convergent validity. To evaluate discriminant validity, we employed Fornell and Larker's (1981) criterion, which involves comparing the square root of the AVE of each construct with the shared variances among constructs. This analysis ensures that each construct shares more variance with its indicators than with other constructs in the model, further substantiating the validity of the measurement model.

<Table 3>Results of confirmatory factor analysis

Item	Estimate β	B	S.E.	C.R.	AVE	CR
GTL6	.773	1.000			.595	.898
GTL5	.766	.985	.065	15.196		
GTL4	.796	1.011	.064	15.886		
GTL3	.784	1.019	.065	15.611		
GTL2	.746	.932	.063	14.733		
GTL1	.761	.944	.063	15.079		
EP6	.796	1.000			.600	.900
EP5	.741	.915	.060	15.132		
EP4	.744	.948	.062	15.203		
EP3	.813	1.016	.060	16.997		
EP2	.754	.942	.061	15.461		
EP1	.798	.970	.058	16.605		
GC6	.777	1.000			.601	.900
GC5	.783	1.057	.067	15.716		

GC4	.783	1.003	.064	15.725	.619	.951
GC3	.779	1.022	.065	15.621		
GC2	.750	.955	.064	14.938		
GC1	.778	1.017	.065	15.599		
GI6	.769	1.000				
GI5	.818	1.090	.064	17.101		
GI4	.777	1.024	.064	16.056		
GI3	.805	1.087	.065	16.763		
GI2	.769	.974	.061	15.845		
GI1	.776	1.019	.064	16.029		
GI7	.803	1.071	.064	16.711		
GI8	.787	.988	.061	16.299		
GI9	.783	1.037	.064	16.190		
GI10	.786	1.044	.064	16.275		
GI11	.770	.998	.063	15.860		
GI12	.794	1.036	.063	16.487		

Model fit:

CMIN/DF = 1.646, $p < 0.001$, RMR=.048, GFI=. 864, CFI= .964, TLI= .961, IFI = 0.964, NFI=.914, RMSEA= .042

Notes. N=368 * $p < .05$, ** $p < .01$. GTL= Green transformational leadership, GI=Green innovation, GC= Green creativity, EP= Environmental performance

4.2 Hypothesis Testing

Before hypothesis testing, this study conducted a correlation analysis on the primary research variables, with the results in Table 4. Involving 368 participants, this analysis explored the relationships between demographic variables (Gender, Age, Career) and key organizational constructs (GTL - GTL, Green Innovation - GI, Green Creativity - GC, and Environmental Performance - EP). The findings indicate that demographic factors exert minimal influence on the constructs oriented toward environmental sustainability. Age and Career demonstrate a significant positive relationship, suggesting career progression correlates with age. Importantly, GTL shows significant positive correlations with GI ($r = .446$, $p < .01$), GC ($r = .453$, $p < .01$), and EP ($r = .404$, $p < .01$), underscoring the crucial role of GTL in fostering organizational innovation, creativity, and environmental performance. Moreover, the strong positive correlation between GI and GC ($r = .457$, $p < .01$) and their positive associations with EP emphasize the interconnectedness of innovation and creativity in driving superior environmental outcomes.

<Table 4> Mean, Standard Deviations and Correlations

Variables	Mean	S.D.	Gender	Age	Career	GTL	GC	GI	EP
Gender	1.46	.499	1						
Age	2.16	.844	-.045	1					
Career	2.31	.950	-.026	.923**	1				
GTL	2.688	.953	.068	.025	.018	1			
GI	2.603	.947	-.015	-.027	-.039	.446**	1		
GC	2.664	.954	.058	.089	.075	.453**	.457**	1	

EP	2.648	.956	.086	.053	.045	.404**	.472**	.451**	1
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Notes. N=368 *p< .05, **p< .01. GTL= Green transformational leadership, GI=Green innovation, GC= Green creativity, EP= Environmental performance.

To test Hypotheses 1 through 5, this investigation utilized structural equation modeling (SEM) via AMOS24.0, with analytical outcomes detailed in Table 5. The SEM approach provided a robust mechanism to assess the postulated interconnections among GTL, green innovation, green creativity, and environmental performance. The empirical evidence, reflected through parameter estimates, standard errors, critical ratios, and highly significant p-values, strongly supported each hypothesis. The model's adequacy was affirmed by fit indices, including CMIN/DF = 1.725, GFI = .860, CFI = .960, TLI = .956, IFI = .960, NFI = .910, and RMSEA = .044, all indicating a satisfactory fit and underscoring the structural coherence of the proposed model. Specifically, Hypothesis 1 posited a positive impact of GTL on green innovation, substantiated by a notable estimate of .495 (S.E. = .058, C.R. = 8.551, $p < .001$). This result underscores the critical role of leadership in facilitating organizational innovation. Hypothesis 2, which proposed a positive impact of GTL on green creativity, also received strong support, as indicated by an estimate of .509 (S.E. = .059, C.R. = 8.705, $p < .001$). This finding emphasizes the significant influence of transformational leadership on encouraging creative environmental initiatives. Regarding the impact of green innovation and green creativity on environmental performance, Hypotheses 3 and 4 were both confirmed. Green innovation was associated with a substantial estimate = .297 (S.E. = .058, C.R. = 5.142, $p < .001$), and green creativity with an estimate of .267 (S.E. = .061, C.R. = 4.352, $p < .001$), indicating that both innovation and creativity have positive effects on environmental performance. Hypothesis 5 assessed the direct impact of GTL on environmental performance, revealing a significant but modest estimate of .173 (S.E. = .067, C.R. = 2.589, $p < .001$), indicating that while leadership directly influences environmental outcomes, its impact is partially mediated through innovation and creativity.

<Table 5> The results for Hypotheses 1-5

hypothesized path	Estimate	S.E.	C.R.	P
H1. GTL → Green innovation	.495	.058	8.551	***
H2. GTL → Green creativity	.509	.059	8.705	***
H3. Green innovation → Environmental performance	.297	.058	5.142	***
H4. Green creativity → Environmental performance	.267	.061	4.352	***
H5. GTL → Environmental performance	.173	.067	2.589	***
Model fit indices summary:	CMIN/DF = 1.725, $p < .01$, GFI= .860, CFI = .960, TLI = .956, IFI = .960, NFI=.910, RMSEA = .044			

Notes. N=368 ***p< .001

To test the mediating roles of green innovation (GI) and green creativity (GC) on the effect of GTL on environmental performance (EP), this study employed the three-step mediation regression method recommended by Baron and Kenny (1986). The analyses, outlined in Table 6, began with assessing the impact of GLT on both GI and GC. Findings from Model 1 showed significant positive associations between GLT and GI ($\beta = 0.450$, $t = 9.589$, $p <$

0.001) as well as GLT and GC ($\beta = 0.449$, $t = 9.634$, $p < 0.001$), meeting the initial criterion for mediation. In the second step, the direct influence of GLT on EP was examined in the absence of mediators, with Model 2 demonstrating a significant direct effect ($\beta = 0.398$, $t = 8.308$, $p < 0.001$), thus fulfilling the necessary condition for mediation analysis. The introduction of GI and GC as mediators in Model 3 highlighted their significant roles, as evidenced by GI's ($\beta = 0.295$, $t = 5.744$, $p < 0.001$) and GC's ($\beta = 0.236$, $t = 4.565$, $p < 0.001$) contributions to EP. This indicates that GLT has a significant positive impact on EP, mediated by both GI and GC. The mediation effect is further emphasized by the decrease in the direct effect coefficient of GLT on EP from 0.398 to 0.159 after incorporating the mediators. This decrease confirms the partial mediating role of GI and GC in conveying GLT's influence on EP, providing strong support for Hypotheses 6 and 7.

<Table 6> Results for regression analyses with potential mediating effects

Variables	H6			H7		
	Model 1 (GI)	Model 2 (EP)	Model 3 (EP)	Model 1 (GC)	Model 2 (EP)	Model 3 (EP)
Gender	-.048 (-1.022)	.061 (1.277)	.068 (1.558)	.031 (.671)	.061 (1.277)	.068 (1.558)
Career	-.040 (-.857)	.045 (.949)	.039 (.882)	.079 (1.698)	.045 (.949)	.039 (.882)
GLT	.450*** (9.589)	.398*** (8.308)	.159** (3.109)	.449*** (9.634)	.398*** (8.308)	.159** (3.109)
GI			.295*** (5.744)			
GC					.236*** (4.565)	
R2	.202	.168	.318	.213	.168	.318
ΔR^2	.196	.162	.309	.206	.162	.309
F statistics	30.800***	24.564***	39.722***	32.758***	24.564***	39.722***

Notes. N=368 * $p < .05$, ** $p < .01$, *** $p < .001$. GTL= Green transformational leadership, GI=Green innovation, GC= Green creativity, EP= Environmental performance.

5. Conclusion

5.1 Theoretical contribution

GTL is gaining popularity because it encourages firms to improve their environmental performance through activities like green innovation and green creativity (Dharmesti et al., 2020; Kraus et al., 2020). However, how GTL promotes green creativity and green innovation and contributes to a company's environmental performance remains to be explored. This study investigates environmental performance through the mediating mechanism of green innovation and green creativity by GTL.

The study collected feedback data from practitioners of various types of companies in the Chinese internet industry, revealing consensus among practitioners of different types of internet companies on environmental issues. Reflecting Chinese official slogans such as "Green mountains are better than gold and silver mountains," there is a well-known

own policy emphasis on green production to counteract the negative consequences of climate change. This emphasizes the significance of environmental challenges in China, a country heavily influenced by climate change (Van et al., 2023). Both citizens and businesses, especially those in the internet industry, are aware of the negative consequences of climate change. According to the management structure of the Internet industry, environmental issues are communicated between upper-level and lower-level managers. Lower-level managers' decision-making and response capabilities must be matched with the unique demands of their departments, and managers at all levels are responsible for implementing strategies that support their organization's environmental goals. The analysis of this study demonstrates that managers' responses to environmental issues are consistent, thereby enhancing the reliability of the research findings.

This study indicates that GTL influences green innovation, creativity, and environmental performance. GTL also assists in promoting green innovation and creativity by providing a clear environmental vision, motivating employees to implement green innovation and creativity, enhancing employees' commitment to achieving environmental performance goals, and encouraging employees to develop and share new green practices and ideas. These findings are consistent with the results of Li et al. (2020). The study results demonstrate that GTL inspires employees to take appropriate actions and fosters green innovation and creativity by instilling green behaviors in employees. Therefore, green transformational leaders can leverage significant opportunities to implement green initiatives effectively. Furthermore, the study confirms that green innovation and green creativity enhance environmental performance, a finding that is strongly supported by previous research (Canova & Manganelli, 2020; Elshaer et al., 2021). Green innovation and green creativity serve as a means for internet enterprises to restrict the use of polluting materials, conserve water and electricity, and introduce environmentally friendly product designs. The basic goals of green innovation and creativity are to assist internet businesses in complying with environmental rules, minimizing their environmental impact, educating staff on environmental concerns, mitigating environmental crises, and making good contributions to a green environment.

The study's findings confirm that green innovation and green creativity serve as mediators between GTL and environmental performance. Our findings suggest that online enterprises actively using GTL should prioritize green innovation and creativity in their manufacturing processes and product development strategies. Green innovation, which includes process and product innovation as well as green creativity, is critical in enabling employees to support the implementation of green initiatives and achieve superior environmental outcomes. Our findings support Asadi et al. (2020) conclude that true and sustained environmental sustainability requires a strong integration of innovation and creativity, a culture of green innovation, and enhanced environmental performance.

5.2 This study contributes to the theoretical understanding of the relationship between green transformational leadership (GTL), green innovation, green creativity, and environmental performance (EP). Our analysis reveals that GTL directly enhances green innovation, green creativity, and EP. Additionally, green innovation and green creativity mediate the relationship between GTL and EP. These findings are particularly significant for internet enterprises i

n China, which face climate change and environmental pollution challenges. Our study suggests that when employees in these enterprises are environmentally conscious, engage in discussions on environmental issues, and propose suggestions for improvement, the implementation of environmental policies and strategies, such as green innovation and creativity, is facilitated. Examples of green innovation and creativity include using materials with lower pollution, recycling materials, reducing energy consumption, and designing environmentally friendly products. These practices can improve EP by reducing harmful materials and carbon emissions while mitigating losses caused by environmental pollution. Our findings demonstrate that GTL promotes environmental policies and initiatives, resulting in enhanced EP in the internet industry. Furthermore, GTL supports and inspires staff to effectively address environmental challenges, reducing energy and resource consumption and increasing the use of biodegradable and recyclable products.

5.3 Practical contribution

This study aims to explore the relationship between green innovation, green creativity, GTL, and environmental performance and their impact on the internet industry. Our research provides several recommendations for leaders and managers to achieve green innovation and green creativity and utilize them to achieve excellent environmental performance and outperform competitors in the market.

To begin with, we argue that green innovation and green creativity are beneficial for businesses looking to improve their image among stakeholders, as demand and pressure for green practices in all processes, goods, and services grow. The research findings indicate that enterprises should prioritize and strengthen GTL behavior. GTL is crucial for acquiring, developing, and maintaining employee relationships who are the driving force behind green innovation and creativity. By supporting the company's strategies, they strengthen competitiveness against rivals through green products derived from green innovation and creativity. Therefore, we recommend that internet enterprises foster GTL by supporting environmental performance, making employees with green capabilities and enthusiasm proud, and providing them with opportunities to realize their green capabilities to aid the enterprise in conducting green innovation in processes and products, thereby maintaining competitiveness in the market.

Secondly, enterprises should invest in the management and practice of GTL, considering it as a strategic asset to guide environmental management activities. GTL should represent the company's strategic focus on environmental performance and motivate employees to engage in green innovation and creativity to minimize pollution. As a result of our research findings, we urge top management to commit to integrating the company's environmental management objectives with GTL and practices that support and sustain green processes and product innovation. Additionally, GTL requires a flat organizational structure to reinforce the demand for green innovation and creativity, thereby achieving sustained competitive advantage.

5.4 Limitations and future directions

This study has some limitations, and additional research is recommended. Because our research is limited to the Internet industry, the findings may need to be generalizable to other industries. Further study is required to broaden the existing conceptual framework to encompass companies outside the Internet industry. Furthermore, the study did not investigate the function of environmental values and beliefs in mitigating the effects of GTL. Within the existing research framework, future research should look into how employees' environmental values and beliefs influence the impact of GTL on green innovation and creativity.

Moreover, this study mainly focused on internal dynamics and their effects on the Internet sector. More research is needed to understand better how internal factors influence Internet industry environmental strategies and how to develop, implement, and sustain proactive environmental methods. Finally, this study emphasizes the importance of GTL in shaping green innovation and creativity's impact on environmental performance. As a result, future research should focus on understanding and interpreting green innovation and creativity in the Internet business for internal and external stakeholders.

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Advancing protection motivation theory through online privacy practices in China

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Abstract

In an era where public concerns over online privacy are paramount, understanding the factors that drive privacy protective behaviors is crucial for both users and relevant practitioners. The rapid advancement of technology and the increasing reliance on digital platforms have significantly transformed how individuals interact online, leading to heightened concerns about privacy protection. With the increasing value of personal information, individuals face increasing risks related to their privacy.

This study sought to elucidate the factors influencing privacy protective behaviors among Chinese online users, based on the Protection Motivation Theory (PMT). The study integrated pivotal constructs such as Perceived Privacy Concerns, Counter-Intentional Habit, Privacy Cynicism, and Implementation Intention into the PMT, expecting to construct a more comprehensive framework to understand online users' privacy protective behaviors. In the study, we also aimed to highlight the mediating effects of Perceived Privacy Concerns and Implementation Intention, and the mediating effect of Privacy Cynicism. Specifically, we anticipated to shed light on the mediating role of Implementation Intention between the relationship between (Goal) Intention and Protective Behavior, thereby bridging the well-known intention-behavior gap.

We collected data by conducting an offline survey via online platforms, targeting online users in China. A pilot test (N = 103) and a main test (N = 312) were conducted, with data collected from Chinese online users.

The analysis utilized SPSS 27.0 for Exploratory Factor Analysis (EFA) and descriptive statistics, alongside SmartPLS 4.0 for Partial Least Squares Structural Equation Modeling (PLS-SEM) involving formative first-order and second-order factors.

This study underscored the critical role of goal intention, implementation intention, and habitual behaviors in shaping protective behaviors related to online information privacy. The findings highlighted implementation intention as a powerful tool to bridge the gap between motivational goals and actual behavior, emphasizing the importance of concrete planning in promoting protective actions. Additionally, the influence of counter-intentional habits and privacy cynicism indicates that both habitual and attitudinal factors play significant roles in information privacy behaviors. Practitioners can use these insights to develop more effective strategies for enhancing online users' personal information privacy, thus contributing to robust privacy practices. This study provides a theoretical foundation for future research and practical interventions aimed at improving information privacy practices in diverse contexts.

Keywords: Protection Motivation Theory, Online Privacy Protection, China, Implementation Intention, Counter-Intentional Habit, Privacy Cynicism

1. Introduction

In the current digital era, online privacy protection has become increasingly significant for governments, organizations, businesses, and individuals. As information technologies continuously evolve, the Internet has come to dominate nearly every aspect of our daily lives. With extensive Internet usage, personal information has become a highly valuable asset. To uncover the potential value of this information, large amounts of personal data are being collected through various means. Individuals across the globe are amassing data at an escalating rate, often oblivious to the entities scrutinizing their digital footprints, amassing their data, and synthesizing this information to furnish free services and personalized advertisements (Malandrino, 2013). Consequently, individuals are more concerned than ever about protecting their personal information. Therefore, this study primarily aimed to elucidate the factors influencing online privacy protective behaviors.

The Internet lays out a fertile ground for malefactors aiming to exploit unsuspecting individuals. These perpetrators can infiltrate personal online accounts and devise customized phishing emails to extract benefits from their victims (Chou, 2013). Additionally, the inherent anonymity of the online environment frequently complicates the users' ability to distinguish authentic interactions from fraudulent ones (Bay et al., 2014). Therefore, online privacy protective behavior has emerged as a critical area of study. In this context, understanding the factors that influence online privacy protective behaviors is critical. Previous research has extensively explored various determinants of privacy behavior, yet there is a pressing need to delve deeper into multifaceted factors like psychological and habitual factors that drive individuals' decisions to protect their privacy online (Bélanger & Crossler, 2011; Smith et al., 2011).

Given the exponential growth in online interactions, understanding the mechanisms that drive individuals to protect their privacy is paramount. Despite the extensive body of research on online privacy protection, there remains several gaps to address. One major gap is the limited understanding of the mechanisms that translate privacy concerns into actual protective behaviors. It calls for additional cognitive and psychological factors that influence the process. Specifically, the role of implementation intention, which involves planning the what, when, where, and how of performing protective behaviors, has not been adequately investigated in the context of online privacy (Gollwitzer, 1999).

Another gap in the literature is the inconsistent findings regarding the impact of privacy cynicism on protective behaviors. It is believed to undermine protective behaviors, yet empirical evidence on its moderating effects is sparse and inconclusive (Hoffmann et al., 2016). Further research is needed to clarify how privacy cynicism interacts with other cognitive factors, such as counter-intentional habits, to influence privacy protection intentions and behaviors.

Despite the extensive body of literature on privacy protection, the investigation of factors influencing online privacy protective behaviors remains an area ripe for further exploration. Protective behavior is complex and requires nuanced approaches from multifaceted perspectives to uncover its challenges. Limited research examined the combined effects of perceived privacy concerns, counter-intentional habit, privacy cynicism, and implementation intention within an expanding PMT framework. Furthermore, the mediating roles of perceived privacy concerns and implementation intention, along with the moderating effect of privacy cynicism, have not been adequately explored (Li et al., 2010).

Therefore, this study aimed to address these research gaps by integrating these pivotal constructs and providing a more comprehensive understanding of the factors that influence online privacy protection, thereby offering practical insights for enhancing privacy practices.

Drawing upon PMT, this study aimed to elucidate the factors driving online privacy protective behaviors through an extensive review of existing literature and quantitative analysis. By doing so, this research sought to provide a comprehensive examination of the topic, offering valuable insights for both theoretical and practical applications. In addressing the identified research gaps, this study endeavored to shed light on the motivations underpinning users' privacy protective behaviors in the general online environment. Specifically, the study sought to enrich the PMT framework by incorporating key constructs such as Perceived Privacy Concerns, Counter-Intentional Habit, Privacy Cynicism, and Implementation Intention. The primary objectives of this research are as follows.

Through the investigation, the study aimed to elucidate the factors influencing online privacy protective behaviors in China; to expand the application of protection motivation theory in the context of online privacy protection; to identify the roles of new constructs (e.g., Perceived Privacy Concerns, Counter-Intentional Habit, Privacy Cynicism, Implementation Intention) that were integrated into the PMT framework.

Specifically, to achieve the above research objectives, the study planned to address the following research questions:

First, what factors influence online users' Privacy Protective Behaviors in China?

Second, what role does Counter-Intentional Habit play in the framework?

Third, how do Perceived Privacy Concerns mediate the relationship between Perceived Threats and (Goal) Intention?

Fourth, how does Implementation Intention mediate the relationship between (Goal) Intention and Privacy Protective Behavior?

Fifth, how does Privacy Cynicism moderate the relationships between Counter-Intentional Habit and (Goal) Intention, Implementation Intention, and Privacy Protective Behavior, respectively?

2. Literature Review

2.1 Privacy protective behaviors

Privacy has emerged as a pivotal area of academic inquiry, bifurcating into two principal research streams: information disclosing/sharing behaviors and privacy protection/management behaviors. The discourse on information disclosure has been predominantly framed within the realms of e-commerce and self-disclosure technologies, such as blogs, microblogs, instant messaging, and social media platforms (Lowry et al., 2011; Sun et al., 2015). With the ascent of social media as central conduits for communication and interaction, the dynamics of information disclosure on these platforms have garnered significant scholarly attention. The copious volumes of data generated, shared, and stored on social media daily have ignited concerns about potential adverse outcomes stemming from unrestricted disclosure.

Privacy violations and information security issues have spotlighted privacy-protective behaviors, particularly within social media contexts. Platforms like Facebook enable users to control their information disclosure levels and employ privacy settings for protection (Strater & Lipford, 2008). Initial studies in this domain, such as the work by Gross & Acquisti (2005), revealed a general hesitancy among users to alter platform-default privacy settings. Subsequent research by Acquisti & Gross (2006) delved into the discrepancy between users' privacy attitudes and their actual data sharing practices, alongside their understanding of Facebook's privacy tools (Boyd & Hargittai, 2010).

Further investigations have explored the utilization of privacy settings (Krishnamurthy & Wills, 2008), factors influencing privacy preferences (Debatin et al., 2009; Madejski et al., 2011, 2012; Netter et al., 2013; Wisniewski et al., 2017), and the impact of individual and social characteristics on privacy behaviors (Spottwood & Hancock, 2017; Tifferet, 2019; Xie & Kang, 2015). Additionally, studies have examined the various factors driving social media users' privacy-related actions (Brandtzæg et al., 2010; Li et al., 2020), highlighting a pervasive tension between the desire to share and the need to protect personal information. Despite widespread declarations of privacy as a paramount concern, actual user behavior often contradicts such assertions, with many willingly trading private information for rewards despite acknowledging potential risks (Barth & De Jong, 2017; Ginosar & Ariel, 2017).

The increasing use of the Internet and digital technologies has significantly transformed how individuals interact,

communicate, and manage personal information. With these advancements, concerns about online privacy have escalated, prompting researchers to investigate the factors influencing online privacy protective behavior. In this section, the study aims to comprehensively examine the key factors that influence online privacy protective behavior, drawing on a wide array of academic sources to provide a thorough understanding of the topic.

The concept of privacy has been a focal point of human concern well before the advent of the Internet, with the rapid advancements in information technology amplifying these apprehensions. The burgeoning capabilities of modern computing to collect, manipulate, and disseminate vast quantities of data have given rise to a thriving market for personal information. This emerging market presents both opportunities and challenges, as the commodification of personal information raises pivotal questions about the ethical boundaries and legal constraints surrounding the trade in private information (Schwartz, 2004; Such et al., 2014).

Online privacy protective behavior refers to the actions and strategies individuals employ to safeguard their personal information from unauthorized access and misuse in digital environments (Dienlin & Metzger, 2013). These behaviors can include the use of privacy settings, encryption tools, cautious sharing practices, and other proactive measures (Youn, 2009). Understanding the factors that drive such behaviors is crucial for developing effective interventions to enhance online privacy.

Accumulated studies have engaged in examining factors influencing privacy protective behaviors. Perceived risk is a critical determinant, with higher perceived risks associated with more protective behaviors (Dinev et al., 2006). Conversely, trust in online platforms and service providers can mitigate perceived risks and reduce the likelihood of engaging in protective behaviors (Beldad et al., 2011). Privacy concerns reflect the degree to which individuals are worried about their personal information being misused (Smith et al., 1996). Numerous studies have found a positive relationship between privacy concerns and privacy protective behaviors, suggesting that heightened concerns drive individuals to adopt more protective measures (Malhotra et al., 2004; Xu et al., 2008). In addition, demographic factors such as age, gender, and education level can influence privacy protective behaviors. For instance, younger individuals and those with higher education levels are generally more likely to engage in protective behaviors (Kumaraguru & Cranor, 2005; Park, 2011). Personality traits, such as conscientiousness and risk aversion, also play a significant role in shaping privacy behaviors (Jia et al., 2017).

Technological literacy, including knowledge of privacy tools and understanding of online threats, is crucial for the protection of privacy. Individuals with higher levels of technological awareness are more likely to employ effective privacy protection strategies (Bartsch & Dienlin, 2016). Legal regulations and social influences can also impact privacy protection. Regulatory frameworks like the General Data Protection Regulation (GDPR) enhance individuals' control over their personal data, thereby encouraging protective behaviors (Regulation (EU) 2016/679). Social influences, including peer behaviors and cultural norms, can either reinforce or undermine privacy protective practices (Zhou, 2011).

However, the discourse surrounding privacy, especially when juxtaposed against the tangible actions and attitudes of individuals and society at large, reveals a complex and often contradictory landscape. The transition from physical to information privacy, and the seamless integration of concepts from the former to the latter,

underscores a broadening understanding of what privacy entails in the digital age. Yet, as nomological models become more tailored to the nuances of information privacy, a tension emerges between the theoretical valuing of privacy and the practical behaviors observed in society.

Franzen (2011) highlights a critical disconnect between the public's expressed concerns for privacy and their actual behaviors, which often contradicts these concerns. This paradox is further compounded by Eric Goldman and Calvin Gotlieb's insights on the divergence between stated privacy concerns and observable actions, suggesting a gap between ideology and practice, which calls for more approaches from the perspective of individuals' irrational behaviors regarding their privacy.

Having reviewed the current literature on information privacy, especially on information protection, the study observed that most studies focus predominantly on intentions than actual behaviors. This emphasis on intentions can lead to a gap in understanding how intentions translate into real-world actions. Additionally, numerous studies adopt a single-dimensional perspective, concentrating on specific factors like privacy concerns or regulatory measures without considering the broader, multi-faceted context of privacy behaviors. These limitations underscore the need for research that comprehensively examines actual behaviors and integrates multiple dimensions to provide a holistic understanding of privacy management.

2.2 Protection motivation theory

As the theoretical foundation of the current study, PMT has been widely used in various disciplines such as health psychology (e.g., Ge et al., 2022; Milne et al., 2002), environmental psychology (e.g., Dup  y & Smith, 2018; Kothe et al., 2019), cognitive neuroscience (e.g., Bottemanne & Friston, 2021; Friston, 2010), and cybersecurity (e.g., Almansoori et al., 2023; Tsai et al., 2016). Based on expectancy-value theory, the PMT was initially developed in the context of health psychology to understand the effects of fear appeals on health-related attitude and behavior, i.e., emphasizing the impact of persuasive communications on behavior change (Rogers, 1975). It was later revised to integrate reward and self-efficacy components (Maddux & Rogers, 1983; Rogers, 1983), shifting the focus from fear to a more comprehensive cognitive appraisal process including both threat appraisal and coping appraisal. More importantly, the revised theory provided strong support for the positive effects of self-efficacy on intentions to adopt preventive health behavior.

The PMT consists of several core components to understand how individuals respond to threats and adopt protective behaviors. The revised PMT (1983) posits that environmental or intra-personal sources of information about a health threat initiates two cognitive processes, threat appraisal and coping appraisal. The threat appraisal process evaluates the factors that increase or decrease the probability of making the maladaptive response. It includes two primary components: perceived severity and perceived vulnerability. Perceived severity refers to the individual's belief about the seriousness of the potential threat or harm (Rogers, 1975). Higher perceived severity increases the likelihood of adopting protective behaviors. While perceived vulnerability is the individual's assessment of their personal risk of experiencing the threat (Floyd et al. 2000). Higher perceived vulnerability enhances the motivation to engage in protective actions.

The maladaptive action can be a behavior that could be enacted, such as beginning to smoke, or it could be a current behavior such as not wearing a seat belt. Intrinsic rewards (e.g., bodily pleasure) and extrinsic rewards (e.g., social approval) can increase the likelihood of the maladaptive response. Assessed severity of the threat and perceived vulnerability to the threat can reduce the probability of the maladaptive response. Fear arousal influences perceived severity but has only an indirect effect on the eventual behavior enacted. The total threat appraisal is a sum of the variables that increase and decrease the maladaptive behavior likelihood.

In addition, individuals also make coping appraisals. It includes three core components: response efficacy, self-efficacy, and response costs. Response efficacy refers to the belief that the recommended protective behavior will effectively prevent or mitigate the threat (Milne et al., 2005). Higher response efficacy increases the likelihood of adopting the protective behavior. Self-efficacy is the individual's confidence in their ability to successfully perform the recommended protective behavior (Maddux & Rogers, 1983). Higher self-efficacy enhances the likelihood of engaging in the behavior. Whereas response costs are the perceived barriers or costs associated with performing the protective behavior, such as time, effort, financial cost, or social disapproval (Rogers, 1975). Lower perceived response costs increase the likelihood of adopting the behavior.

Coping appraisal process focuses on the coping responses available to the individual to deal with the threat and factors that increase or decrease the probability of an adaptive response, such as following behavioral advice. Both the belief that the recommended behavior will be effective in reducing the threat (i.e., response efficacy) and the belief that one is capable of performing the recommended behavior (i.e., self-efficacy) increase the probability of an adaptive response. For example, smokers may consider the extent to which quitting smoking would reduce their chances of developing lung cancer in the future and whether they are capable of doing so.

While perceptions of response efficacy and self-efficacy serve to increase the probability of an adaptive response, there may be a number of response costs or barriers (e.g., availability of resources) that inhibit performance of the adaptive behavior. For example, smokers may believe that quitting smoking may lead to increased craving. Protection motivation (i.e., intention to perform a recommended behavior) results from the two appraisal processes and is a positive function of perceptions of severity, vulnerability, response efficacy and self-efficacy, and a negative function of perceptions of the rewards associated with maladaptive responses and the response costs of the adaptive behavior. For protection motivation to be elicited, perceptions of severity and vulnerability should outweigh the rewards associated with maladaptive responses. In addition, perceptions of response efficacy and self-efficacy should outweigh the response costs of the adaptive behavior.

In summary, the assumption of PMT is that protection motivation is maximized under the condition that the threat to health is severe, the individual feels vulnerable, the adaptive response is believed to be an effective means for averting the threat, the individual is confident in his or her abilities to complete successfully the adaptive response, the rewards associated with the maladaptive behavior are small, and the costs associated with the adaptive response are small.

The development and evolution of Protection Motivation Theory (PMT) can be traced through various key milestones that have shaped its application and theoretical underpinnings over the years. Initially formulated by

Rogers in 1975, PMT aimed to elucidate the impact of fear appeals on health attitudes and behaviors, concentrating on the dual aspects of threat and coping appraisal (Rogers, 1975). This foundational work set the stage for the theory's role in understanding how individuals respond to perceived threats by assessing their ability to cope with and mitigate these threats.

In 1983, the theory was significantly revised by incorporating the concept of self-efficacy. This revision highlighted the importance of an individual's belief in their capacity to execute the recommended behavior, thereby enhancing the explanatory power of PMT in predicting health-related actions (Maddux & Rogers, 1983).

By 1986, Prentice-Dunn and Rogers had extended PMT beyond the confines of the Health Belief Model, emphasizing its applicability in broader preventive health contexts. This expansion underscored the versatility of PMT in addressing various health behaviors (Prentice-Dunn & Rogers, 1986). They recognized the increasing importance of social psychological factors' roles in theoretical models of preventive health behavior and compared the PMT (revised version in 1983) and Health Belief Model (HBM), two of the most extensively applied frameworks. The HBM, originated from 1950s, was then formally formulated by Rosenstock (1974) to understand the acceptance of preventive practices. The model consists of four components: perceived susceptibility, perceived severity, perceived benefits, and perceived barriers. The theory posits that the susceptibility together with severity mobilize the individuals to act, whereas the cost-benefit analysis of perceived benefits minus assess costs provides the individual with a preferred course of action (Prentice-Dunn & Rogers, 1986).

The role of risk perception within PMT was brought to the forefront in 1997 by Boer and Seydel. Their integration of risk perception into the theory underscored its significance in health-related decision-making processes, thus refining the model's predictive capabilities (Boer & Seydel, 1997).

Empirical validation came in 2000 through the work of Floyd, Prentice-Dunn, and Rogers, who conducted a meta-analysis to provide robust empirical support for PMT. Their findings affirmed the theory's predictive validity across diverse domains, solidifying its standing in the field (Floyd et al., 2000).

The application of PMT to physical activity promotion was explored in 2000 by Milne, Sheeran, and Orbell. Their research highlighted the crucial roles of response efficacy and self-efficacy in encouraging physical activity, thereby broadening the theory's application scope (Milne et al., 2000).

In 2009, Witte and Allen developed the Extended Parallel Process Model (EPPM), which integrated PMT with fear control processes. This extension addressed how individuals respond to fear appeals based on their efficacy and threat appraisals, thereby offering a more comprehensive framework for understanding responses to fear-based messages (Witte & Allen, 2009).

The application of PMT within the realm of information systems (IS) security was pioneered by Anderson and Agarwal in 2010. They extended the theory to focus on user intentions to perform security-related behaviors, marking a significant shift in PMT's application from health behaviors to digital security (Anderson & Agarwal, 2010).

Boss et al. (2015) further highlighted the necessity of fear appeals in PMT-based IS security models. Their work

underscored the critical role of fear appeals in motivating users to adopt security measures, thereby enhancing the practical application of PMT in cybersecurity contexts (Boss et al., 2015).

The examination of social influence within PMT was undertaken by Rippetoe and Rogers in 2014. They explored how social influence could enhance the predictive power of PMT for health behaviors, thereby integrating a social dimension into the theory (Rippetoe & Rogers, 2014).

In 2019, Kothe et al. applied PMT to pro-environmental behaviors, identifying gaps in the consistent operationalization and comprehensive measurement of the theory. Their work highlighted the challenges and opportunities in extending PMT to environmental contexts (Kothe et al., 2019).

Chen et al. (2022) extended PMT to e-waste management focused on perceived threat and response efficacy in handling e-waste. Their research emphasized the relevance of PMT in addressing environmental issues related to electronic waste (Chen et al., 2022).

Most recently, in 2022, the PMT was refined with a meta-analytic structural equation modeling (SEM) approach. Their work addressed inconsistencies in the theory and explored cultural and context-specific moderators, providing a nuanced understanding of PMT's applicability across different settings (Mou et al., 2022).

In recent years, PMT has been extended to the field of information systems (IS), providing a robust framework for understanding and influencing user behavior in the context of digital security. The application of PMT in IS security focuses on how users perceive and respond to threats such as cyber-attacks and data breaches. By leveraging the components of PMT, such as threat appraisal (severity and vulnerability) and coping appraisal (response efficacy and self-efficacy), IS security professionals can design more effective interventions to promote secure behaviors and mitigate risks in the digital environment.

Anderson & Agarwal (2010) conducted an empirical study to explore the factors influencing individuals' intentions to perform security-related behaviors. They utilized PMT constructs such as perceived threat severity, perceived threat vulnerability, response efficacy, and self-efficacy, while also considering psychological ownership and social norms. Their multi-method approach, which included surveys and laboratory experiments analyzed using Structural Equation Modeling (SEM), revealed significant insights into security behaviors. However, their study was limited by its focus on specific contexts and the use of cross-sectional data, which restricted the ability to infer causality.

Chenoweth et al. (2009) examined the application of PMT to the behavioral intention to use anti-spyware software. Their empirical study, presented as a conference paper, considered variables such as perceived vulnerability, perceived severity, response efficacy, self-efficacy, response cost, and maladaptive coping. Using surveys and SEM, the study provided valuable findings but was limited by its narrow focus on anti-spyware software and potential response bias due to self-reported data. Liang & Xue (2009) offered a theoretical perspective by developing the Technology Threat Avoidance Theory (TTAT), which builds on PMT. Their journal paper synthesized literature to discuss how perceived susceptibility, perceived severity, perceived effectiveness, perceived costs, and self-efficacy drive avoidance motivation and coping strategies. While their theoretical development advanced the understanding of threat avoidance in information systems, the lack of empirical

validation was a notable limitation, highlighting the need for practical applicability studies.

Johnston & Warkentin (2010) conducted an empirical study to investigate how fear appeals and PMT constructs influence behavioral intentions to comply with security recommendations. Their research included perceived threat severity, perceived threat susceptibility, response efficacy, self-efficacy, and social influence as independent variables. The study employed surveys and laboratory experiments analyzed with SEM, contributing valuable insights into compliance behaviors. However, the reliance on self-reported intentions and the experimental nature of the study limited the generalizability of the findings.

Chen et al. (2022) extended PMT to the context of e-waste management in their empirical study. They examined how perceived threat severity, perceived threat vulnerability, self-efficacy, and optimism bias influence intentions to protect information on e-waste. Using surveys and SEM, their research highlighted the importance of these factors in motivating protective behaviors. Despite the significant contributions, the study's focus on e-waste management and potential optimism bias as a moderator limited the broader applicability of the findings.

Boss et al. (2015) investigated the role of fear appeals in motivating security intentions and behaviors. Their longitudinal study, which combined data on backups and anti-malware software, considered fear appeals, perceived threat severity, perceived threat vulnerability, response efficacy, self-efficacy, response cost, and maladaptive rewards. Using SEM, their findings emphasized the importance of fear in shaping security behaviors. However, the study's reliance on self-reported data and the specific focus on certain security practices limited its generalizability.

All of the above studies collectively highlighted the versatility of PMT in understanding and predicting security-related behaviors in the field of information systems. However, there remain several limitations for further refinement and expansion of the theory to enhance its applicability and robustness.

To start with, many PMT applied studies in IS are frequently limited to specific contexts, which limits the generalizability of findings. For instance, many studies focus on particular areas such as healthcare security (Anderson & Agarwal, 2010), anti-spyware software (Chenoweth et al., 2009), or e-waste management (Chen et al., 2022). These context-specific applications restrict the broader applicability of PMT across diverse IS security scenarios, suggesting the need for research across varied contexts to improve generalizability. Therefore, this study aimed to expand and validate PMT in a broader context, i.e., the general online environment to improve its applicability.

Then, one of the primary critiques of PMT is about its overemphasis on rationality. PMT is grounded in the rational decision-making process, assuming that individuals weigh the costs and benefits of behaviors logically. This approach overlooks the role of irrational factors and emotional responses that can significantly influence behavior. People often act based on emotions, habits, or social influences rather than purely rational calculations (Marikyan & Papagiannidis, 2023; Yu et al., 2022). For instance, during emergencies, people may not always make the most rational decisions, such as failing to evacuate despite clear warnings of impending danger. Thus, this study integrated irrational factors such as Counter-Intentional Habit into the PMT framework to formulate a more comprehensive perspective for understanding individuals' behaviors.

In addition, most applications of PMT simply consider the effects of PMT variables on protection motivation, not the behavior itself. Protection motivation, seen as an intervening variable, has been measured in different ways. However, PMT assumes that the most appropriate way to assess protection motivation is by behavioral intentions which is seen to direct and sustain protective behavior. The problem is accumulated evidence suggests that the behavioral intention is not a completely satisfactory substitute for actual behaviors (e.g., Sheeran & Webb, 2016; Webb & Sheeran, 2006). For instance, Sheeran & Webb (2016) found that changes in intention lead to only modest changes in behavior, highlighting an intention-behavior gap. Additionally, a meta-analysis by Webb & Sheeran (2006) showed that while intentions account for 28% of the variance in behavior, other factors like environmental constraints and habit strength often impede the translation of intentions into actions (Fishman et al., 2020). These findings underscore the complexity of explaining and predicting behavior solely based on intention. To address the limitation, this study sought to assess the online users' privacy protective behavior and incorporate interventional variable such as Implementation Intention to bridge the gap between behavioral intention and behavior.

Furthermore, another primary critique of PMT is that it lacks consideration of moderators and mediators. While some studies have explored the roles of moderators and mediators in the relationships between PMT constructs and security behaviors, this area remains underdeveloped. For example, Boss et al. (2015) examined fear as a moderator, and Chen et al. (2022) considered optimism bias. However, more comprehensive examinations of additional moderators and mediators are needed to understand the complex interplay of factors influencing protective behaviors. Driven by the limitation, this study attempted to highlight the mediating roles of Perceived Privacy Concerns and Implementation Intentions, as well as the moderating role of Privacy Cynicism in the PMT framework. By identifying these additional effects can provide deeper insights into the mechanisms driving users' online privacy protective behaviors.

2.2 Expanding PMT by incorporating perceived privacy concerns, counter-intentional habit, privacy cynicism, and implementation intention

2.2.1 Perceived privacy concerns

To begin with, privacy concerns have consistently been recognized as a pivotal concept for measuring privacy in the field of privacy literature. Extensive research has confirmed that individuals' concerns about privacy significantly influence their privacy-related beliefs and behaviors. Numerous studies have demonstrated that privacy concerns play a crucial role in shaping how individuals perceive and respond to privacy issues (Smith, Dinev, & Xu, 2011). Although privacy concerns have been defined in various ways across numerous studies, it consistently encompasses the apprehension about losing control over one's personal information. This commonality underscores the importance of perceived control in the conceptualization of privacy concerns (Solove, 2006).

Integrating perceived privacy concerns into the PMT framework is crucial for several reasons. This integration can provide a more comprehensive understanding of online privacy protective behaviors, especially in the context

of rapidly evolving digital environments. Perceived privacy concerns significantly influence individuals' intention to engage in protective behaviors online. Traditional PMT focuses on factors such as perceived severity, perceived vulnerability, response efficacy, and self-efficacy. However, by incorporating perceived privacy concerns, the model can more accurately predict online privacy behaviors. Perceived privacy concerns encompass users' worries about data misuse, surveillance, and potential identity theft, which are increasingly relevant in today's digital age (Li, 2011; Dinev & Hart, 2006).

The digital landscape has transformed considerably, with frequent and severe data breaches elevating concerns about personal information privacy (Smith, Dinev, & Xu, 2011). Integrating perceived privacy concerns into PMT allows the model to address contemporary privacy issues more effectively. For instance, empirical studies have shown that privacy concerns drive users to adopt stricter privacy settings and use privacy-enhancing technologies (Bansal, Zahedi, & Gefen, 2010; Krasnova et al., 2010). While PMT traditionally explains the cognitive processes leading to protective intentions, perceived privacy concerns can elucidate why users sometimes fail to act on these intentions (Li, Sarathy, & Xu, 2010). Malhotra et al. (2004) found that privacy concerns significantly decrease users' intention to disclose personal information online. Similarly, Tsai et al. (2011) demonstrated that heightened privacy concerns lead to the adoption of privacy protection measures.

Incorporating perceived privacy concerns into PMT not only enhances its predictive power but also makes it more relevant to contemporary digital privacy issues. This integration is supported by substantial empirical evidence, highlighting its necessity for a holistic understanding of online privacy protective behaviors.

2.2.2 Implementation intention

Then, the study also integrated implementation intention into the PMT framework. The traditional attitude-intention-behavior progression, fundamental to models like PMT, serves as a cornerstone for research aimed at understanding and predicting behaviors. Yet, this linear progression faces criticism due to observed discrepancies, notably the attitude-intention gap and the intention-behavior gap, which challenge the direct and predictable flow from attitude to behavior through intention (Grimmer & Miles, 2017). While numerous studies in the realm of information privacy have examined the link between attitude and intention, presupposing that intentions are accurate predictors of actual behaviors (e.g., Hsieh & Lee, 2020; Wall & Warkentin, 2019; Yang et al., 2020), evidence suggests a complex reality. Indeed, behavioral intentions often fail to materialize into corresponding actions, underscoring a significant challenge in translating intentions into behaviors. Meta-analyses indicate that although these models can explain variations in intentions well, the predictive power of intentions for actual behaviors remains weak (Papies, 2017). This discrepancy calls into question the reliability of the attitude-intention-behavior relationship and highlights the need for a reevaluation of the potential dichotomy within this relationship.

In socio-psychological discourse, the concept of intention is nuanced, encompassing both goal intentions and implementation intentions as delineated by Bagozzi and Dholakia (2003). Goal intentions articulate a commitment to achieving a certain behavior ("I intend to achieve behavior X"), but they fall short of ensuring behavioral realization. On the contrary, implementation intentions specify the context of behavior ("I intend to

perform behavior X when situation Y arises"), thus detailing the circumstances under which the behavior will be executed, including when, where, and how (Gollwitzer, 1993; Van Gelderen et al., 2018). This distinction is crucial for understanding the dynamics of behavior execution.

Meta-analyses reveal that widely used models such as the Theory of Planned Behavior (TPB) are more effective at explaining intentions than actual behaviors (Acikgoz & Sumer, 2019; Gollwitzer & Sheeran, 2006; Van Gelderen et al., 2018). The gap, as Sheeran (2002) points out, often results from an individual's failure to translate intentions into actions. The introduction of implementation intentions by researchers such as Gollwitzer & Schaal (1998) aims to close this gap, demonstrating that the formation of implementation intentions substantially increases the likelihood of behavior execution among those with strong goal intentions.

Subsequent studies, including those by Gollwitzer (2014) and Bieleke et al. (2018), have underscored the efficacy of implementation intentions in achieving goals across various domains, from health and environmental behaviors to diet and purchasing decisions. Yet, the application of implementation intentions in the field of information privacy remains underexplored. This gap presents an opportunity for further research, particularly in investigating the mediating role of implementation intentions in the relationship between intention and behavior within the realm of online privacy protection. By doing so, this study seeks to enhance the understanding of how specific planning regarding the execution of privacy protective behaviors can improve the alignment between individuals' privacy intentions and their actual online behaviors.

2.2.3 Counter-intentional habit

We also incorporated Counter-Intentional Habit into the PMT framework. The dual process theory posits the coexistence of two distinct systems of thinking: a rapid, automatic, associative, and emotionally charged System 1, and a slower, more deliberate, and analytical System 2. This dichotomy is variously described in the literature as intuitive vs. deliberative thinking, associative vs. rule-based reasoning, or fast vs. slow thinking. System 1 operates effortlessly, drawing on experiences and associations, and is often influenced by affective processes. In contrast, System 2 requires significant cognitive effort and is characterized by abstract rule manipulation and symbolic processing.

In the landscape of dual-process models, habits are primarily managed by a swift, automatic processing system, characterized by associations formed through repeated experiences. This contrasts sharply with the more deliberate, conscious processing system that leans on a finite working memory capacity. Various dual-process frameworks suggest a division between two semi-independent systems, offering nuanced views on the nature of automatic versus deliberative processes. Key frameworks include System 1, as proposed by Kahneman (2003), the impulsive system outlined by Strack & Deutsch (2004), and the reflexive system discussed by Lieberman et al. (2002), all of which encompass habits, aspects of automaticity, and reliance on heuristic judgment as part of their lower-effort processes.

The dual process theory provides a framework for understanding the inconsistencies in privacy behavior. Fast thinking may lead individuals to overlook privacy concerns due to its reliance on intuition and immediate rewards,

whereas slow thinking, which is more deliberate and considers future consequences, is often underutilized in privacy decision-making. This theoretical perspective sheds light on the complex interplay between emotional and cognitive processes in shaping privacy-related behaviors, highlighting the need for strategies that enhance individuals' awareness and use of slow thinking in navigating privacy decisions.

Fast thinking operates under "cognitive ease," as described by Kahneman (2011), allowing individuals to effortlessly process information and make decisions within familiar or straightforward contexts. In such scenarios, the mind relies on associative and domain-specific principles, bypassing the need for the more laborious slow thinking processes. This form of thinking is characterized by spontaneity and ease, where decisions are made with minimal mental strain. On the other hand, slow thinking demands considerable mental effort, evident in biological markers like pupil dilation—a finding reported by Kahneman & Beatty (1966) and reiterated by Kahneman (2011). This effortful mode of cognition is typically enlisted during tasks that require focused attention and deliberate thought, contrasting sharply with the intuitive ease of fast thinking.

Habit elucidates how actions often transpire not from deliberate decision-making but from routines ingrained through repetition. This perspective is particularly insightful when considering eating behaviors, highlighting how they become entrenched in daily lives through consistent repetition in specific contexts. For instance, research by Wansink & Cheney (2005) demonstrates that individuals tend to consume roughly 91% of the food on their plates, regardless of the plate's size. This indicates that the act of clearing one's plate persists irrespective of the actual quantity of food served, underscoring the power of habitual behavior over conscious choice.

Further evidence of habit's stronghold on behavior comes from a study by Neal, Wood, Wu, & Kurlander (2011), which found that habitual popcorn eaters at movie theaters consumed similar amounts of popcorn whether it was fresh or stale. Despite recognizing and disliking the poor quality of stale popcorn, these individuals' consumption patterns remained unchanged, showing how entrenched habits can override sensory cues like taste.

Habits, therefore, emerge from the frequent repetition of behavior within specific contexts, leading to the formation of strong associations between the behavior and contextual cues (e.g., seeing food on a plate or popcorn in a bag). Once established, these habits can trigger automatic responses to these cues, propelling behavior with little to no regard for the conscious evaluation of the action's consequences. This mechanism underlines the importance of situational cues in habit formation and sustenance, suggesting that altering these cues could be a strategic approach to modifying habitual behaviors, especially those related to health and wellbeing.

Notably, despite the profound impact of habits on behavior, they often go unrecognized as a distinct mechanism of action control within dual-process models and are somewhat overlooked in the broader field of social psychology. The omission of habit from significant resources, such as Fiske, Gilbert, and Lindzey's (2009) *Handbook of Social Psychology*, points to a gap in the academic treatment of this concept. Therefore, we included counter-intentional habit into the PMT framework to have a more nuanced understanding of online privacy protective behaviors.

2.2.4 Privacy cynicism

Privacy cynicism can be seen as a form of resigned acceptance, where individuals acknowledge the potential risks to their privacy online but choose to engage with digital services despite these risks. This mindset suggests that users might view the efforts required to protect their privacy as either ineffective or too burdensome relative to the perceived benefits of online engagement. Hence, privacy cynicism emerges as a pragmatic adaptation to the complexities of managing privacy in the digital age, allowing users to navigate online spaces without the constant burden of privacy concerns.

The findings of Dienlin & Metzger (2016), indicating that Facebook self-efficacy correlates with higher self-withdrawal from the platform, highlight an interesting dynamic. Users with higher internet skills or literacy, who are more capable of understanding and managing their online privacy, may choose to engage in avoidance strategies as a form of privacy protection. This behavior underscores the idea that more knowledgeable users might be more aware of the potential for privacy breaches and, thus, more inclined to reduce their exposure by limiting their online activities.

Similarly, Hoffmann et al. (2016) position privacy cynicism as a cognitive coping mechanism, a way for individuals to reconcile their desire to participate in online services with their concerns about privacy. By adopting a cynical attitude towards privacy protection, users permit themselves to enjoy the benefits of online transactions and social interactions without the constant anxiety over potential privacy violations. This coping mechanism allows for a continued engagement with digital services, albeit with a nuanced understanding of the trade-offs involved.

Integrating privacy cynicism into the PMT framework as a moderating variable can significantly enhance the understanding of online privacy protective behaviors. Privacy cynicism reflects a skeptical attitude towards the effectiveness of privacy protection measures and the intentions of organizations handling personal data. This integration is supported by several theoretical and empirical findings.

Counter-intentional habits, such as engaging in risky online behaviors despite knowing the potential risks, can undermine privacy protective intentions and behaviors. Privacy cynicism can moderate the impact of these habits by influencing how individuals perceive and react to privacy risks. Individuals with high privacy cynicism may exhibit stronger counter-intentional habits, thereby reducing their motivation to engage in protective behaviors (Hoffmann et al., 2016).

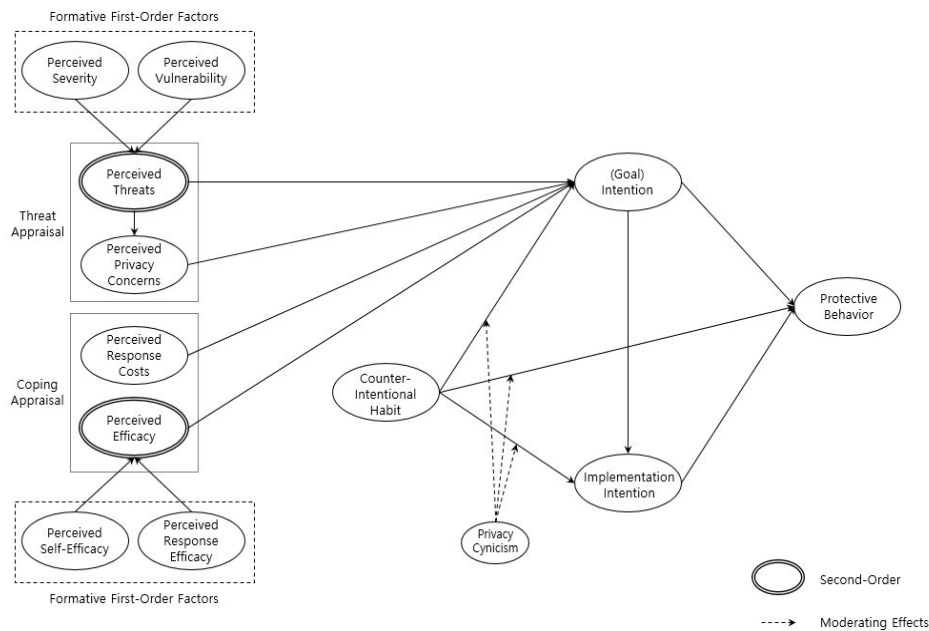
Privacy cynicism can also help explain the discrepancy between privacy-related intentions and actual behaviors. Individuals who are cynical about privacy protection may form intentions to protect their privacy but fail to follow through due to a belief that their efforts are futile. This cynicism can weaken the relationship between goal intention and protective behavior (Choi et al., 2018). Empirical studies have demonstrated the moderating role of privacy cynicism in the context of online privacy. For instance, research has shown that privacy cynicism can diminish the effectiveness of privacy protection strategies by fostering a sense of helplessness and reducing proactive privacy behaviors (Hargittai & Marwick, 2016). Additionally, users with high levels of privacy cynicism are less likely to believe in the efficacy of privacy tools and measures, further weakening the relationship between privacy concerns and protective behaviors (Zafeiropoulou, Millard, & Lupu, 2013).

Incorporating privacy cynicism into PMT not only provides a deeper understanding of the psychological factors influencing privacy behaviors but also enhances the model's applicability in contemporary digital environments. This integration is critical for developing more effective privacy protection strategies.

3. Research Model and Hypotheses

3.1 Research model

After identifying gaps in the literature, the study developed a comprehensive framework (referenced in Figure 1) to explore the factors that influence online privacy protective behaviors. Synthesized insights from PMT, the model encompasses first-order factors such as Perceived Severity, Perceived Vulnerability, Perceived Self-Efficacy, Perceived Response Efficacy, Perceived Privacy Concerns, Perceived Response Costs, Privacy Cynicism, Counter-Intentional Habit, (Goal) Intention, Implementation Intention, and Protective Behavior. Furthermore, the study delineated second-order factors: Perceived Threats, constituted by Perceived Severity and Perceived Vulnerability, and Perceived Efficacy, constructed from Perceived Self-Efficacy and Perceived Response Efficacy. This comprehensive framework aims to provide a deeper understanding of the dynamics



influencing individuals' engagement in online privacy protection measures.

<Figure 1> Research Model

As noted previously, the study set Perceived Threats of threat appraisal and Perceived Efficacy of coping appraisal as second-order factors influencing users' (Goal) Intention to protect their online privacy. Based on the work of Rogers (1975, 1983), threat appraisal consists of perceived severity and perceived vulnerability, while coping appraisal includes self-efficacy and response efficacy. To evaluate threats, both the probability of occurrence (Perceived Vulnerability) and the severity of the consequences (Perceived Severity) must be considered. Even if the probability of a threat occurring is low, the threat should be rated high if its occurrence

would result in severe consequences. Conversely, a high probability of a threat with minor consequences would result in a lower threat rating (Versprite, 2023). Numerous studies in the field of information systems, based on PMT, have empirically confirmed that threat appraisal is determined by perceived severity and perceived vulnerability, ultimately influencing behavioral changes (Chenoweth et al., 2009; Workman et al., 2009; Johnston & Warkentin, 2010; Liang & Xue, 2010; Ifinedo, 2012).

Next, coping appraisal involves assessing one's capability to avert potential losses from perceived threats, which is critical in determining whether an individual will engage in protective behaviors. Numerous studies based on PMT have empirically validated that coping appraisal is founded on response efficacy and self-efficacy, which ultimately lead to behavioral changes (Chenoweth et al., 2009; Workman et al., 2009; Johnston & Warkentin, 2010; Liang & Xue, 2010; Ifinedo, 2012). Empirical studies in the information systems domain have demonstrated that high levels of response efficacy and self-efficacy are associated with increased likelihood of adopting protective behaviors. For instance, Chenoweth et al. (2009) found that individuals who believe in the effectiveness of security measures and their ability to implement them are more likely to take protective actions. Similarly, Johnston & Warkentin (2010) showed that fear appeals in information security are effective when individuals perceive both the threat and their capability to counteract it.

As illustrated in the proposed research model, the study aimed to investigate the mediating roles of Perceived Privacy Concerns and Implementation Intention and the moderating role of Privacy Cynicism. Specifically, the mediating effect of Perceived Privacy Concerns was examined in the relationship between Perceived Threats and (Goal) Intention to protect online privacy. Adjusted to research context, the study defined the Perceived Threats as an individual's perception of how threatened they feel regarding their online privacy, encompassing both the Perceived Severity and Perceived Vulnerability to online privacy threats. Such perceived threats were hypothesized to influence the individual's intention to engage in protective behaviors online, both directly and indirectly mediated by Perceived Privacy Concerns. By mediating the relationship between Perceived Threats and (Goal) Intention, Perceived Privacy Concerns play a crucial role in shaping the extent to which individuals are motivated to engage in privacy protective behaviors online. This mediation implies that the higher the concerns stemming from threats over privacy, the stronger the intention to protect online privacy.

In addition, as proposed in the research model, the mediating role of Implementation Intention was examined in the relationship between (Goal) Intention and Protective Behavior. While (Goal) Intention is known to be a crucial predictor of actual behavior, the translation of intention into action often encounters various obstacles, leading to the well-documented intention-behavior gap. Implementation Intention serves as a vital mediator in this process, facilitating the conversion of (Goal) Intention into Protective Behavior.

As noted earlier, implementation intention involves creating specific and detailed plans that outline what, when, where, and how an individual will perform the intended behavior. By specifying these contextual details, implementation intention can help execute privacy protective actions, reducing the impact of barriers. This mediation implies that individuals with strong goal intentions who also form specific implementation intentions are more likely to engage in protective behaviors consistently. Understanding the mediating role of

implementation intention provides deeper insights into how goal intentions can be more effectively translated into actual protective behaviors.

Besides, as presented in the research model, the moderating role of privacy cynicism was examined in the relationship between Counter-Intentional Habit and (Goal) Intention, Implementation Intention, and Protective Behavior. According to the operational definitions of the study, Counter-Intentional Habit refers to the extent to which an individual engages in non-protective behaviors automatically when participating in online activities. For instance, an individual routinely accepts default privacy settings or sharing personal information without consideration. Such habits that contradict an individual's intention to protect their online privacy can undermine the formation of goal intentions, the development of implementation intentions, and the execution of protective behaviors.

Understanding the moderating role of privacy cynicism provides deeper insights into the psychological barriers that affect online privacy protection. It highlights the need to address underlying attitudes of skepticism to enhance the effectiveness of privacy protection strategies. By recognizing the impact of privacy cynicism, interventions can be designed to reduce cynicism and strengthen the relationship between two forms of intentions and protective behaviors, even with the presence of counter-intentional habits.

Drawing on the PMT, this study proposed a research model to elucidate the dynamics of online privacy protection behaviors. By incorporating key constructs, such as Perceived Privacy Concerns, Counter-Intentional Habit, Privacy Cynicism, (Goal) Intention, and Implementation Intention, the model provides a comprehensive framework for understanding these interactions and underscoring the complexity of privacy protection in the digital age. This multifaceted approach not only enriches the theoretical landscape of information privacy literature but also offers practical insights for developing more effective interventions to enhance online privacy practices.

3.2 Research hypotheses

PMT suggests that individuals' intention to engage in protective behaviors is influenced by their appraisal of threats. Rogers (1975) initially proposed PMT to explain how fear appeals influence behavior, suggesting that perceived severity and perceived vulnerability (collectively known as perceived threats) directly impact individuals' motivation to protect themselves. Later studies have extended this model to various contexts, including online privacy behaviors, affirming that heightened perceptions of threat lead to stronger intentions to engage in protective actions (Boss et al., 2015; Johnston & Warkentin, 2010).

Prior research indicating that individuals' awareness of potential threats significantly elevates their concerns about privacy. Studies in information systems have shown that as users perceive higher levels of threat from data breaches, identity theft, or surveillance, their concerns about privacy increase proportionally (Dinev & Hart, 2006; Malhotra, Kim, & Agarwal, 2004). The heightened state of awareness caused by perceived threats thus translates into elevated privacy concerns.

When individuals are concerned about their privacy, they are more likely to form intentions to protect it. Empirical evidence supports this relationship, showing that higher privacy concerns lead to stronger intentions to

adopt protective measures, such as using privacy-enhancing technologies or altering online behaviors to mitigate perceived risks (Smith et al., 2011; Yao & Linz, 2008). The link between privacy concerns and protective intentions is well-documented across various studies, reinforcing the validity of the following hypotheses.

H1: Perceived Threats positively influence (Goal) Intention directly.

H2: Perceived Threats positively influence (Goal) Intention through the mediation of Perceived Privacy Concerns.

H2a: Perceived Threats positively influence Perceived Privacy Concerns.

H2b: Perceived Privacy Concerns positively influence (Goal) Intention.

PMT posits that individuals weigh the costs and benefits of protective behaviors when forming intentions to engage in such behaviors. Perceived response costs refer to the anticipated drawbacks or barriers associated with performing a protective action. According to PMT, when individuals perceive high response costs, they are less likely to form intentions to engage in the protective behavior, as the costs outweigh the perceived benefits (Rogers, 1983). Empirical studies have consistently supported this relationship. For instance, Liang & Xue (2010) found that higher perceived costs, such as time, effort, and financial expenses, negatively impact individuals' intentions to adopt security measures. Similarly, Pahnla et al. (2007) demonstrated that perceived response costs significantly reduce the likelihood of employees adhering to information security policies.

Self-efficacy refers to an individual's belief in their capability to perform a protective behavior, while response efficacy pertains to the belief that the protective behavior will effectively mitigate the threat. According to PMT, high levels of perceived efficacy enhance motivation and intention to engage in protective actions (Bandura, 1977; Rogers, 1983). Numerous studies have validated the positive impact of perceived efficacy on protective intentions. Workman et al. (2008) found that both self-efficacy and response efficacy are critical predictors of employees' intentions to comply with information security policies. Additionally, Ifinedo (2012) highlighted that higher levels of perceived efficacy lead to stronger intentions to follow security guidelines and adopt protective measures. Therefore, the study hypothesizes that,

H3: Perceived Response Costs negatively influence (Goal) Intention.

H4: Perceived Efficacy positively influences (Goal) Intention.

Counter-Intentional Habits, which involve behaviors contrary to one's goals, undermine the formation of goal intentions. According to TPB, habitual behaviors can significantly influence behavioral intentions (Ajzen, 1991). When individuals develop counter-intentional habits, such as procrastination or neglecting security measures, these habits interfere with the intention to achieve specific goals, including privacy protection (Ajzen, 1991). LaRose et al. (2003) showed that habitual behaviors can detract from goal-directed actions by reducing the cognitive resources available for forming strong intentions.

Habits formed contrary to protective intentions, such as habitual sharing of personal information online, reduce the likelihood of engaging in protective behaviors. Empirical studies have shown that counter-intentional habits weaken the effectiveness of protective behaviors by consistently leading individuals away from actions that secure their privacy (Jiang et al., 2013). Additionally, Wood & Neal (2007) emphasized that habits, once formed, tend to

persist and exert a strong influence on behavior, often leading to the neglect of protective measures.

Implementation intentions are specific plans that individuals formulate to execute goal-directed behaviors (Gollwitzer, 1999). When counter-intentional habits are present, they interfere with the execution of these plans by creating conflicting behavioral patterns. Orbell & Sheeran (2000) indicated that strong habitual behaviors can disrupt the process of implementing intentions, leading to a decrease in the likelihood of following through with protective actions. Thus, the following hypotheses were formed,

H5: Counter-Intentional Habit is negatively associated with (Goal) Intention.

H6: Counter-Intentional Habit is negatively associated Protective Behavior.

H7: Counter-Intentional Habit is negatively associated with Implementation Intention.

When individuals harbor high levels of privacy cynicism, they are more likely to see protective behaviors as futile, thereby reinforcing their counter-intentional habits. This moderation effect means that privacy cynicism amplifies the negative impact of counter-intentional habits on goal intention. Studies have shown that individuals with high privacy cynicism tend to develop stronger habitual behaviors that contradict their stated goals due to a perceived lack of control and efficacy in privacy protection (Hargittai & Marwick, 2016; Hoffmann et al., 2016).

When privacy cynicism is high, the negative impact of counter-intentional habits on protective behavior is strengthened. Privacy cynicism can lead individuals to believe that protective measures are ineffective, thus diminishing their motivation to engage in such behaviors. Research indicates that privacy cynicism is associated with reduced engagement in protective behaviors, as individuals become disillusioned with the effectiveness of these measures (Morch et al., 2019; Choi et al., 2018).

High levels of privacy cynicism can lead individuals to doubt the efficacy of their protective actions, thereby reducing their commitment to implementing privacy-protective measures. This moderation effect suggests that privacy cynicism exacerbates the negative influence of counter-intentional habits on the formation of implementation intentions. Studies have shown that privacy cynicism undermines the process of translating intentions into actions by fostering a sense of helplessness and reducing the perceived value of implementation plans (Bansal et al., 2016; Taddicken, 2014). Therefore, the following hypotheses were formed,

H8: Privacy Cynicism positively moderates the relationships between Counter-Intentional Habit and (Goal) Intention, Implementation Intention, and Protective Behavior.

H8a: Privacy Cynicism positively moderates the relationship between Counter-Intentional Habit and (Goal) Intention.

H8b: positively moderates the relationships between Counter-Intentional Habit and Protective Behavior.

H8c: positively moderates the relationships between Counter-Intentional Habit and Implementation Intention.

TPB posits that intention is the most immediate and significant predictor of behavior (Ajzen, 1991). According to TPB, if individuals form strong intentions to engage in a particular behavior, they are more likely to perform that behavior. Additionally, PMT also supports the notion that intentions directly influence protective behaviors. PMT suggests that individuals' motivation to protect themselves from perceived threats leads to the formation of protective intentions, which then translate into protective actions (Rogers, 1983).

Empirical research has consistently shown that goal intentions are significant predictors of protective behaviors in various contexts, including health, cybersecurity, and environmental protection. For example, Milne et al. (2000) found that intentions to engage in health-protective behaviors were strong predictors of actual health behaviors. In the context of cybersecurity, studies have demonstrated that users' intentions to engage in security practices, such as updating passwords or using antivirus software, significantly predict their actual engagement in these behaviors (Ifinedo, 2012; Johnston & Warkentin, 2010). Therefore, the study hypothesized that,

H9: (Goal) Intention positively affects Protective Behavior directly.

According to TPB, goal intentions represent an individual's commitment to perform a behavior (Ajzen, 1991). Implementation Intention theory further delineates that once a goal intention is formed, individuals plan the specific actions required to achieve their goals, known as implementation intentions (Gollwitzer, 1999). Empirical evidence supports that strong goal intentions lead to the formation of detailed implementation intentions. Studies have shown that when individuals are committed to achieving a goal, they are more likely to plan the specific steps needed to execute the behavior, enhancing their overall intention to follow through with their plans (Prestwich et al., 2015; Sheeran et al., 2005).

Implementation intentions, or "if-then" plans, specify the exact behavior to be performed and the context in which it will occur, thereby increasing the likelihood of behavior enactment (Gollwitzer & Sheeran, 2006). Research has demonstrated that forming implementation intentions significantly enhances the probability of engaging in the desired behavior. In the context of protective behaviors, studies have found that individuals who develop specific plans for how and when to perform protective actions are more likely to carry out those actions (Orbell et al., 1997; Milne et al., 2002). This is particularly relevant in areas such as health and cybersecurity, where specific action plans can mitigate risks and enhance compliance with protective measures (Schüz et al., 2009). Combining the insights from the above hypotheses, the study proposed that goal intention positively affects protective behavior through the mediation of implementation intention. It suggests that while goal intention sets the motivational basis for engaging in protective behavior, implementation intention translates this motivation into concrete action steps, thereby facilitating the actual performance of the behavior (Gollwitzer, 1999). Thus, the study hypothesized that,

H10: (Goal) Intention positively affects Protective Behavior through the mediation of Implementation Intention.

H10a: (Goal) Intention positively affects Implementation Intention.

H10b: Implementation Intention positively affects Protective Behavior.

4. Research Methodology

4.1 Operational definitions and measurement items

In the quest to understand online users' privacy protective behavior, the study has embarked on a comprehensive review of the literature, drawing from a wide range of theories and empirical studies. This exploration has led us to the development of a robust research model that captures the complex interplay of factors influencing individuals' decisions and actions regarding their online privacy.

The model proposed in the study integrates twelve primary factors, which are Perceived Severity (PS), Perceived Vulnerability (PV), Perceived Self-Efficacy (PSE), Perceived Response Efficacy (PRE), Perceived Privacy Concerns (PC), Perceived Response Costs (PRC), Privacy Cynicism (PCY), Counter-Intentional Habit (HA), (Goal) Intention (IN), Implementation Intention (IIN), and Protective Behavior (PB). These factors are not isolated; rather, they interact in nuanced ways to influence an individual's motivation and ability to engage in privacy protective behaviors.

Additionally, to delineate the relationships between these factors more clearly, the study introduced second-order factors: Perceived Threats (PT) and Perceived Efficacy (PE). Perceived Threats encapsulated both Perceived Severity and Perceived Vulnerability, highlighting the individual's assessment of the potential risks to their online privacy. Perceived Efficacy combined Perceived Self-Efficacy and Perceived Response Efficacy, reflecting the individual's belief in their capability to effectively protect their privacy and the effectiveness of the protective measures available to them.

The variables have been redefined and adjusted to fit the current digital landscape. This refinement process acknowledges the evolving nature of online privacy concerns and the increasing sophistication of both threats to privacy and the means to counteract them. The study aimed to offer a comprehensive framework that not only elucidates the factors influencing privacy protective behavior but also provides actionable insights for researchers, policy-makers, and practitioners working to enhance online privacy protection. We summarized the operational definitions of variables in the following table.

<Table 1> Operational definitions

Variable	Definition	Source
Perceived Severity (PS)	The extent to which an individual believes that an online privacy threat is serious.	Milne et al. (2000)
Perceived Vulnerability (PV)	The degree to which an individual feels personally susceptible to an online privacy threat.	Milne et al. (2000)
Perceived Threats (PT)	An individual's perception of how threatened they feel regarding their online privacy, encompassing both the perceived severity and perceived vulnerability to online privacy threats.	Milne et al. (2000)
Perceived Self-Efficacy (PSE)	An individual's belief in their ability to take measures to protect their online privacy.	Gore & Bracken, 2005; Milne et al. (2000)
Perceived Response Efficacy (PRE)	An individual's belief in the effectiveness of taking measures to protect their online privacy.	Milne et al. (2000)
Perceived Efficacy (PE)	An individual's belief in their capability to manage problematic situations when taking measures to protect their online privacy, which includes both perceived self-efficacy and perceived response efficacy.	Swenson & Prelow (2005)
Perceived Privacy Concerns (PC)	An individual's concern for their privacy when engaging in online activities.	Kim & Wang (2019)
Perceived Response Costs (PRC)	An individual's belief about the costs associated with taking measures to protect their online privacy.	Milne et al. (2000)

Counter-Intentional Habit (HA)	The extent to which an individual engages in non-protective behaviors automatically when participating in online activities.	Limayem et al. (2007)
Privacy Cynicism (PCY)	An individual's attitude of uncertainty, powerlessness, and mistrust towards online privacy, leading to the belief that privacy protective behavior is subjectively futile.	Hoffmann et al. (2016)
(Goal) Intention (IN)	An individual's willingness to protect their own privacy online.	Kim & Wang (2019)
Implementation Intention (IIN)	The development of detailed plans specifying where, when, and how an individual will enact their intentions to protect their online privacy.	Kim & Wang (2020)
Protection Behavior (PB)	The extent to which an individual takes actions to protect their privacy when engaging in online activities.	Kim & Wang (2020)

In order to rigorously examine the determinants of online users' privacy protective behaviors, the study has designed a detailed survey that harnesses measurement items derived from existing, pertinent studies. This strategic selection and adaptation of measurement items serve to enhance the validity of the instruments, ensuring they are well-tailored to the research context and objectives. To capture the nuanced attitudes and perceptions of participants, the study employed a seven-point Likert scale for questions. This scale extends from (1) "Strongly Disagree" to (7) "Strongly Agree," allowing for a rich gradation of responses.

All the questions utilized in the survey, excluding demographic inquiries, are meticulously compiled in the following table. This table serves as a concise reference for researchers, presenting a clear overview of the constructs being measured and the specific items used to gauge each construct. Through this carefully constructed survey, the study aimed to shed light on the complex interplay of factors affecting online users' decisions to engage in behaviors that protect their privacy.

<Table 2> Measurement items

Variable	Measurement Item		Source
Perceived Severity (PS)	PS1	Losing personal information privacy through online activities is a serious problem for me.	Wang et al. (2016); Zhang et al. (2018); Johnston & Warkentin (2010)
	PS2	If my personal information privacy is invaded through online activities, it constitutes a severe issue.	
	PS3	If my online privacy is violated, it poses a significant problem for me.	
	PS4	If my information privacy is compromised through online activities, it is a substantial issue.	
	PS5	If my personal information is leaked through online activities, it presents a major problem for me.	
Perceived Vulnerability (PV)	PV1	My personal information online can be used in ways I do not foresee.	Dinev & Hart (2006); Zhang et al. (2018)
	PV2	My personal information online can be inappropriately utilized.	

	PV3	My personal information online is susceptible to misuse.	
	PV4	My personal information can be disclosed to unknown third-parties or individuals online without my knowledge.	
	PV5*	My online privacy is at risk of being invaded.	
Perceived Self-Efficacy (PSE)	PSE1	I have the skills to take measures to protect my online privacy.	Herath & Rao (2009); Ifinedo (2012)
	PSE2	If I want to, I can easily take measures to safeguard my online privacy.	
	PSE3	I am capable of following available online privacy protection guidelines even without assistance.	
	PSE4	I have the requisite skills to defend myself against online information privacy violations.	
	PSE5*	I have the ability to implement preventive measures to secure my online confidential information.	
Perceived Response Efficacy (PRE)	PRE1	Online privacy protection measures can effectively safeguard my personal information.	Zhang et al. (2018); Mohamed & Ahmad (2012)
	PRE2	By using online privacy protection measures, my personal information is more likely to be protected.	
	PRE3	If I implement online privacy protection measures, I can prevent the loss of my information privacy.	
	PRE4	I can enhance my information privacy protection by using available online privacy protection measures.	
	PRE5	Employing online privacy protection measures can ensure the security of my information privacy.	
Perceived Privacy Concerns (PC)	PC1	I am concerned that engaging in online activities poses a risk to my information privacy.	Jozani et al. (2020); Xu et al. (2011); Dinev & Hart (2006)
	PC2	I am worried that engaging in online activities may lead to potential information privacy loss.	
	PC3	I am apprehensive that sharing my personal information during online activities is risky.	
	PC4	I am concerned that my personal information online can be misused.	
	PC5*	I am wary of providing personal information online due to potential misuse by others.	
Perceived Response Costs (PRC)	PRC1	It requires considerable time to learn how to protect my online privacy.	Lee et al. (2008); van Ooijen et al. (2022); Ifinedo (2012)
	PRC2*	Using online privacy protection measures involves numerous disadvantages for me.	
	PRC3	Implementing online privacy protection measures entails significant costs.	

	PRC4	Employing online privacy protection measures is time-consuming.	
	PRC5*	It is inconvenient to adopt online privacy protection measures.	
Privacy Cynicism (PCY)	PCY1	I have become less interested in online privacy issues.	Choi et al. (2018); van Ooijen et al. (2022); Khan et al. (2023)
	PCY2	I doubt the significance of online privacy issues.	
	PCY3	I have become less enthusiastic about protecting my online privacy.	
	PCY4*	I have grown more cynical about the effectiveness of my efforts to protect online privacy.	
	PCY5	I have doubts about whether my actions to protect online privacy are effective at all.	
Counter-Intentional Habit (HA)	HA1*	I automatically engage in online activities without considering privacy protection.	Limayem et al. (2003); Gardner et al. (2012)
	HA2*	Engaging in online activities without using privacy protection measures has become a habit for me.	
	HA3	Not using privacy protection measures while engaging in online activities has become automatic for me.	
	HA4	I engage in online activities without thinking about using privacy protection measures.	
	HA5	I enjoy online activities before realizing I am not using any privacy protection measures.	
(Goal) Intention (IN)	IN1	I intend to utilize available measures to protect my personal information during online activities.	Kim & Wang (2019); Zhao et al. (2012); Wang et al. (2013)
	IN2	I aim to use protection measures to ensure my online privacy.	
	IN3	It is my intention to employ protection measures to secure my online privacy.	
	IN4	My goal is to safeguard my online privacy by using available protection measures.	
	IN5	I try to adopt protection measures to maintain my privacy during online activities.	
Implementation Intention (IIN)	IIN1	I plan when to use privacy protection measures during my online activities.	Kim & Wang (2020); Rhodes et al. (2006)
	IIN2	I have plans detailing what measures to take to protect my online privacy.	
	IIN3	I develop strategies on how to secure my online privacy using available measures.	
	IIN4	I determine where specifically to apply privacy protection measures during online activities.	

	IIN5	I make plans for employing privacy protection measures in my online activities.	
Protection Behavior (PB)	PB1	While engaging in online activities, I actively use privacy protection measures to preserve my privacy.	Kim & Kim (2014); Kim & Wang (2020)
	PB2	I utilize available measures to protect my personal information during online activities.	
	PB3	Whenever I participate in online activities, I ensure to apply protection measures to safeguard my privacy.	
	PB4*	I take proactive steps to employ protection measures for my online privacy.	
	PB5	I seek out ways to maintain control over my information privacy during online activities.	

4.2 Data collection

The sample for this study was drawn using a convenience sampling method, targeting online users within Chinese universities and colleges. Participants were recruited through offline means, specifically focusing on university and college environments to ensure accessibility and ease of data collection. The target population for this study was all online users affiliated with these educational institutions, including students, faculty, and administrative staff. By focusing on this population, the study aimed to capture a diverse range of online attitudes and behaviors towards information privacy issues.

Data collection was conducted exclusively offline, despite utilizing online survey platforms (Wenjuanxing) for actual data entry. The data collection period spanned from September 18th to September 29th 2023. Participants accessed the survey through unique URL link or QR code, directing them to a secure online survey platform where they could complete the questionnaire at their convenience using any internet-enabled device. By employing a convenience sampling method and using offline recruitment and offline survey, the study aimed to gather high-quality data reflecting the information privacy perceptions and behaviors of Chinese online users. The demographic profile of the sample provides a detailed overview of the participants' demographic characteristics and online behavior preferences. The frequency and percentage distribution of various demographic categories are summarized as follows.

<Table 3> Demographic characteristics of respondents

Demographic Category		Frequency	Percent (%)
Age	10s	117	37.5
	20s	195	62.5
Gender	Female	181	58.0
	Male	131	42.0

4.3 Data analysis

Primarily, this study aimed to examine the factors influencing privacy protective behaviors of online users. On the basis of the PMT, the study further developed a comprehensive framework by integrating pivotal constructs

such as Perceived Privacy Concerns, Counter-Intentional Habit, Privacy Cynicism, Implementation Intention, and Protective Behavior. Additionally, the study sought to highlight the mediating roles of Perceived Privacy Concerns and Implementation Intention and the moderating role of Privacy Cynicism within the proposed framework. The current section outlined the statistical techniques and tools used, the steps involved in the analysis process, and then the results.

In the study, there were two main software tools used for data analysis: SPSS (Statistical Package for the Social Sciences) version 27.0 for Exploratory Factor Analysis (EFA) and descriptive statistics of samples and variables, and SmartPLS version 4.0 for Partial Least Squares Structural Equation Modeling (PLS-SEM).

4.3.1 Evaluating measurement models

To refine and enhance the measurement scales prior to the final data collection phase, a preliminary pilot test (N = 103) was administered in China. Based on this analysis, several items were identified as lacking in reliability and validity and were subsequently removed: the fifth item from perceived vulnerability, the fifth item from perceived self-efficacy, the fifth item from perceived privacy concerns, the second and fifth items of perceived response efficacy, the fourth item from privacy cynicism, the first and second items from habit, and the fourth item from protective behavior.

The study utilized SmartPLS (Partial Least Square) version 4.0 for the data analysis. The initial steps involved testing the reliability and validity of first-order factors. Reliability was confirmed through three key criteria: Cronbach's alpha (α) greater than 0.7, composite reliability (CR) greater than 0.7, and average variance extracted (AVE) above 0.5, in line with established standards (Nunnally, 1978; Thompson et al., 1995). Two forms of validity were examined: convergent validity, assessed with a factor loading value greater than 0.7 (Hulland, 1999), and discriminant validity, confirmed when the square root of α is greater than 0.7 and demonstrates higher correlations with its own measures than with those of other factors (Awad & Krishnan, 2006). The analytical results, presented in <Table 4>, confirm that all Cronbach's α , CR, AVE, and factor loading values exceeded the thresholds, thereby establishing the reliability and convergent validity of the measurement instruments.

<Table 4> Reliability and convergent validity of first-order factors

2 nd order factor	1 st order factor	Item	Mean	STDEV	Outer loading	T statistics (p-value)	α	CR rho _a (ρ_a)	CR rho _c (ρ_c)	AVE
Perceived Threats (PT)	Perceived Severity (PS)	PS1	6.28	1.090	0.934	57.006 (0.000)	0.980	0.981	0.985	0.928
		PS2	6.30	1.011	0.962	89.070 (0.000)				
		PS3	6.29	0.973	0.977	191.261 (0.000)				
		PS4	6.30	0.971	0.972	139.164 (0.000)				
		PS5	6.29	0.980	0.970	154.001				

						(0.000)				
	Perceived Vulnerability (PV)	PV1	5.89	1.019	0.942	80.226 (0.000)	0.959	0.960	0.970	0.891
		PV2	5.75	1.067	0.947	67.808 (0.000)				
		PV3	5.73	1.095	0.954	121.552 (0.000)				
		PV4	5.88	1.025	0.934	69.610 (0.000)				
Perceived Efficacy (PE)	Perceived Self-Efficacy (PSE)	PSE1	5.35	1.259	0.923	75.876 (0.000)	0.934	0.934	0.958	0.883
		PSE2	5.07	1.400	0.959	157.343 (0.000)				
		PSE4	5.13	1.379	0.937	94.319 (0.000)				
	Perceived Response Efficacy (PRE)	PRE1	5.72	1.077	0.924	48.719 (0.000)	0.972	0.973	0.978	0.901
		PRE2	5.65	1.118	0.966	176.921 (0.000)				
		PRE3	5.64	1.103	0.952	82.164 (0.000)				
		PRE4	5.71	1.055	0.956	95.118 (0.000)				
		PRE5	5.66	1.117	0.948	81.727 (0.000)				
	Perceived Privacy Concerns (PC)		PC1	5.66	1.119	0.935	66.567 (0.000)	0.961	0.962	0.972
PC2			5.71	1.091	0.962	158.639 (0.000)				
PC3			5.78	1.067	0.945	93.076 (0.000)				
PC4			5.78	1.067	0.944	83.902 (0.000)				
Perceived Response Costs (PRC)		PRC1	4.59	1.653	0.947	10.452 (0.000)	0.961	0.965	0.975	0.928
		PRC3	4.36	1.697	0.975	12.212 (0.000)				
		PRC4	4.26	1.744	0.967	12.041 (0.000)				
Privacy Cynicism (PCY)		PCY1	4.06	1.873	0.922	44.514 (0.000)	0.915	0.963	0.945	0.850
		PCY2	4.35	1.773	0.911	57.055 (0.000)				
		PCY3	3.88	1.946	0.934	51.584 (0.000)				
Counter-Intentional Habit		HA3	3.98	1.887	0.975	97.728 (0.000)	0.978	0.982	0.985	0.957

(HA)	HA4	3.98	1.907	0.983	304.410 (0.000)				
	HA5	4.06	1.869	0.977	180.412 (0.000)				
(Goal) Intention (IN)	IN1	5.68	1.100	0.941	65.434 (0.000)	0.96 3	0.963	0.973	0.90 0
	IN2	5.65	1.124	0.953	70.384 (0.000)				
	IN4	5.67	1.107	0.962	138.068 (0.000)				
	IN5	5.64	1.114	0.938	61.462 (0.000)				
Implementation Intention (IIN)	IIN1	5.29	1.206	0.950	86.909 (0.000)	0.96 6	0.966	0.975	0.90 7
	IIN2	5.24	1.208	0.963	129.732 (0.000)				
	IIN4	5.27	1.228	0.945	89.988 (0.000)				
	IIN5	5.25	1.245	0.952	99.463 (0.000)				
Protective Behavior (PB)	PB1	5.58	1.102	0.953	87.046 (0.000)	0.96 7	0.967	0.976	0.91 0
	PB2	5.58	1.114	0.959	107.916 (0.000)				
	PB3	5.56	1.127	0.953	80.862 (0.000)				
	PB5	5.59	1.133	0.951	82.623 (0.000)				

Following the assessment of reliability and convergent validity, discriminant validity was evaluated and the results were displayed in <Table 5>. The criteria for discriminant validity assessment were met, as all square root values of AVE were equal to or almost equal to 0.7. Additionally, these values demonstrated a higher correlation within their own construct than with any other construct, thereby satisfying the requirements for discriminant validity. This outcome ensures that each construct in the study is sufficiently distinct from the others, underlining the measurement instruments' ability to capture the unique aspects of each variable effectively.

<Table 5> Discriminant validity of first-order factors

1 st order factor	1	2	3	4	5	6	7	8	9	10	11
1. (Goal) Intention	0.949										
2. Counter-Intentional Habit	0.048	0.978									
3. Implementation Intention	0.679	0.229	0.952								
4. Perceived Response Costs	0.088	0.688	0.294	0.963							

5. Perceived Response Efficacy	0.549	0.171	0.537	0.245	0.949						
6. Perceived Self-Efficacy	0.425	0.291	0.599	0.396	0.512	0.940					
7. Perceived Severity	0.484	-0.013	0.330	0.062	0.484	0.322	0.963				
8. Perceived Vulnerability	0.528	0.170	0.435	0.255	0.466	0.404	0.634	0.944			
9. Perceived Privacy Concerns	0.528	0.205	0.462	0.244	0.531	0.390	0.582	0.755	0.947		
10. Privacy Cynicism	0.151	0.774	0.333	0.781	0.131	0.413	-0.028	0.202	0.181	0.922	
11. Protective Behavior	0.782	0.064	0.776	0.183	0.540	0.497	0.438	0.507	0.536	0.197	0.954

In this study, the constructs Perceived Threats (PT) and Perceived Efficacy (PE) were conceptualized as formative second-order factors, which is distinctive from reflective indicators where the direction of causality is reversed. In the formative model, the indicators create the construct and elucidate its various dimensions, highlighting the significance of each indicator in defining the construct (Petter, Straub, & Rai, 2007). A pivotal concern with formative indicators is the potential for multicollinearity, where a high degree of correlation among indicators could compromise their validity as distinct contributors to the construct (Jarvis, MacKenzie, & Podsakoff, 2003).

In contrast to reflective measurements, where high correlations and internal consistency are sought after, formative indicators benefit from low correlations and internal consistency, reflecting their role in explaining different aspects of the construct. To assess multicollinearity among the formative second-order factors, this study employed the Variance Inflation Factor (VIF), alongside outer loading, outer weight, and their respective t-values and p-values. As shown in <Table 6>, acceptable thresholds were set at $VIF < 5$, and $p\text{-value} < 0.05$ to confirm the absence of multicollinearity concerns (Petter et al., 2007).

<Table 6> Multicollinearity analysis of second-order factors

2 nd order factor	1 st order factor	Outer weights	T statistics (p-value)	Outer loadings	T statistics (p-value)	VIF
Perceived Threats (PT)	Perceived Severity (PS)	0.302	4.436 (0.000)	0.797	19.113 (0.000)	1.960
	Perceived Vulnerability (PV)	0.781	13.879 (0.000)	0.972	72.242 (0.000)	2.846
Perceived Efficacy (PE)	Perceived Self-Efficacy (PSE)	0.341	2.481 (0.007)	0.741	9.334 (0.000)	1.754
	Perceived	0.782	7.577	0.956	24.078	1.883

	Response Efficacy (PRE)		(0.000)		(0.000)	
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The analysis confirmed that both the reliability and validity of the first-order factors were upheld, ensuring that multicollinearity does not pose an issue within this study. This validation allows for a confident interpretation of the formative indicators as legitimate and distinct aspects of the second-order constructs, ensuring the integrity of the study's findings.

4.3.2 Evaluating structural model

Next, the study tested the structural model using structural equation modeling. First, the study tested the collinearity statistics. As described in <Table 7>, with every variance inflation factor (VIF) value less than 5, there were no multicollinearity problems in the study.

<Table 7> Multicollinearity analysis of structural model

	1	2	3	4	5	6	7	8	9
1. (Goal) Intention	—	—	1.450	—	—	—	—	—	2.087
2. Counter-Intentional Habit	2.698	—	2.667	—	—	—	—	—	2.669
3. Implementation Intention	—	—	—	—	—	—	—	—	2.192
4. Perceived Efficacy	1.771	—	—	—	—	—	—	—	—
5. Perceived Response Costs	2.833	—	—	—	—	—	—	—	—
6. Perceived Threats	2.613	—	—	—	—	—	1.000	—	—
7. Perceived Privacy Concerns	2.634	—	—	—	—	—	—	—	—
8. Privacy Cynicism	3.543	—	2.615	—	—	—	—	—	2.739
9. Protective Behavior	—	—	—	—	—	—	—	—	—

Then, the study tested R square statistics to demonstrate the explanatory power of the structural model. As shown in <Table 8>, 73.6% in the variance of protective behavior, the dependent variable, could be explained. Chin (1988) recommended the following standard in the context of PLS-SEM. R-squared values of more than 0.67, between 0.33 and 0.67, or less than 0.33 can be described as substantial, moderate, or weak, respectively. In the study, adjusted R square value for protective behavior in Korean sample was between moderate and substantial, and that in Chinese sample was substantial.

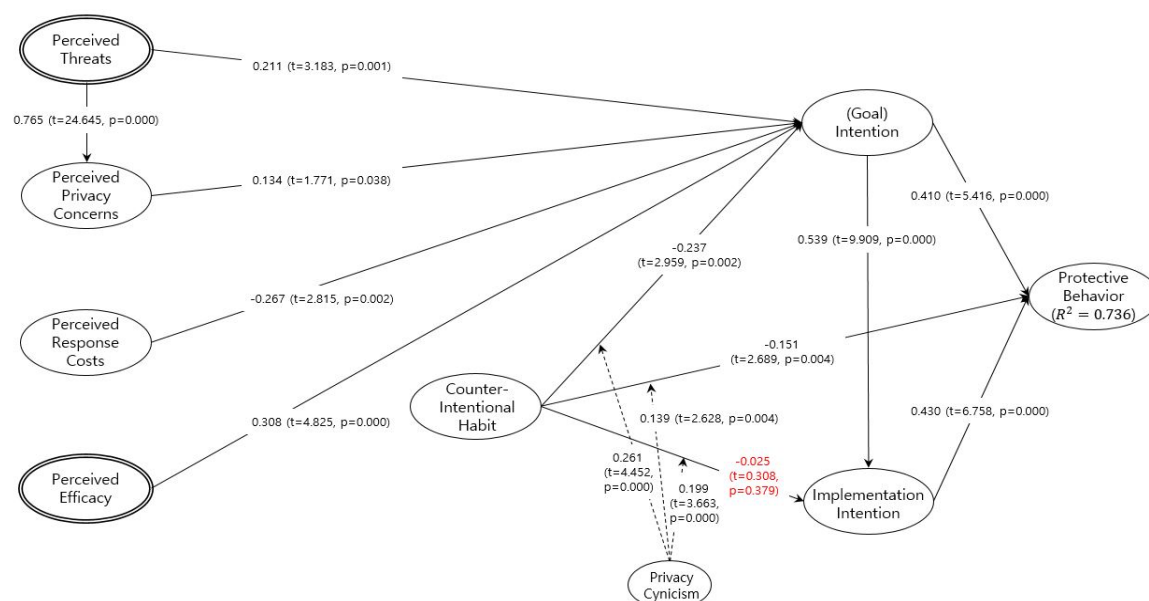
<Table 8> Coefficient of determination: R square value

	R-square	R-square adjusted
(Goal) Intention	0.524	0.513
Implementation Intention	0.544	0.538
Perceived Privacy Concerns	0.586	0.585
Protective Behavior	0.741	0.736

Before testing the research hypotheses, the study estimated the explanatory power of the structural model by using R square values, Redundancy, and Communality values. The explanatory power of the research model was calculated and shown in <Table 9>. The explanatory power of the structural model was substantial (63.4%), next to go is the hypothesis testing.

<Table 9> Explanatory power of structural model

	R^2	Redundancy	Communality
Perceived Threats	—	—	0.373
Perceived Privacy Concerns	0.586	0.521	0.799
Perceived Response Costs	—	—	0.788
Perceived Efficacy	—	—	0.252
Counter-Intentional Habit	—	—	0.838
Privacy Cynicism	—	—	0.647
(Goal) Intention	0.524	0.433	0.806
Implementation Intention	0.544	0.468	0.816
Protective Behavior	0.741	0.659	0.822
Mean	0.599	0.520	0.682
Explanatory Power	0.639		



<Figure 2> Results of Hypothesis Testing

As illustrated in <Figure 2>, among the total 10 hypotheses of the study, there was only one not supported by the results of hypothesis testing. The results indicated that perceived threats, perceived privacy concerns, perceived response costs, and perceived efficacy were significant predictors of goal intention, which in turn significantly influenced implementation intention and protective behavior. Counter-intentional habit also played a significant role, influencing both goal intention and protective behavior. Privacy cynicism significantly moderated the relationships between counter-intentional habit and goal intention, implementation intention, and protective

behavior. These findings underscore the importance of addressing both motivational and habitual factors to enhance protective behaviors in information privacy contexts.

4.3.3 Additional analyses

After testing the general hypotheses, the study initiated the testing of the mediating effects in <Table 10] and moderating effects in <Table 11> separately. According to the results of mediating effect analysis, both of the mediating roles of Perceived Privacy Concerns and Implementation Intention were supported. And as for the results of moderating effect analysis, it confirmed the positive moderating effects of Privacy Cynicism on the relationships between counter-intentional habit and goal intention, implementation intention, and protective behavior.

<Table 10> Mediating effects

Path	Path coefficient	STDEV	t-value	p-value	Result
Direct Effect: Perceived Threats → (Goal) Intention	0.211	0.066	3.183	0.001	Supported
Specific Indirect Effect: Perceived Threats → Perceived Privacy Concerns → (Goal) Intention	0.102	0.058	1.773	0.038	Supported
Direct Effect: (Goal) Intention → Protective Behavior	0.410	0.076	5.416	0.000	Supported
Specific Indirect Effect: (Goal) Intention → Implementation Intention → Protective Behavior	0.232	0.044	5.290	0.000	Supported

<Table 11> Moderating effects

Path	Path coefficient	STDEV	t-value	p-value	Result
Counter-Intentional Habit → (Goal) Intention	-0.237	0.080	2.959	0.002	Moderating Effect: Supported
Privacy Cynicism → (Goal) Intention	0.368	0.099	3.729	0.000	
Privacy Cynicism × Counter- Intentional Habit → (Goal) Intention	0.261	0.059	4.452	0.000	
Counter-Intentional Habit → Protective Behavior	-0.151	0.056	2.689	0.004	Moderating Effect: Supported
Privacy Cynicism → Protective Behavior	0.085	0.053	1.608	0.054	
Privacy Cynicism × Counter- Intentional Habit → Protective	0.139	0.053	2.628	0.004	

Behavior					
Counter-Intentional Habit → Implementation Intention	-0.025	0.080	0.308	0.379	Moderating Effect: Supported
Privacy Cynicism → Implementation Intention	0.238	0.079	3.019	0.001	
Privacy Cynicism × Counter-Intentional Habit → Implementation Intention	0.199	0.054	3.663	0.000	

Perceived Threats significantly influenced Goal Intention directly and through Perceived Privacy Concerns. Goal Intention strongly influenced Protective Behavior, and this effect was mediated by Implementation Intention. Counter-Intentional Habit negatively impacted Goal Intention and Protective Behavior. Privacy Cynicism positively moderated the relationships between Counter-Intentional Habit and (Goal) Intention, Implementation Intention, and Protective Behavior. Perceived Response Costs negatively influenced (Goal) Intention, while Perceived Efficacy had a positive effect. The results provide new insights into the correlation and interactions within the expanded PMT framework, shedding light on a more comprehensive understanding of users' protective behavior in a general online context.

5. Conclusion

5.1 Findings and discussion

The study aimed to investigate the factors influencing protective behaviors related to information privacy among online users in China, utilizing the PMT as the theoretical foundation. The key findings of the study are as follows:

First, the study found that perceived threats and perceived privacy concerns significantly and positively influence goal intention, indicating that higher perceived threats and concerns about privacy enhance individuals' motivation to engage in protective behaviors. This is consistent with previous research by Posey et al. (2015), which emphasized the role of threat appraisal in motivating protective behaviors. Similarly, Yao et al. (2007) demonstrated that heightened privacy concerns drive individuals to adopt more robust privacy measures. Conversely, perceived response costs had a significant negative effect on goal intention, suggesting that higher perceived costs deter individuals from intending to adopt protective measures. This finding aligns with the research of Keith et al. (2013), which identified that the perceived effort and inconvenience associated with privacy protection can be significant barriers to intention formation. Perceived efficacy also significantly and positively influenced goal intention, highlighting the importance of individuals' beliefs in their ability to effectively carry out protective behaviors. This supports the findings of Milne et al. (2009), who noted that self-efficacy is a critical determinant of privacy protective behaviors.

Second, goal intention was shown to significantly and positively influence both implementation intention and

protective behavior, demonstrating that strong motivational intentions lead to actual protective actions. This is in line with the TPB proposed by Ajzen (1991), which posits that intentions are the most immediate predictors of behavior. Similarly, implementation intention had a significant positive impact on protective behavior, emphasizing the crucial role of detailed action plans in translating intentions into actual behaviors. Gollwitzer (1999) highlighted the effectiveness of implementation intentions in bridging the intention-behavior gap, and the findings of this study corroborated this by showing that specific action plans enhance the likelihood of engaging in privacy protective behaviors. These results confirmed that implementation intention is indeed a powerful tool to bridge the relationship between goal intention and behavior, which aligns with the meta-analysis conducted by Gollwitzer & Sheeran (2006) demonstrating the efficacy of implementation intentions across various behavioral domains.

Third, the study revealed that counter-intentional habit significantly influenced both goal intention and protective behavior, indicating that habitual behaviors play a crucial role in shaping both the formation of intentions and the execution of protective measures. This finding is supported by Wood & Neal (2007), who argued that habits often override intentional control, thereby impacting behavior directly. The results of this study suggested that to enhance protective behaviors, interventions need to address these entrenched counter-intentional habits. This is consistent with the findings of Ouellette & Wood (1998), who emphasized the importance of disrupting negative habits to promote positive behavioral changes.

Lastly, privacy cynicism was found to significantly moderate the relationships between counter-intentional habit and goal intention, implementation intention, and protective behavior. This suggested that skepticism about privacy measures can influence both intentions and behaviors. The findings of this study revealed significant insights into how privacy cynicism interacts with habitual behaviors to influence online privacy protection efforts. This nuanced interaction indicated that privacy cynicism might lead to a stable baseline of intentions and behaviors, potentially as a defense mechanism against nonprotective habitual behaviors.

5.2 Implications

The findings of this study contribute significantly to the existing literature on the theoretical understanding of information privacy behaviors by expanding and validating the application of Protection Motivation Theory (PMT) in the context of online users in China. One significant theoretical implication is the validation of the expanded PMT framework, which includes additional constructs such as perceived privacy concerns, counter-intentional habit, privacy cynicism, implementation intention, and protective behavior. This expansion provides a more comprehensive understanding of the factors that influence protective behaviors, going beyond traditional PMT constructs.

Another key theoretical implication is the validation of the critical role of implementation intention. This study supports the theoretical perspective that implementation intentions act as a crucial mechanism for translating motivational goals into specific actions, thereby enhancing both the explanatory and predictive power of PMT. The significant impact of implementation intention on protective behavior underscores the importance of concrete

planning in behavior change models.

Furthermore, the study integrates habitual behaviors into the PMT framework, highlighting the influence of counter-intentional habits on both intention and protective behavior. This suggests that protective behaviors are not solely driven by motivational factors but are also significantly shaped by individuals' habitual tendencies. Integrating habitual behaviors into theoretical models of information privacy provides a more comprehensive understanding of how these factors interact with motivational constructs to influence privacy behaviors.

In addition, the moderating role of privacy cynicism on the relationships between counter-intentional habit and other PMT constructs adds depth to our understanding of attitudinal factors in informing privacy behaviors. Privacy cynicism's influence suggests that future research should consider the broader attitudinal context when applying PMT to the information privacy literature, acknowledging how skepticism about privacy measures can impact both intentions and behaviors.

The practical implications of this study are highly relevant for stake-holders such as policy-makers, educational institutions, and information privacy practitioners. First, the findings suggest that information privacy interventions should focus on enhancing implementation intentions by helping individuals develop concrete plans for protective actions. This can be achieved through detailed guidance on how to implement privacy protective measures, as well as reminders and prompts that encourage users to specify when, where, and how they will perform these actions.

Additionally, the significant role of habitual behaviors suggests that interventions should aim to disrupt negative habitual behaviors and promote positive ones. Regular training sessions, reminders, and the use of technology to automate protective behaviors, such as automatic updates and regular security checks, can help in this regard.

Finally, to address privacy cynicism, communications about the effectiveness of privacy protection measures and engage in practices should be transparent to build trust among users. Reducing skepticism about privacy measures can foster a more positive attitude towards privacy protection and support the adoption of protective behaviors.

5.3 Limitations and future research

Despite the valuable insights provided, the study has several limitations.

Firstly, this study was conducted within a single cultural and regional context, which may limit the generalizability of the findings to other cultural backgrounds. Cultural differences can significantly impact online privacy-related behaviors, so the findings based on the sample collected in China may not be universally applicable. Future research should explore the influence of cultural differences by conducting cross-cultural comparative studies to offer a more comprehensive understanding of how these differences impact online behaviors. Comparing user behaviors across different countries and a diverse range of cultural contexts may allow for identifying universal patterns and unique cultural influences.

Secondly, the study has limitations in sample diversity, which may not completely represent the broader population and thereby affect the generalizability of the results. Future studies should improve sample diversity in

terms of age, occupation, socioeconomic status, and technological skill. This will help generalize the findings to a larger population.

Thirdly, the primary method used for data collection in this study was self-reported surveys, despite respondents being instructed to report based on real events. Self-reported data can cause various biases like social desirability bias and recall bias, which may affect the reliability and validity of the findings. Future studies should employ a mixed-methods approach, combining quantitative methods like surveys with qualitative methods such as interviews. This approach will provide a more comprehensive understanding of online behaviors, help validate the results from self-reported data, and uncover deeper insights into users' online behaviors.

Fourthly, the study has limitations in controlling external variables. It is likely that unconsidered external factors, such as privacy literacy and individuals' personal traits, may affect the shaping of users' behaviors. Future research should pay more attention to identifying and controlling potential external variables to ensure more precise analysis and thereby more accurate outcomes.

Fifthly, while this study aimed to expand the PMT framework in the current research context, it did not directly compare the proposed model with the original PMT model. Future studies should consider conducting comparative analyses to concretely evaluate the incremental value of integrating more variables into the PMT framework. This will increase the credibility of the findings and support the wider use of the expanded model.

Lastly, this study has limitations in reflecting the diversity of online environments. It focused on the general online environment without specifically distinguishing between various types, such as social media platforms, e-commerce platforms, and mobile applications. Such a general perspective might overlook the unique characteristics of each specific online context, potentially leading to differences across these distinct environments. Given this, it is important for future research to address this issue more explicitly. Specifically, future studies should differentiate between various types of online environments and consider including moderating variables to capture their unique dynamics. This approach would enable a more precise analysis and a more nuanced understanding of their effects on user behaviors and interactions, thereby enhancing the practical applicability of the results.

In conclusion, this study underscores the critical role of goal intention, implementation intention, and habitual behaviors in shaping protective behaviors related to information privacy. The findings highlight implementation intention as a powerful tool to bridge the gap between motivational goals and actual behavior, emphasizing the importance of concrete planning in promoting protective actions. Additionally, the influence of counter-intentional habits and privacy cynicism indicates that both habitual and attitudinal factors play significant roles in information privacy behaviors. Based on the findings and implications of this study, information privacy relevant practitioners can develop more effective strategies to enhance online users' personal information privacy, thereby contributing to the development of robust information privacy practices. In a word, this study provides a theoretical foundation for future research and practical interventions aimed at improving information privacy practices in diverse contexts.

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数字化转型对企业绿色创新效率的影响研究： 管理能力的调节作用

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Research on the Impact of Digital Transformation on Enterprise Green Innovation Efficiency: The Moderating Role of Managerial Ability

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Abstract

数字化转型优化了生产流程和资源配置,提高了绿色创新效率,减少了环境污染。以往的研究表明,数字化转型对绿色创新产出有正向影响,但对绿色创新效率的研究相对较少,尤其是管理能力(MA)在其中的调节作用尚不明确。本研究基于资源基础理论和资源依赖理论,利用2007-2021年中国A股制造业上市公司数据,探讨数字化转型对绿色创新效率的影响机制。研究发现,数字化转型显著提高了制造企业的绿色创新效率;管理能力的过度干预可能会降低企业的绿色创新效率,特别是在高创新能力的企业中。本研究利用微观数据和文本分析方法,提供了关于数字化转型对经济影响的新数据,考察不同管理能力对数字化转型和绿色创新效率、促进制造企业高质量发展、改善创新环境的影响。

Keywords: Digital Transformation; Green Innovation Efficiency; Management Capability; Chinese Manufacturing Enterprises

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1. 研究背景

中国作为世界制造业中心，制造业增加值占全球比重约 30%，连续 14 年位居全球首位[†]。在过去的几十年中，中国制造业经历了显著的增长，然而，由于其生产过程的资源密集型性质，加剧了污染排放等环境问题。因此，推动中国制造业的绿色发展对于中国经济向低碳未来转型至关重要。随着物联网(IoT)、大数据分析、人工智能(AI)等技术的快速发展，中国制造企业为适应时代发展，正从结构升级走向高端化、智能化、绿色制造。这些技术为传统制造业的绿色低碳转型提供了新的思路。中国制造企业正在加快数字化转型，转变经营方式，开始将“数字技术”作为结构优化的核心战略。通过数字化转型，制造企业可以提升能源利用技术和生产流程，促进绿色技术的智能化转型。由此产生了绿色产品设计系统、绿色制造决策系统、绿色产品回收系统等数字化绿色生产平台，促进了制造业绿色低碳转型升级提质增效。数字化转型是指战略性地采用和整合信息和数字技术，彻底改变传统的生产和管理方式(Philippart, 2021; Zhao et al., 2023a)。数字技术的应用可以优化制造企业的生产流程和资源配置，从而提高创新资源的转化效率，减少环境污染(Ngo et al., 2022)。因此，数字化转型与绿色创新效率之间可能存在着密切的联系。

已经有研究探讨了数字化转型对绿色创新的影响。然而，这些研究的主要焦点是围绕着数字化转型对绿色创新产出的影响。例如，He et al.(2023b)和 Xu et al.(2023a)进行的调查显示，数字化转型导致了企业提交的绿色专利申请数量的增加。此外，Liu et al.(2023)进一步证明了数字化转型提高了企业绿色专利的质量。然而，绿色创新产出的增加可能是由于对创新投资的增加或绿色创新效率的增强。最近，越来越多的研究强调了绿色创新效率对制造业的意义(He et al., 2023a; Li & Zeng, 2020)。然而，目前关于数字化转型对制造企业绿色创新效率影响的研究还不多。在企业数字化转型和高质量发展创新的双重背景下，企业数字化转型与企业绿色创新效率之间是否存在必然的因果关系，以及两者通过什么路径和机制发生联系，目前的文献还不足。因此，基于这些现有的研究，深入研究数字化转型与绿色创新效率之间的联系机制至关重要。

绿色创新已成为高层管理团队实践中的重要战略问题，近年来研究人员研究了 TMT 特征如何影响企业的绿色创新绩效(Meng et al., 2022)。Chen et al. (2015) 首次研究了管理能力与创新之间的关系，发现两者存在正相关关系，管理能力是企业创新成功不可或缺的因素。Yao et al. (2018) 研究发现，管理能力越强，有助于提高企业绿色创新效率。然而，Feng & Wang(2024)发现由于管理者的短视行为和优先考虑收入的薪酬制度限制了企业绿色创新能力的发展，管理者的能力抑制了绿色创新。综上所述，管理能力对绿色创新效率的影响随着环境的变化而变化。因此，数字化转型与绿色创新效率之间的关系在不同的管理能力(MA)水平上是否存在差异，仍有待进一步的实证检验。基于以上分析，我们提出了以下问题：数字化转型如何影响中国制造企业的绿色创新效率？这种影响的潜在机制是什么？管理能力(MA)是否会影响两者之间的关系？

为了解决上述问题，本研究从资源基础观点(RBV)和资源依赖理论(RDT)的角度，构建了理论框架，并从内部资源配置效率的角度进行分析。本文基于 2007 年至 2021 年沪

[†] https://www.gov.cn/yaowen/liebiao/202402/content_6933130.htm

深两地中国 A 股制造业上市公司的数据，深入探讨数字化转型对制造业企业绿色创新效率的内在机制，并进行实证验证。研究发现数字化转型能够极大促进制造企业的绿色创新效率；第二，数字化转型与绿色创新效率之间的关系受到多种因素的影响。具体来说，管理能力可以参与企业创新，但会导致过度干预，降低企业绿色创新效率，尤其是在创新能力较高的企业中。因此，对管理能力的干预很可能导致资源的错配。

本研究具有以下意义。首先，它提供了有用的数据，可以补充关于数字化转型经济影响的研究。其次，利用上市公司微观数据，采用基于爬虫技术的文本分析方法建立企业级数字化转型指标，有效克服了现有数字化层面量化衡量的不足。最后，我们从数字化转型的差异化环境出发，考察不同企业管理能力的差异，分析数字化转型对绿色创新效率的不同影响。通过完善数字化转型与绿色创新效率的研究框架，加强对数字化转型与绿色创新效率影响因素的研究，推动制造企业高质量发展，为改善制造企业创新环境提供参考资料。

2. 理论分析与研究假设

2.1 数字化转型对绿色创新效率的影响

制造企业通过数字技术赋能资源优化，从而影响绿色创新的效率。企业数字化转型利用新一代信息技术，促进企业战略决策、业务流程、运营管理和组织文化的互动创新，打破信息传递的层级化约束，释放和整合创新资源，降低信息处理成本，提高绿色创新效率（Zhang & Guo, 2022）。数字化转型还增强了决策能力，通过建立专家数据库、知识库和过程机制模型，利用决策支持系统和客户关系管理系统，丰富决策场景，增强动态协作和持续学习能力，提高决策效率和研发投资的产出绩效(Lin & Xie, 2023a)。此外，数字化转型通过数据挖掘和信息共享，加快数据积累和技术更新(Pereira & Frazzon, 2021)，促进新老业务的深度融合，准确识别客户需求，探索最优创新路径，使企业的资源调动更加灵活、组织弹性增加(Klingebiel & Rammer, 2014)。面对政府提倡企业绿色转型的政策，企业能够迅速整合内外部资源，从而更好地进行绿色创新，提高技术创新成功的可能性(He et al., 2023b)。对此，本文提出以下假设：

H1：数字化转型影响制造企业的绿色创新效率。

2.2 管理能力调节数字化转型对绿色创新效率的影响

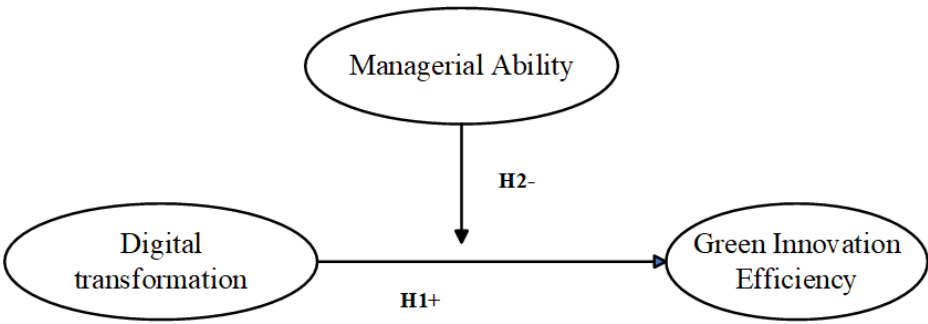
Hambrick & Mason (1984)提出的上层梯队理论认为，企业高管从他们过去的教育和专业经历中获得的独特特征塑造了管理者的认知能力和价值观。这些特征一旦形成，管理者能够识别数字技术对业务的潜在影响，并制定相应的战略(Zhang & Greve, 2018)。企业高层管理团队在战略方向、资源分配和投资方面具有重大影响，从而推动变革和创新(Carpenter et al., 2004)。因此，认识到高层管理团队逐渐在企业绿色创新中的应用得到了关注(Khanra et al., 2022; Shahab et al., 2020)。他们能确保数字化转型项目获得足够的资源和支持，并且能识别转型中的风险并提前制定应对策略。管理者的支持和鼓励可以促进员工的创新行为，并推动不同部门之间的合作，实现更大范围的创新(Dewiruna et al., 2020)。然而，过度干预也可能带来风险，特别是在高创新能力的企业中，可能会抑制创新活动，导致资源错配

(Zhang et al.,2019)。过多的管理干预可能增加企业内部的官僚主义和决策层的保守倾向，限制转型所需的灵活性和创新精神。

H2：管理能力越强，数字化转型对绿色创新效率的影响越弱。

3. 研究方法

3.1 研究模型



<Figure1> Research Model

3.2 研究设计

3.2.1 样本选择与数据来源

以中国沪深 A 股制造业上市公司为研究对象，以 2007 年至 2021 年的数据作为初始研究样本，删除 ST 和*ST 公司样本，删除主要变量缺失以及退市公司样本，为了降低异常值的影响，文章还对样本中所有连续变量进行了行 1% 和 99%的 Winsorize 处理。数字化转型相关数据通过搜集和整理相应公司年报，采用爬虫技术获得，其他数据取自 CSMAR 数据库。最后利用 STATA16.0 进行相关数据处理。

3.2.2 变量定义

(1) 被解释变量：绿色创新效率（EFFI）

被解释变量为企业绿色创新效率。参考 Yang（2022）的方法，使用公司年度研发支出对创新投入的比值衡量绿色创新效率。上市公司的绿色创新产出则使用上市公司绿色发明专利、实用新型和外观设计专利的总申请量加 1 的自然对数衡量。

(2) 解释变量：数字化转型（DITL）

解释变量为数字化转型。采用机器学习的文本分析法提取沪深 A 股制造业上市企业年报文本形成相应数据池。借鉴相关政策文件以及赵璨等的处理思路，从人工智能、互联网、大数据、区块链、云计算、电子商务、智能制造等技术实践应用入手选出代表企业数字化转型的特定关键词。最后，基于 Python 技术,得到大数据、人工智能、区块链、云计算、数字技术应用 5 个维度词频数求和，并加 1 取自然对数来衡量上市企业的数字化转型程度。

(3) 调节变量

调节变量为管理者能力。管理者能力本文借鉴了 Demerjian et al(2012)的研究, 采用数据包络分析和 Tobit 模型相结合的两阶段模型测度管理者能力。具体计算过程如下:首先, 本文将固定资产净额、无形资产净额、商誉、研发支出、营业成本、销售与管理费用作为 DEA 分析中的投入变量, 把营业收入作为唯一的产出变量, 通过数据包络分析计算得出企业效率值。其次, 数据包络分析计算得出的企业效率值同时受企业与管理者两个层面的因素影响, 因此, 文章进一步采用 Tobit 模型将两个层面的效应进行分离。Tobit 模型中控制的企业层面因素包括企业规模、市场份额、自由现金流、成立年限、国际化程度和多元化程度。由于 Tobit 模型无法涵盖所有影响企业运营效率的企业层面特征, 导致回归残差代表管理者能力存在噪音干扰(Dai et al, 2016)。为降低该指标的噪音, 本文将回归残差从小到大排序分为四组, 相应的把管理者能力(MA)赋值为 1、2、3、4 来衡量, 赋值越高, 代表管理者能力越强。

(4) 控制变量

本文选取公司规模 (SIZE)、应收账款占比 (REC)、营业收入增长率 (Growth) 作为控制变量。<Table1>列示所有变量的具体定义及说明。

<Table1> 变量的定义及说明

变量类型	变量名称	标记	测度方法
被解释变量	绿色创新效率	EFFI	$\ln(\text{企业绿色专利申请数量}+1) / \ln(\text{企业研发投入}+1)$
解释变量	数字化转型	DITL	对基于爬虫数据归集整理所得的加总词频加 1 取对数
调节变量	管理能力	MA	模式残差
控制变量	公司规模	SIZE	年总资产的自然对数
	应收账款占比	REC	应收账款净额/总资产
	营业收入增长率	Growth	本年营业收入/上一年营业收入-1

3.2.3 模型设计

基于上述理论和假设, 首先建立模型 (1) 考察数字化转型对企业绿色创新效率的影响。其次建立调节效应模型检验管理者能力对数字化转型与企业绿色创新效率关系的影响, 具体见模型 (2):

$$EFFI_{i,t} = \alpha_0 + \alpha_1 DITL_{i,t} + \alpha_2 Controls_{i,t} + \varepsilon_{i,t} \tag{1}$$

$$EFFI_{i,t} = \beta_0 + \beta_1 DITL_{i,t} + \beta_2 MA_{i,t} + \beta_3 DITL_{i,t} \times MA_{i,t} + \beta_4 Controls_{i,t} + \varepsilon_{i,t} \tag{2}$$

式 (1) 中, α_1 代表企业数字化转型 $DITL_{i,t}$ 对绿色创新效率 $EFFI_{i,t}$ 影响的总效应; β_3 代表管理能力对数字化转型促进企业绿色创新效率的调节效应。如果 β_3 显著为正, 则说明企业管理能力越强, 越有利于加强数字化转型对企业绿色创新效率的促进作用。如果 β_3 显著为负, 则说明管理程度越低, 数字化转型对企业绿色创新效率的提升作用越明显, 调节效应显著。

4. 实证分析

4.1 描述性统计

Table2 是所有变量的描述性统计。从企业绿色创新效率（speed）指标来看，其均值为0.0285，标准差为 0.049，绿色创新效率的均值较低，且标准差较高，反映出我国制造业上市公司绿色创新效率整体处于较低水平且企业之间差异显著；数字化转型程度（digital）均值和标准差分别为 1.2918 和 1.323，均值处于中等水平，但标准差较大。说明企业实施数字化转型程度不高且不同企业间有较大差异；管理能力均值为 2.1606，标准差为 1.008，说明均值较高，标准差适中，表明企业在管理能力上整体较强，但也存在一定的差异。

Variable	Obs	Mean	SD	Variance	Min	Max
speed	15487	0.0285	0.049	0.002	0.00	0.41
digital1	15487	1.2918	1.323	1.749	0.00	6.15
ma	15487	2.1606	1.008	1.016	1.00	4.00
gaoxin	15487	0.6504	0.477	0.227	0.00	1.00
Size	15487	21.8885	1.135	1.287	19.32	26.45
Rec	15487	0.1409	0.093	0.009	0.00	0.51
Growth	15487	0.1729	0.372	0.138	-0.66	4.02

<Table2> 描述性统计分析

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

4.2 相关性分析

相关性分析结果见表 3。由表 3 可知，企业数字化转型和绿色创新效率的系数为 0.197，在 1%水平下显著为正，表明企业数字化转型的推动会提高企业绿色创新效率，控制变量中公司规模、营业收入增长率、应收账款占比均与绿色创新效率在 1%水平下显著正相关，营业收入增长率则呈负相关关系。

	speed	digital1	ma	gaoxin	Size	Rec	Growth
speed	1						
digital1	0.197***	1					
ma	-0.033***	0.053***	1				
gaoxin	0.084***	0.078***	-0.030***	1			
Size	0.253***	0.165***	-0.103***	-0.181***	1		
Rec	0.148***	0.187***	0.065***	0.121***	-0.079***	1	
Growth	-0.005***	0.035***	0.123***	0.035***	0.091***	0.031***	1

<Table3> 相关性分析

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

4.3 回归分析

数字化转型对企业绿色创新效率的直接影响的回归结果见表 4。在表 4 的第 (1) 列中，只包含自变量，可见数字化转型系数显著为正。这表明数字化转型对推进公司的绿色创新效率有积极的贡献。控制变量的研究结果见表 4 的第(2)列。在这些结果中公司规模、应收账款占比的正显著的回归系数和营业收入增长率的负回归系数表明，制造企业的绿色创新效率确实可以从数字化转型的过程中获益。

<Table4> 回归分析

	(1)	(2)
	speed	speed
digital1	0.0015*** (0.0004)	0.0013*** (0.0004)
gaoxin		0.0018** (0.0009)
Size		0.0031*** (0.0008)
Rec		0.0251*** (0.0062)
Growth		-0.0022*** (0.0007)
Year	Fixed (Control)	Fixed (Control)

Industry	Fixed (Control)	Fixed (Control)
_cons	-0.0233**	-0.0926***
	(0.0117)	(0.0200)
N	15487	15487
adj. R2	0.628	0.629

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

4.4 调节效应检验

表 5 第 3 列显示区域管理能力对数字化转型与绿色创新效率关系的调节结果，系数为-0.004，在 1%显著水平下通过检验，表明管理能力抑制了数字化转型对绿色创新效率水平的影响。模型 (1):数字化转型 (digital) 对 "speed" 的系数为 0.0013，且非常显著 ($p < 0.05$)。模型 (3) 重新引入了管理者能力 (MA4) 作为解释变量。数字化转型 (digital) 对 "speed" 的系数略有增加，为 0.0021，且在统计上显著 ($p < 0.05$)。管理者能力 (MA4) 对 "speed" 具有负面影响，系数为 -0.004， $p < 0.1$ 。

这些结果表明数字化转型 (digital) 对 "speed" 有正面影响，而管理者能力 (MA4) 对 "speed" 有负面影响。此外，模型 (3) 暗示数字化转型和管理者能力之间可能存在某种交互作用，尽管该交互项的显著性略低于 0.1。这表示管理能力与制造业企业绿色创新效率间显著负相关，即管理能力的提升能对制造业企业绿色创新效率产生显著抑制效应。

<Table5> 调节效应检验

	(1)	(2)	(3)
	speed	speed	speed
digital1	0.0013***	0.0012***	0.0021***
	(0.0004)	(0.0004)	(0.0007)
gaoxin	0.0018**	0.0017*	0.0017*
	(0.0009)	(0.0009)	(0.0009)
Size	0.0031***	0.0030***	0.0030***
	(0.0008)	(0.0008)	(0.0008)
Rec	0.0251***	0.0270***	0.0272***
	(0.0062)	(0.0062)	(0.0062)
Growth	-0.0022***	-0.0017**	-0.0017**

	(0. 0007)	(0. 0008)	(0. 0008)
ma		-0. 0013***	-0. 0007
		(0. 0004)	(0. 0005)
digital1ma			-0. 0004*
			(0. 0003)
Year	Fixed (Control)	Fixed (Control)	Fixed (Control)
Industry	Fixed (Control)	Fixed (Control)	Fixed (Control)
_cons	-0. 0569***	-0. 0517***	-0. 0529***
	(0. 0158)	(0. 0159)	(0. 0159)
N	15487	15487	15487
adj. R2	-0. 129	-0. 128	-0. 128

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

4.5 稳健型检验

为了检验模型结果的可信度和稳健性，采用替换变量的方法进行稳健性检验，得到上表。所呈现的结果显示，数字化水平的系数为 0.0013($p<0.05$)，与前文实证结果相符，表明数字化水平的提升能对制造业企业绿色创新效率产生显著促进效应。替换变量之后数字化水平的提升能对制造业企业绿色创新效率也产生显著促进效应，数字化水平的系数为 0.0017($p<0.05$)。因此上述模型结论具有稳健性。

<Table6> 稳健型检验

	(1)	(2)
	speed	speed
digital1	0. 0013***	
	(0. 0004)	
digital2		0. 0017***
		(0. 0005)
gaoxin	0. 0018**	0. 0018**
	(0. 0009)	(0. 0009)

Size	0.0031*** (0.0008)	0.0030*** (0.0008)
Rec	0.0251*** (0.0062)	0.0249*** (0.0062)
Growth	-0.0022*** (0.0007)	-0.0022*** (0.0007)
Year	Fixed (Control)	Fixed (Control)
Industry	Fixed (Control)	Fixed (Control)
_cons	-0.0569*** (0.0158)	-0.0576*** (0.0158)
N	15487	15487
adj. R2	-0.129	-0.128

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

4.6 内生性检验

为了检验模型的内生性，采用滞后一期、滞后二期自变量的方法进行内生性检验，得到上表。所呈现的结果显示，数字化水平的系数为 0.0013($p<0.05$)，滞后一期后的数字化水平系数为 0.0015($p<0.05$)，滞后二期的数字化水平系数为 0.0015($p<0.05$)。由此检验模型不存在内生性问题。

	(1)	(2)	(3)
	speed	speed	speed
digitall	0.0013*** (0.0004)		
L. digitall		0.0015*** (0.0004)	
L2. digitall			0.0015*** (0.0005)
gaoxin	0.0018** (0.0009)	0.0019* (0.0011)	0.0024* (0.0012)

Size	0.0031*** (0.0008)	0.0022** (0.0009)	0.0015 (0.0010)
Rec	0.0251*** (0.0062)	0.0245*** (0.0070)	0.0251*** (0.0077)
Growth	-0.0022*** (0.0007)	-0.0021** (0.0009)	-0.0022** (0.0009)
Year	Fixed (Control)	Fixed (Control)	Fixed (Control)
Industry	Fixed (Control)	Fixed (Control)	Fixed (Control)
_cons	-0.0569*** (0.0158)	-0.0387** (0.0186)	-0.0111 (0.0210)
N	15487	12737	10776
adj. R2	-0.129	-0.142	-0.151

4.7 异质性检验

是否是高新技术产业意味着企业在技术研发和创新方面的投入和关注度不同，同时数字化水平也反映出较大差异。本文以是否是高新技术产业为分组依据，将样本企业分为高新技术企业组和非高新技术企业组，检验是否是高新技术产业下数字化水平与制造业企业绿色创新效率内在关联的变化，其结果如上表所示。回归分析结果表明无论是高新技术企业组，还是非高新技术企业组，数字化水平与企业绿色创新效率间正相关，高新技术组的促进程度更大。

主要原因可能在于：第一，技术驱动和创新导向：高新技术产业以技术创新为核心，推动数字化和创新的发展。高新技术的引入和应用可以促进制造业企业的数字化水平提升，提供先进的生产工具和技术，改进产品设计和制造流程，从而增强企业的绿色创新效率。第二，跨界融合和合作创新：高新技术产业常常涉及多个领域和行业的融合，需要不同领域的专业知识和技术能力。制造业企业参与高新技术产业可以与科研机构、高校、技术专家等进行合作创新，共享资源和知识，提高绿色创新效率和水平。第三，市场需求和竞争压力：高新技术产业的快速发展和市场需求的变化，推动制造业企业加快数字化转型和创新步伐。企业为了适应市场需求和应对竞争压力，需要不断提升数字化水平和绿色创新效率，以保持竞争优势。第四，政策支持和资源投入：高新技术产业往往得到政府和相关机构的政策支持和资源投入。政府在财税、政策和创新基金等方面提供支持，为企业提供研发资金、税收减免和技术转移服务等资源，促进数字化水平和绿色创新效率的提升。综上所述，高新技术的技术驱动、跨界融合和合作创新、市场需求和竞争压力以及政策支持和资源投入等因素共同推动了数字化水平与绿色创新效率的提升。

<Table7> 异质性检验

	非高新	高新
	speed	speed
digitall	0.0012** (0.0006)	0.0014*** (0.0005)
Size	0.0039*** (0.0009)	0.0028*** (0.0008)
Rec	0.0220** (0.0104)	0.0430*** (0.0082)
Growth	-0.0021** (0.0011)	-0.0040*** (0.0010)
Year	Fixed (Control)	Fixed (Control)
Industry	Fixed (Control)	Fixed (Control)
_cons	-0.0679*** (0.0203)	-0.0369** (0.0171)
N	5414	10073
adj. R2	-0.326	-0.211

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

5. 结论

数字技术是制造企业获得竞争优势和实现增值的根本途径，提高创新效率是关键所在。本文探讨了数字化转型对制造企业创新效率的影响机制，并基于高层梯队理论，分析了管理者能力对数字化转型与企业创新效率之间关系的影响。研究发现，数字化转型对制造企业创新绩效的提升有显著的促进作用；然而，管理者能力对数字化转型与创新效率之间关系具有抑制作用，即管理者能力越强，数字化转型对创新效率的抑制作用越明显。

数字化水平（数字化）与制造企业的创新效率（速度）之间存在显著的正相关关系，即数字化水平的提高可以显著促进制造企业的创新效率。主要原因包括：首先，提供更准确的数据和分析能力。数字化转型使企业能够收集和分析大量数据，包括供应链、生产过

程、产品质量等方面的数据。这些数据可以用于深入了解企业的运营状况和市场需求，为创新提供有力支持。通过更准确的数据和分析能力，企业能够更好地识别问题、发现机会，并采取相应的创新行动。其次，促进跨部门和跨组织的协作。数字化转型打破了传统组织结构的界限，使得不同部门和组织之间能够更紧密地协作。通过数字平台和工具，员工能够更轻松地共享信息、协同工作，促进创新协作和知识共享。这种协作和跨界合作的机制有助于加速创新过程，减少信息壁垒，提高创新效率。第三，提高生产过程的智能化和自动化。数字化转型可以使生产过程的各个方面实现智能化和自动化。通过引入物联网、人工智能和机器学习等技术，企业能够实现设备的自动监控和故障预测，生产线的智能调度和优化，从而提高生产效率和质量稳定性。智能化和自动化的生产过程为企业提供了更大的灵活性和反应速度，使其能够更快速地应对市场变化和创新需求。第四，加快产品开发和上市周期。数字化转型可以提高产品开发的效率和速度。通过使用虚拟仿真、快速原型制作、云协作等工具和技术，企业能够在更短的时间内设计、测试和改进产品。数字技术还可以支持定制化生产，使企业能够更快地将新产品推向市场，以满足不断变化的客户需求。总体而言，数字化水平的提高为制造企业提高创新效率提供了更多的机会和工具。通过更好地利用数据、促进协作、智能化生产以及加快产品开发周期，企业能够更快速地识别市场机会、响应客户需求，并迅速推出创新产品和解决方案，从而提高创新效率和竞争力。

管理能力与制造企业的创新效率之间存在显著的负相关关系，即管理能力的提高对制造企业的创新效率有显著的抑制作用。主要原因包括：首先，冗余和复杂性增加。管理能力的提高可能导致企业内部出现更多的层级和程序，以应对更复杂的业务需求和组织结构。这种增加的冗余和复杂性可能导致决策的滞后和创新的障碍。冗余和复杂性增加了信息传递和决策的成本和时间，降低了企业对外部变化的敏感性和适应性。其次，僵化和保守的倾向。管理能力的提高有时会使企业变得更加保守，遵循规则和程序。管理层面的标准化和规范化可能会限制员工的自由创新和试错精神。创新需要一定的冒险精神和灵活性，过分强调规范和控制可能会抑制员工的创新动机。第三，长期目标和短期绩效之间的权衡。管理能力的提高可能导致企业更加关注短期绩效和经营指标的实现，而忽视了对长期创新的投资和发展。在追求短期利润和绩效的压力下，企业可能缺乏长期战略规划和创新投入，从而影响创新效率的提高。总之，尽管管理能力的提高对企业运营和绩效有积极影响，但也可能对制造企业的创新效率产生抑制作用。这包括冗余和复杂性增加、僵化和保守的倾向以及长期目标与短期绩效的权衡等因素。为克服这些抑制作用，企业需要注重平衡管理与创新之间的关系，培养创新文化和氛围，确保长期创新投资的可持续性。

在引入数字化水平和管理能力的交叉项后，发现这一交叉项与企业创新效率（EFF）显著负相关，表明企业管理能力显著抑制了数字化水平与制造企业创新效率之间的正相关关系。主要原因可能是管理层对数字化转型缺乏战略规划和明确愿景，导致数字化水平与创新效率的相关性较弱。没有明确的数字化战略，企业可能无法充分利用数字工具和技术来推动创新。此外，如果企业的组织文化不支持创新和数字化转型，存在沟通障碍，即使管理能力提高，也可能无法激发员工的创新热情和意愿。缺乏开放沟通与协作文化可能会阻碍数字化水平与创新效率之间的正相关程度。

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SESSION 3

HUMANITIES



襯字對元散曲南北曲語言風格的影響

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摘要

襯字用於北曲者較多，南曲較少使用，用於劇曲多而散曲者少。進一步觀察元散曲用襯現象，按《南北詞簡譜》³所載，北曲襯字不限字數，但南曲則「襯不過三」。

一般皆以為北曲因胡樂較多，用襯遂廣，襯字成為補足語義、加強聲情的重要成份；南曲因規範較嚴且受限於音樂形式，難加襯字，使襯字使用的自由度不如北曲，多為虛字。而元散曲中北曲用襯的自由度也大大提升了文學家在語義上創新的空間，故王國維《宋元戲曲史》評元散曲：「元曲之佳處何在？一

言以蔽之，曰：自然而已矣。」所謂「自然」仍屬較抽象的評述，本文企圖從南北曲襯字使用之異分析其語言風格，並討論一個文學體裁呈現南北有異語言風格的成因，我們以為首先由於音樂形式不同使襯字使用在南北呈現寬嚴之別，進一步又與南北方言在語音、詞彙上的差異有關，是以元散曲的整體發展是肇因於音樂和語言風格之異，而形成文學風格之特殊性，亦是北曲「自然」風格之關鍵。

³ 吳梅：《南北詞簡譜》（台北：學海出版社，1997）

襯字對元散曲南北曲語言風格的影響

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一、元曲性質及其襯字發展

（一）曲的起源

曲做為金、元以來的一種新興文體，是配合音樂演唱的韻文，一般而言是文學家依照曲牌填入曲詞。

曲和詞不同之處，一般最粗淺的認識是「襯字」有無，事實上，若深究根本原因，乃在音樂性之異。金、元等外族入主中國時，帶來「胡樂」，包括樂曲形式和樂器，此類胡樂節奏較快，和原先中土流行的詞調不能配合，兩者一急一緩，於是時人更為新聲，創作新曲牌，是為元曲之由來。故明王世貞《曲藻》曰：

曲者，詞之變。

此「變」的根本在音樂性，進而影響了填詞內容的自由度，並隨著方言語詞的使用差異，使元曲的南、北曲存在語言風格的差異，這也是本文論述的著力處。

襯字起因於胡樂特殊的音樂性，由於音樂節奏較快，可較隨意地加入唱詞，相較於中國原先的樂曲形式，如較古老的南曲因板眼清楚，節奏較緩，難以增字。此音樂性的轉變，對中國傳統詞曲韻律發展有著莫大的影響。

由以上起源之論述，故曲又可稱「詞餘」，指產生時間在「詞」之後，或名「樂府」、「今樂府」，即中國傳統文學稱可入樂韻文之稱。

（二）曲的分類

以文學形式而言，可分散曲與劇曲；若以曲牌內容和音樂旋律分類，可分北曲和南曲，此待後段「曲的音樂性」再論。

1. 散曲

散曲大致可分「小令」、「散套」和「帶過曲」，以下分述之。

小令時稱「葉兒」，又稱「單牌曲」，顧名思義指只有單支曲牌，短小的形制和「詞」很接近，文辭上的差異是小令可加襯字，當然就前文所述，胡樂傳入後詞與曲有著音樂上的根本差異，若不對照音樂和詞牌曲牌填詞規範，我們實難單從文學形式實難確切分出「詞」和「小令」之別。

散套又稱「套數」、「大令」，指集合同一宮調（相當西洋樂理的 C 大調、D 大調）數支小令成一套曲，此聯章形式源自宋金諸宮調，各曲在在內容上可以連貫，各曲同押一部韻，通常在結尾加上〔尾聲〕。文學家用以發展一段較長的情節。此外，另有介於小令和散套間的「帶過曲」形式。

2. 劇曲

劇曲指的是元、明雜劇（一般簡稱北曲）和明、清傳奇（一般簡稱南曲），是包含曲文（歌詞）、做科（動作）、說白（白話的台詞）三部份，為元代以後流行於宮廷或民間的戲劇搬演形式。值得注意的是，元、明雜劇雖一般稱北曲，但其實其曲文兼有南北曲牌，稱「南北合套」，明、清傳奇亦皆是南北合套形式，這是元代後戲曲音樂的共性。將元、明雜劇或明、清傳奇簡稱北曲或南曲，原因在於元、明雜劇在體制上是由宋雜劇、金院本到元雜劇向下一脈相承的，音樂形式是逐步由中國本土樂曲納入胡樂，而明、清傳奇則根源於中國南方的南戲，原先的戲曲通篇皆用南曲曲牌，元代以前未有北曲納入，故舊習稱「南曲」。

（三）曲的音樂性和體制

1. 北曲

北曲的起源可上溯唐宋大曲、宋元金諸宮調、宋詞、鼓子詞、唱賺、轉踏等中國北方各民族音樂，是七聲音階。

北曲的音樂和曲詞隨時代歷經流轉，從元代後納入胡樂，納入胡琴等，以彈撥樂器為主，胡樂成為北曲與流行於南方的樂曲在音樂性上的根本差異；為了與南宋以來流行於南方的南戲樂曲相區別，故後世多南、北曲區分。

但曲牌之流傳時間實早於胡樂傳入，故今所見之曲牌可分別見於南北曲，如[一枝花]今日可見南北曲的不同作品，風格亦有差異，下一節將從南北皆存的曲牌分析南北曲詞的語言風格差異。

元代後，隨著漢語近代音的發展，元代北曲有「入派三聲」的表現，曲文填寫上也較為口語化，並可大量運用襯字，使北曲在句數、字數上打破了詞的格律，形式較靈活。我們簡單地用詞和曲同名的曲牌相比較，有少數格律無異者，如[虞美人]，也有格律不同者，字數、句數皆異，如[折楊柳]、[後庭花]等，這種詞、曲形式上的顯著差異，在曲文填寫更自由的北曲尤其明顯。

曲（尤其是北曲）文辭創作的自由度提升，固然肇因於音樂性，使倚聲填入歌詞的方式與過去「填詞」不同，這種形式上的突破，有幾點重要意義：首先，使文學與音樂的關係發生變化，詞為了合樂必須按譜填詞，而曲因為音樂的節奏改變使文辭填寫更加靈活，久而久之，襯字越加越多並佔有重要意涵（不若南曲襯字常是虛詞），音樂便必須配合曲文譜出適合演唱的曲調。其二，承上所述，音樂性的改變使北曲襯字的使用規律極寬，也讓曲文的創作逐步走向口語化，除了形成北曲獨特的語言風格，也進而形成一種文學風格，甚至成為一代之文學典範——「元曲」。其三，北曲的口語化，也擴大了口語詞彙在文學上的應用，如句式固定但字數增多、整篇內容增長、連接詞增多及口語或外來語的使用等，皆對文學語言風格的轉變有著莫大的影響。

2. 南曲

南曲是宋、元時中國南方（長江以南）戲曲、散曲所用曲調的統稱，用韻以南方方言為基準，分平上去入四聲，音樂用五聲音階，節奏較緩和，樂器以簫、笛為主，明清後納入箏、琵琶等彈撥樂器。宋元南戲和繼之而起的明清傳奇都以南曲為主，但明代後逐步納入些許北曲曲牌，成為「南北合套」形式。

南曲承繼唐代宮廷樂曲（唐大曲）及宋詞樂曲，板眼明確，即及所謂一板一眼。南曲音樂緩和、節奏較慢，一字拖腔較長，故難以加入太多襯字，若增字太多則會打亂原樂曲節奏。是以有「襯不過三」之謂。

我們比較北曲與南曲，主要有幾點差異：

（1）字腔不同（音樂不同→語言風格不同→聲情不同）

北曲音樂節奏快，字多腔少，曲文一字字緊密而少拖腔，再加上主樂器為彈撥樂器，曲調較為高亢。明王世貞《曲藻》言北曲特色：

北主勁切雄麗。

北字多而調促，促處見筋。

北辭情多而聲情少

南曲則與北曲相反，通篇字少腔多，即一字唱多個音調，故節奏較慢，字與字間較疏散，曲調緩慢。

如王世貞所述「北辭情多而聲情少」，便是一種對語言風格的分析，認為北曲的字詞較多使其重於敘事，在文辭上可發揮空間較多，但字詞所含的聲音（音調）較少，整體音樂節奏較快，故認為其情感抒發較缺乏。相對的，對南曲的評價一般是認為適於抒情，情感細膩和緩，表達出細微的內心情感。就南北曲之異而言，造成聲情差異的根本關鍵在其音樂性質，我們初步認同王世貞的觀點，但北曲「聲情少」之論，若指字的腔較少則可，但若用以指北曲情感容攝量不足則無法認可，因節奏較快或許無法呈現悠長的曲調，並予人一種悠遠的感受，北曲常用節奏較快速的方式敘述情思，但真情所出豈會因節奏快而稍少？

我們對節奏輕快及和緩呈現出的音樂風格差異有所認識後，便明白「聲情」所為何來。值得注意的是，「不同的音樂性質」對人類自然的、具普遍性的影響力，對應如音樂一般起伏頓挫的言語，其中的語言風格更是大大影響文字意涵呈現出的風格。故論南曲和北曲之比較，核心便在「音樂不同->語言風格不同->聲情不同」。

(2) 音階不同

北曲是七聲音階，即 1、2、3、4、5、6、7，南曲是五聲音階，為 1、2、3、5、6，沒有 4 和 7，五聲音階是中國傳統民族音樂的基本音階。

(3) 入聲字之有無

北曲和南曲在曲文上的另一個差異是：北曲沒有入聲字，入聲派入平、上、去調，南曲則有入聲字，呈現平上去入四分。南曲嚴明地分辨入聲字，如沈寵綏曾言唱南曲之要：

凡遇入聲字面，毋連腔，出口即需唱斷。

此南北曲之異，正好顯現了漢語南北方言入聲韻尾發展的差異。由韻書或曲律的編寫，我們知道北方曲律的經典曲韻《中原音韻》有「入派三聲」現象，即古入聲字丟失塞音尾-p、-t、-k，而成為陰聲韻字，便與其他原陰聲韻字混讀。南方方言在當時則多保留入聲尾，故反應在曲文上也是平上去入四分的韻母系統。

(四) 曲的襯字

元曲有別於其他韻文的一大特色，是襯字的使用，曲詞一般依曲牌訂製的句式和平仄限制寫成，但句間可加襯字，這類增字是原曲譜沒有的。在曲牌音樂節奏可容許的範圍，由作詞者加上襯字，其作用一般認為是補足語義或加強聲情。一般是南曲襯字少，北曲襯字多；小令襯字少，套數襯字多；散曲襯字少，劇曲襯字多。

童斐元《曲選注》釋正字與襯字：

曲文之中，有正字襯字之分。正字者，原譜所有，填曲時不可少之字也。

襯字者，原譜所無，填曲者以己意加增之字也。

增襯字的規範為：

1. 不妨礙曲調中的正字吐音清晰為原則。
2. 襯字可以在句首，也可在句中，但不能用於句末，尤其不能用作韻腳，故襯字不入韻、一般來說不拘平仄。
3. 如果是對句的襯字，用襯也要跟著相對。

4. 多是形容詞、副詞、助詞、連接詞等，但也有實詞的襯字。

襯字的添加和胡樂傳入有關，如前文所述，北曲納入胡樂後多可加襯字，字數不限，但南曲屬中國傳統舊曲，襯字之添加屬後起的發展，在典律較嚴明的南曲中，襯字的規範是「襯不過三」，即一曲中襯字不可超過三字。襯字常以前置在句首的方式表現，也偶有置於句中的，襯字原則上不需要理會平仄關係。

細究南北曲音樂性，北曲用彈撥樂器，板與板的緩或急變動不拘，一字可下三四板，板與板間便多了可容納字詞的空間（只要把字唱得快即可），故襯字數量不拘，虛詞或實詞皆可用。南曲宮調則板眼固定，即使加了襯字，其上不能加板（不能為襯字多音調），故南曲襯字少，有襯不過三之說，且因音調不為襯字改動，則宜用虛詞。

王國維《宋元戲曲史》論元曲：

元曲之佳處何在？一言以蔽之，曰：自然而已矣。古今之大文學，無不以自然勝，而莫著於元曲。

古代文學之形容事物也，率用古語，其用俗語者絕無。又所用之字數亦不甚多。獨元曲以許用襯字故，故輒以許多俗語，或以自然之聲音形容之。

所謂「自然」仍屬較抽象的評述，應從南北曲襯字使用之異分析其語言風格，並討論一個文學體裁呈現南北有異語言風格的成因。從前文逐步討論南、北曲根本之差異。

我們可發現首先是「音樂形式不同」，由於北曲的音樂改變，使襯字的使用成為中國韻文史上一個奇異的轉折，並在中國南北呈現襯字使用寬嚴之別，影響了南北曲文的語言風格。又南北方言在語音、詞彙上的差異，如北方口語詞、外來蒙古詞的使用，亦是北曲語言風格特殊的重點。是以元散曲的整體發展是肇因於音樂和語言風格之異，而形成文學風格之特殊性，亦是北曲「自然」風格之關鍵。所以王國維所謂「自然」，乃著重在「多用俗語」、「多用襯字」或「多用自然之聲音形容之」，是其「口語化」的曲文創作造就「自然」的評價，相較於南曲，北曲表現為「句式較長（增襯字）」、「增口語用詞」，在在使北曲貼近自然而然的口說環境，由此便成就了元代雅俗共賞的文學體裁。

（五）曲的風格：語言風格、文學風格與審美取向

單以元曲而論，過去一般不分南曲或北曲，而直稱曲是「以俗為尚」的，但從前文脈絡一路觀照下來，我們知道口語化、多用俗語和接近散文化的語言風格，實多集中在北曲的曲文中。散曲仍不脫典雅的一面，但較多是出現在南曲中，南曲雖也有方言詞的使用，但整體而言其構詞和句法還是較接近古典詩詞。

舉例來說，古典詩詞常主詞或用倒裝句，省略語法關係構成不合口語的詩句或詞句，常可見直接排列意象，句子間不用連結詞直接接續，這類走樣句構成了「詩的語言」。北曲則用加「襯字」的方式讓文句完整而連貫，語言風格明顯地口語化甚至接近散文化了。

和語言風格相關的是文學風格，以及最終形成的「審美取向」。中國文學史評元曲多以其「俗」為美，向有「詩莊、詞媚、曲俗」之評，深究其審美取向

之訂定，即所謂「本色」，實與語言風格有關，更根本的原因又與其音樂風格有關。元曲（尤其是北曲）形成較明快流暢的文學風格，是在北曲快節奏的彈撥樂器交響下自然構成的。然而，散曲在審美取向也不乏抒情委婉的作品，尤以小令最常見，但以一個時代整體的發展脈絡而言，這類作品在北曲中便被歸為「要非本色」了。

我們拿寫「閨怨」詩、詞、曲作品做比較：

打起黃鶯兒，莫教枝上啼。啼時驚妾夢，不得到遼西。

（唐金昌緒〈閨怨〉詩）

時光只解催人老，不信多情，長恨離亭，淚滴春衫酒易醒。 梧桐昨夜西風急，淡月朧明，好夢頻驚，何處高樓雁一聲。

（宋晏殊〈採桑子〉詞）

雲鬆螺髻，香溫繡被，掩春閨一覺傷春睡。柳花飛，小瓊姬，一聲雪下呈祥瑞，團圓夢兒生喚起。誰，不做美？呸，卻是你！

（元張可久〈山坡羊〉閨思曲）

以上三首作品都是閨中女子懷抱思念之情的描寫，金昌緒詩寫中規中矩並留有餘韻，晏殊詞則是婉轉陳情，張可久的曲子卻是情感畢露。

總的來說，北曲以音樂性的節奏明快為因，構成有別於詩、詞的審美取向，在句法、構詞、詞彙使用、描寫手法上，在在呈現的口語化傾向。值得注意的是，這種傾向口語化的韻文，雖然肇因於源自胡樂的音樂性質，卻也必定相應於漢語北方方言的語言發展態勢，近代漢語在音韻和構詞上逐步發生變化，詩、詞的格式已然無法滿足文學家的創造力；人們若無讓曲文貼近口語的想法，音樂節奏再怎麼適合加襯字，也不見得能如此流利地實踐在文學作品中。

學者若欲分析文學家的文學風格，可能傾向從其個人生命尋求解釋，如今我們發現語言風格也是一條認知作者的路徑，從中可宏觀地看出作者文學創作的特性及該時代作家的共性。本文論元代南、北曲在語言及文學風格上的表現，與當時樂曲的根本型態有絕對的關係，從整體時代風格中開展出各曲家的璀璨成果。否則何以唐代文學家性格如此莊重，宋代文學家如此柔媚，而元代又何以獨獨率真自然且以俗為美呢？由各具體的語言風格入手，使我們對文學風格的性質有另一個角度的瞭解。

二、 南、北曲襯字使用舉例

本節以南、北曲共有的曲牌為例，比較其襯字使用及隨之而來的語言風格差異。下錄曲文內容主要參自吳梅先生《南北詞簡譜》，旁及其他曲文收錄書目，如《曲苑揚芬》。

宮調前加注南、北以明南、北曲，此乃吳梅書中所記，本文轉用而已。又曲文正字用正常字體，襯字下標底線，加灰底字表示《南北詞簡譜》所無、他版本所載的襯字。

(一) 南呂宮 [一枝花]

1. 北南呂宮 [一枝花] / 貨郎旦

雖則是打牌兒出野村，不比那吊名兒臨構肆。與別人無夥伴，單看俺當家兒。

哥哥你索尋思，錦片也排著節使，都只待奏新聲舞柘枝。揮霍的是一錠錠、

響鈔精銀，擺列的是一行行、朱唇來皓齒。

關於不同版本新增的襯字，吳梅在本曲注中提到「用襯字無定，要在不傷本牌句法耳。」可見襯字使用的自由度，可隨實際搬演由演員或編曲家再不影響句法及文意下進行刪改。

2. 北南呂宮 [一枝花] 《不伏老》 / 關漢卿 [一枝花]

攀出牆朵朵花，折臨路枝枝柳。花攀紅蕊嫩，柳折翠條柔，浪子風流。憑著

我折柳攀花手，直煞得花殘柳敗休。半生來折柳攀花，一世裡眠花臥柳。

[尾聲]（此乃前曲的尾聲，一併補充參照）

我是個蒸不爛煮不熟捶不扁炒不爆響瑤瑤一粒銅豌豆，恁子弟每誰教你鑽入

他鋤不斷斫不下解不開頓不脫慢騰騰千層錦套頭。我玩的是梁園月，飲的是

東京酒，賞的是洛陽花，攀的是章台柳。我也會圍棋，會蹴鞠，會打圍，會

插科，會歌舞，會吹彈，會咽作，會吟詩，會雙陸。你便是落了我牙，歪了

我口，癘了我腿，折了我手，天賜與我這幾般兒歹症候，尚兀自不肯休。則

除是閻王親自喚，神鬼自來勾，三魂歸地府，七魄喪冥幽。天那，那其間才

不向煙花路兒上走。

3. 南呂宮 [一枝花] / 《琵琶記》

閑庭槐影轉，深院荷香滿。簾垂清晝永，怎消遣？十二欄杆無事閑憑遍，悶
來把湘簾展。方夢到家山，又被翠竹敲風驚斷。

4. 分析：

比較南、北曲共有且格式一致的曲牌，便可知襯字使用大不相同，由於襯字多用，北曲納入許多連接詞或其他虛詞或實詞，語言風格是自由的、較口語化的，評其「自由」是因為不同版本可見零星相異的襯字紀錄，評其「口語」則因連結詞多，使句子間的聯繫如同自然言語，使審美傾向貼近生活。

南曲因襯字不可多用，一般而言多依照曲牌格式填入曲文，整體語言風格與詞難有區別。

附帶補充的是關漢卿的[南呂 一枝花]的尾聲。全曲把襯字使用發揮到了極致，首兩句，本格原是七、七句式，作者足足增加了三十九個襯字，即使北曲襯字數量未有限制，這類長句還是相當獨特。將「我是一料銅豌豆」，增為「我是個蒸不爛煮不熟捶不扁炒不爆響噹噹一粒銅豌豆」，情緒直接，具有直白陳述帶來的強烈效果。利用襯字，突破了詞牌格律的字數限制，使得曲調字數可自由增減，從最根本的句法結構層面改變了詩詞的整齊一致性，開啟北曲新的藝術範疇。

(二) [山坡羊]

1. 北中呂宮 [山坡羊] 《驪山懷古》 / 張養浩

驪山四顧，阿房一炬，當時奢侈今何處？只見草蕭疏，水縈紆。

至今遺恨迷煙樹，列國周齊秦漢楚。贏，都變做了土；輸，都變做了土

驪山屏翠，湯泉鼎沸，說瓊樓玉宇今俱廢。漢唐碑，半為灰，

荊榛長滿繁華地，堯舜土階君莫鄙。生，人讚美；亡，人讚美。

2. 南商調 [山坡羊] 《牡丹亭》 / 湯顯祖

驀地裡懷人幽怨。則為俺生小嬋娟，

揀名門一例一例裡神仙眷。甚良緣，把青春拋的遠。

俺的睡情誰見？則索要因循覷腴。

想幽夢誰邊，和春光暗流轉。

遷延，這衷懷哪處言？淹煎，潑殘生除問天。

據《九宮大成譜》，南曲[山坡羊]大抵是七、七、七、八、三、五、七、八、二、五、二、五（十二句）。

（三）戲曲南北合套

崑曲許多戲碼都採用曲牌「南北合套」的形式演唱，如此一來，風格在整齊中又富變化。因為崑曲屬於南曲，故其南北合套的曲牌都是不多加襯字的，即使北曲的曲牌，在南方劇團的創作中，亦合於曲牌格律。崑曲南北合套一般由主角唱北曲，配角唱南曲，此處的北曲便無太多口語成份。

比方名劇《石秀探莊》中，主角石秀先唱北曲[新水令]，配角楊林唱南曲[步步嬌]，石秀再唱北曲[折桂令]，下面由鐘離老人唱南曲[江兒水]，石秀再唱北曲[得勝令]，其後祝小三唱南曲[園林好]，石秀最後唱北曲[沽美酒]。以上各曲將不離格律，曲文典正。

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針對中國籍韓語學習者的中韓慣用語比較研究

-- 以韓國語能力考試中高級（TOPIKⅡ）學習者為中心

楊芳

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5. 結論

摘要

中韓自古文化交流頻繁，有著共同的文化因素和相近的風俗習慣，這些相近之處不僅體現在文化方面，也體現在語言表達方式之中。作為最傳統、最代表民族文化特徵與思維方式的慣用語是語言的重要組成部分之一，是人們在日常生活中經常使用的語言；採用比喻的手法，慣用語能以簡潔的形式表達出人們的思想和感情。因此，聽懂、理解和熟練運用韓國語中的慣用語，能夠使韓國語水平提升到更高的層次。

本文主要研究對象是學習韓國語的中高級階段學生，研究內容為參加韓國語能力考試（TOPIK）二級階段閱讀部分出現的慣用語。本研究採用對比語言學的研究方法，首先對試題中出現的韓國諺語進行翻譯，然後進行對比分析，找出中韓慣用語的相同處和不同之處，從而提出針對中國學生行之有效的韓語慣用語的學習方法與建議。

在研究過程中，我們發現中國學生在學習韓語慣用語時常常會遇到一些問題。其中，由於中韓兩國文化背景的差異，中國學生往往難以理解韓語慣用語背後的深層含義。例如，韓語中的“손이 맵다”（手辣）並不是指手是辣的，而是形容“用手輕輕地打也很疼”，這與中文中的“辣手”在字面上相似但意義完全不同。另一個例子是“발이 넓다”（腳寬），它並不是指腳的尺寸大，而是形容某人“擅長與人交往，認識的朋友比較多”，這與中國學生習慣的直接翻譯方式存在很大差異。

在實踐運用能力方面，中國學生雖然可能理解了某個慣用語的含義，但在實際交流中可能還是會選擇使用更簡單的表達方式，因為他們對如何準確地運用慣用語缺乏信心。這種不自信可能源於對韓國文化背景的不了解，或者是對慣用語使用場合的不熟悉。

因此，本研究的必要性在於通過對比分析中韓慣用語的相同處和不同之處，找出中國學生在學習韓語慣用語時常見的問題，並提出有效的學習方法和建議。這不僅有助於提高中國學生的韓語能力，促進中韓兩國之間的文化交流，還能為韓語教學和研究領域提供新的視角和方法，推動該領域的發展和創新。通過本研究，我們可以更好地了解中國學生在學習韓語慣用語時的困難和需求，為他們提供更有效的學習支持。

第一章 緒論部分，介紹了國內外研究現狀，本文的研究意義和對象。

第二章 介紹了韓國語水準能力考試(TOPIK)。TOPIK 考題慣用語翻譯以及對比研究，首先對中韓慣用語的概念進行說明；並介紹了中韓慣用語的特點。

第三章選取 2014~2023 年的公開考試題中出現的韓國慣用語進行直譯後並找出與其相對於或相近的漢語慣用語進行比較分析，通過對同形同義的慣用語比較，異形同義的慣用語比較；同形異義的慣用語；異形異義的慣用語比較等四個層面上的分析，看出中韓慣用語詞匯意義的異同。

第四章就第三章的分析結果，提出了慣用語的學習方法。就使用對比的實際和使用文化背景的學習方法進行了簡單的說明。

關鍵字：中韓慣用語；TOPIK；對比；同形同義；異形同義；同形異義

1. 緒論

1.1 先行研究

慣用語是語彙寶庫中很有特色的一種熟語。慣用語在其形成過程中，與其語言文化有著密切的聯繫。^① 韓國與中國，作為地理上相鄰且歷史悠久的鄰國，自古以來就保持著頻繁的文化交流。在世宗大王 1446 年頒佈訓民正音（即韓國文字）之前，韓國也一直借用漢字來記錄韓國語。在這樣的背景之下，漢字詞也大量的融入到了韓國語中；據韓國的《標準國語大辭典》登載的 44 萬個詞匯當中，漢字詞占了約 57% 左右。但是隨時時間的推移，以及兩國的社會、文化、生活、言語行為發生了不同的變化，中韓使用的漢字詞匯也漸漸的演變，韓國語的漢字詞和對應的漢語詞匯發生了大的變化，而慣用語語作為語言的重要組成部分之一，也在產生了變化和發展。國內外，對於中韓慣用語的比較研究也從 1. 中韓慣用語總體比較；2. 中韓慣用語某一類型比較；3. 中韓慣用語某一具體問題這三個方面分類進行了比較研究，並且取得了很大的成果。

鄭潤基（2007）『中韓「四肢」慣用語對比研究』在研究比較時，先把 310 個漢語四肢慣用語語匯同 203 個韓語四肢慣用語分別按照「手 / 손」，「腳 / 발」，「胳膊 / 팔」，腿 / 다리，分成四個大類。對每個大類的中韓慣用語結構和意義上的異同進行比較分析。⁴

全金姬（2009）『中韓慣用語對比及教學中存在的問題分析』通過對中韓慣用語的概念、分類、語義與表現形態進行對比；並闡述了韓語慣用語在教學中存在的問題及對策。

金貞姬（2010）『中韓慣用語對比研究』從慣用語的語匯素材、語法結構、語義表達等三個不同角度考察了中韓慣用語的相似之處和不同之處，分析了它們之間的對應關係。

沈杜麗（2011）『漢韓常用慣用語對比研究』中通過對漢韓不對應的慣用語之間的意義和用法進行比較，系統的分析它們之間的區別。

崔希亮· 漢語熟語與中國人文世界〔M〕· 北京：北京語言大學出版社。2005·

王奕達(2017)在『中韓動詞「吃」和「먹다」的慣用語對比』一文中說明了中韓動詞「吃」和「먹다」的基本釋義和派生釋義。通過分析找出了有關中韓兩國動詞「吃」和「먹다」的慣用語特點的共同點和不同點。

楊欽妃(2023)在『漢韓常用慣用語對比研究』對中韓飲食慣用語進行意義方面的對比分析,找出其中的共同點以及兩國人民的認知和文化差異。

綜上所述,現有的關於韓中慣用語的比較研究,側重於對某一類型的分析,對於中韓諺語以及韓中慣用語詞匯進行綜合研究的論文比較少。因此,在韓中慣用語比較研究方面任然有比較大的空間。

1.2 研究意義

慣用語是一個國家一個民族在歷史、文化與社會交際過程中形成的,融合了風俗習慣、社會文化背景,是具有代表性意義的語言,在外國語的學習過程中,是非常難以掌握的。雖然隨著時代的發展,新創語的出現,部分慣用語的使用頻率正在逐漸減少,但是為了讓學習韓國語的外國人能夠在理解韓國文化的同時學習語言,在每一年的韓國語水準能力考試(TOPIK II)閱讀理解部分,都會結合語言環境出關於韓語慣用語的試題。本文選取 2014 年至 2023 年韓國語水準能力考試(TOPIK II)閱讀理解試題中出現的慣用語作為研究對象,進行語義上的對比分析,首先進行數據收集,收集 2014 年至 2023 年 TOPIK II 閱讀理解試題中所有出現的慣用語,並對每個慣用語的出現頻率、上下文語境進行記錄。第二,語義對比分析。對於每個慣用語,詳細分析其字面意義和在試題中的實際用法,及對比同壹類別中不同慣用語的語義差異和用法特點,特別注意那些字面意義與實際用法差異較大的慣用語。第三,進行案例分析,選取壹些典型的慣用語進行詳細的案例分折,包括其在試題中的具體用法、與其他詞彙的搭配、對理解文章內容的幫助等。根據分析結果,總結出韓國語能力考試中慣用語使用的特點和規律。尋找中韓諺語的異同之處,針對考生在理解和使用慣用語方面可能遇到的問題,提出相應的學習策略和建議,期望對韓國語學習者在韓語慣用語學習能有一定的幫助和啟示。

2. TOPIK 以及韓國、中國慣用語定義與特點

2.1 TOPIK 概述

TOPIK, 英語“Test Of Proficiency In Korean”的縮寫, 中文譯為韓國語能力考試(한국어능력시험), TOPIK 考試為非以韓國語為母語的韓國僑民和外國人,指導學習方向並藉此令韓語更為普及。測試和評價韓國語使用能力,並以此為留學韓國或就業的依據。

TOPIK 考試從第一次試行至今(截至 2021 年 9 月 7 日)已經進行了 79 次。1997 年、1998 年在韓國學術振興財團主管下舉行了第一、二屆 TOPIK 考試。1999 年 2 月, TOPIK 主管機關發生變更, 從韓國學術振興財團變更到韓國教育過程評價院。之後, 1999 年至 2010 年間, 在韓國教育過程評價院主管下, 第三屆至第二十屆 TOPIK 考試順利進行。2011 年 1 月, 主管機構再次發生變更, 變為國立國際教育院, 到 2014 年 4 月 20 日, TOPIK 考試進行到第 34 屆。2014 年 7 月 20 日, TOPIK 考試設置發生變更。

考試種類分為 TOPIK I, TOPIK II; 評估等級分為 6 個等級(1~6 級); 根據取得的綜合分數來判定, 劃分各個等級的分數線如下:

表格 1

区分	TOPIK I		TOPIK II			
	1級	2級	3級	4級	5級	6級
等级评定标准	80~139	140~200	120~149	150~189	190~229	230~300

2.2 韓國慣用語的定義

韓語慣用語定義說法不一。除了用慣用語名稱以外, 還說“慣用句”、“慣用文”、“慣用法”、“慣用表現”等。因為每個學者對慣用語定義的觀點不同, 所以韓語慣用語還沒有統一的定義。關於慣用語, 先來看看詞典裡的解釋。

“慣用語與一般語言的表現相比, 它指的是具有特別不同的結構或意義的單詞或句子, 廣義上是指某一種語言對其他語言相對具有特徵的所有體系。有慣用語、慣用語、熟語、成語、熟語、熟語等稱呼。普通慣用語與西歐語的熟語同義, 但該用語本身具有的‘習慣化語言’之意, 以及韓國學界將諺語、俗語、隱語等也包含在內, 因此有必要進一步明確規定該用語的概念及範圍。^①”

국립국어원『標準國語大辭典』里, 則是這樣定義的: “慣用語時習慣用語; 由兩個以上的單詞組成, 僅僅從這些單詞的意義上是無法知道其整體意義, 是表現特殊意義的語句。”

『두산백과사전』(斗山百科全書)中: 一種語言所具有的特有的習慣化的語言形態。在一個語言內部, 任何句子的整體意義都無法用各種形態素的含義組合來解釋的所有語言形態。例如, 英語中的"*It rains cats and dogs.*", "*He kicked the bucket.*"等, 在辭典中經常用俗語來形容。雖然是非語法, 但社會通用, 也意味着其意義明確(例如 *It's me*), 漢字的成語也被稱為“慣用句”。

① 《국어국문학자료사전》(國語國學資料詞典) 1998. 李應柏, 金媛京, 金善豐

『현대조선말사전』(現代朝鮮語詞典)中：在某一語言中，根據習慣使用而定型的語句或句子。慣用語是一種語言特有的表達方法，是該民族語言固有的傳統表現。

除了詞典之外，韓國的研究學者也對慣用語進行了定義。

박영순(1985)在『关于慣用語』中，解釋說慣用語是兩種以上單詞相結合的語言形式，是非邏輯的、脫離語法，但在言中普遍通用的特殊語言。

이혜원(1987)在『한국(韓國)관용어(慣用語)소고(小考)』中，慣用語是某一語言社會中共用的一種特殊表現，是語法或基本詞彙無法把握的具有獨特意義的語羣的總稱。即，在語言使用時，無法直接的用基本的意義來把握的、慣用的、婉曲語法。

綜上所述，韓語的慣用語，包括的範圍比較廣，包括了俗語、諺語和隱語在內；屬於習慣化的語言；具有民族性以及表現特殊意義的性質和非語法的特點；是兩個以上的單詞組成，不能從字面的意思去理解而必須考釋語義的一種特殊的語言類型。

2.3 中國慣用語的定義

慣用語是漢語詞匯中一類重要的單位。今天人們用“慣用語”這個叫名指稱的單位，至少在唐代即已出現而且被人留意到，而“慣用語”這個術語本身卻是在那一千多年之後才出現的。^① 所以目前語言學界在慣用語的劃界和釋義問題上分歧比較嚴重，也沒有一個大家公認的慣用語的概念。

慣用語在『漢語詞典』裡的解釋為：熟語的一種。口語中習用的一種固定固定短語。多為三音節，常用比喻義或引申義，簡明生動，活潑有趣。如“拍馬屁”“走後門”“撈油水”等。在『百度百科』裡：慣用語是一種習用的固定的詞組，既有三音節為主的固定格式，又有比較靈活的結構和強烈的修辭色彩。它通過比喻等方法而獲得修辭轉義。

詞典與字典的定義之外，對於慣用語的定義，學者們也都有著不同的意見。馬國凡和高家東(1983)在『慣用語』中將慣用語定義如下：人們在語言的運用當中，往往要借助於比喻來說明事理或形象地描寫事物。這種比喻漸漸被使用多了，流行廣泛了，並且被作為語言表述的一種單位固定下來了，這種比喻又被專門用來說明某一事理，描寫某一事物，表示某種概念，至於它本身表示的意義並不被人們注意。隨著時間的推移和人們使用習慣的形成，它的比喻義就被抽象出來，成為這一片語的基本意義，該片語也就形成為一種新的‘語’，這種表示新的含義的‘語’就是常用的慣用語。

王德春(1983)『詞彙學研究』中“慣用語也是語言中一種習用的的固定語在日常交際過程中，一些常用的應酬用語、招呼用語和口頭用語日益固定化。人們把這些用語當做現成的語言材料來使用，一般都是脫口而出，不必臨

① 《詞彙論》2016.周薦，商務印書館有限公司

時組織。”王德春(1996)『新慣用詞典』序言裡又進一步說明“慣用語是廣范流轉於日常談話中既有固定格式又有比較靈活結構的習用詞組,它通過比喻等方法而獲得修辭轉義,具有生動的形象性和特有的表現力。”

李行健(2002)『慣用語的研究和規範問題』中:“用排他法,從固定語中分出諺語、歇後語和成語,剩下的部分就是慣用語。”並且進一步說明“應將廣義的慣用語一分為二。區別特徵是有無語義的雙層性,除去字面的語義外,有無比喻引申的深層次語義。”

周薦(2002)『詞匯論』認為,慣用語術語所指的應是非三字組合的一部分俗語。

杜元敏(2007)『《現代漢語詞典》和《現代漢語規範詞典》慣用語比較研究』認為,慣用語是一種群眾常用的、結果上以述賓關係為主既具有定型性有具有一定靈活性;意義上具有整體性;具有鮮明的口語色彩和情感傾向;形式上衣三字格為主的固定詞組。

綜上所述,在中國對於慣用語的定義雖然意見不一,但是“慣用語”在日常生活中是存在的一種語言,並且是日常生活中常用的單位^①。

本文將從語義表達方面對韓中慣用語進行比較,並可以通過比較分析找出異同之處,以便中國的韓語學習者在比較、理解的基礎上能過更快、更有效的掌握慣用語,可以使韓國語水準向更高層次提升。

3. 2014~2023 年 TOPIK 考題中出現的慣用語比較研究

我們先來看看韓國語能力考試 TOPIK (Ⅱ) 閱讀部分關於慣用語的考題:

① 沈杜麗(2011), <漢韓常用慣用語對比研究>

圖【3-1】

※ [21~22] 다음을 읽고 물음에 답하십시오. (각 2점)

사람들은 보통 선택을 할 때 여러 가지 중에서 고르면 더 좋은 선택을 할 수 있을 것이라고 생각한다. 그래서 선택이 필요할 때 정보를 많이 수집하려고 노력한다. 그러나 선택의 수가 늘어나면 고민의 양도 함께 증가한다. () 결정을 내리지 못하는 상황이 되는 것이다. 후회 없는 선택을 위한 노력이 오히려 선택을 방해하는 결과를 불러오게 된다.

21. ()에 들어갈 알맞은 것을 고르십시오.

- | | |
|------------|------------|
| ① 골치만 아프고 | ② 콧대만 높아지고 |
| ③ 눈치만 빨라지고 | ④ 비행기만 태우고 |

圖【3-2】

※ [21~22] 다음을 읽고 물음에 답하십시오. (각 2점)

현대 사회는 인구의 증가와 산업의 발전으로 인해서 환경오염이 심각한 수준에 이르렀다. 그 중에서도 수질 오염은 우리의 생존과 직결되는 중요한 문제이기 때문에 이에 대해 우려하는 사람들이 많다. 그러나 오염을 막기 위한 구체적인 노력은 부족해 보인다. 수질 오염을 방지하기 위해서는 ()라는 말처럼 우리가 생활 속에서 할 수 있는 작은 노력부터 시작하는 것이 중요하다. 이러한 실천이 하나씩 이루어질 때 우리 자녀들이 깨끗한 물을 안심하고 마실 수 있게 될 것이다.

21. ()에 들어갈 알맞은 것을 고르십시오.

- ① 하나를 보면 열을 안다
- ② 천 리 길도 한 걸음부터
- ③ 소 잃고 외양간 고친다
- ④ 윗물이 맑아야 아랫물이 맑다

 TOPIK 제37회 한국어능력시험 II B형 2교시 (읽기)
Test of Proficiency in Korean

운동선수가 실수에 대한 부담감을 가지게 되면 경기에서 좋은 성적을 거두기가 어렵다. 그렇기 때문에 감독은 선수를 지도할 때 실수를 떠올리게 하는 직접적인 말을 () 않아야 한다. 예를 들어 스케이트 선수들은 넘어지면 안 된다는 부담감이 크다. 그러므로 감독은 선수에게 넘어지지 말라는 말 대신에 중심을 잡고 스케이트를 타라고 주의를 주는 것이 좋다.

① 입 밖에 내지 ② 눈 감아 주지
③ 한 술 더 뜨지 ④ 껌등으로 듣지

表【3-1】⁵⁾

TOPIK 考試年度	漢文慣用語	直 譯	喻 義
2014 年 35 回	골치 아프다	頭疼	傷腦筋
	눈치(가) 빠르다	眼神快	眼尖；會察言觀色
	콧대가 높다	鼻子 (鼻梁)高	趾高氣揚 ；自命不凡
	비행기(를) 태우다	坐飛機	吹喇叭；戴高帽子；擡轎子

네이버 중국어사전 <https://zh.dict.naver.com/#/main>

2014 年 36 回	하나를 보면 열을 안다	看到一個就可以知道十個	以一知萬，窺一斑而知全豹
	천 리 길도 한 걸음부터	千裏之行始于足下	千裏之行始于足下
	소 잃고 외양간 고친다	丟了牛才修牛棚	亡羊補牢于事無補
	윗물이 맑아야 아랫물이 맑다	上游的水清，下游的水才会清	上梁不正下梁歪
2014 年 37 回	입 밖에 내다	說出口	說出來；說出口
	눈 감아 주다	閉眼睛	視而不見
	※ 한술 더 뜨다	再吃一口	變本加厲，一錯更錯
	귓등으로 듣다	用耳背聽	聽而不聞；當耳旁風
2015 年 41 回	제 눈의 안경	我眼中的眼鏡	情人眼裏出西施；王八看綠豆對上眼了
	엎질러진 물	倒在地上的水	覆水難收
	싼 게 비지떡	便宜的是豆腐渣	便宜沒好貨
	티끌 모아 태산	積尘堆成泰山	積(聚)沙成塔；積少成多
2016 年 47 回	※ 담을 쌓다	筑起围墙	漠不關心；壹刀兩斷
	※ 못을 박다	钉钉子	傷人心；心口窩裏揸個釘
	머리를 맞대다	碰頭；聚首	碰頭；聚首
	고개를 숙이다	低头	拋棄自尊心屈服
2017 年 52 回	앞뒤를 재다	丈量前後	瞻前顧後；思前想後
	발을 빼다	拔腿	脫身；洗手不幹
	발걸음을 맞추다	对齐脚步	心往壹塊想；勁往壹處使
	앞뒤를 가리지 않다	前後不顧	不知天高地厚；不管三七二十壹
2018 年 60 回	손을 떼다	抽手	脫手不幹
	이를 간다	磨牙	咬牙切齒

	담을 쌓다	筑起围墙	漠不關心；壹刀兩斷
	※ 열을 올리다	使發熱	勁頭十足；提高聲勢
2023 年 64 回	앞뒤를 재다	丈量前後	瞻前顧後；思前想後
	진땀을 흘리다	流冷汗	狼狽不堪
	발목을 잡다	抓住腳踝	抓把柄；抓小辮
	귀 기울이다	側耳	側耳傾聽
2023 年 66 回	그림의 떡	畫中的年糕	水中月；鏡中花
	새 발의 피	鳥足之血	微不足道，小巫見大巫
	우물 안 개구리	井底之蛙	井底之蛙
	티끌 모아 태산	積塵堆成泰山	積(聚)沙成塔；積少成多
2022 年 83 回	등을 떠밀다	推后背	硬讓人去做；趕鴨子上架
	눈을 맞추다	互相對視	互相對視
	발 벗고 나섰다	脫鞋站出去	全力以赴
	손에 땀을 쥐었다	手裏捏了一把汗	驚險萬分；提心吊膽
2023 年 91 回	입맛에 맞을	合口味	合口味
	가슴을 울릴	敲擊胸壁	動人心弦
	발목을 잡다	抓住腳踝	抓把柄；抓小辮
	손을 맞잡다	携手，联手	同心同德，密切合作

通過上表的解釋與翻譯，我們可以按照從結構與語義方面講韓中慣用語進行四種分類：第一類是結構與意義相同的慣用語，以下稱同形同義；第二類是結構相同，語義不相同的慣用語，以下稱同形異義；第三類是結構不同，而語義相同的慣用語，以下稱異形同義，第四類是結構與語義都不相同的異形異義慣用語。

3.1 同形同義的慣用語比較：

1) 골치 아프다 = 头疼; 大伤脑筋; 令人头疼

例) 끝없이 나타나는 플러그인[부가 기능 프로그램] 때문에 온라인 게임 회사들은 골치가 아프다.

層出不窮的外掛令各網絡遊戲公司頭疼不已。

2) 천 리 길도 한 걸음부터 = 千里之行，始于足下

例) 천 리 길도 한 걸음부터 시작한다는 이 말은 지극히 당연한 명언 이다.

千里之行，始於足下，這是至理名言。

3) 눈 감아 주다 = 睜只眼，闭只眼

例) 기존 주주들이 기업의 이런 편법 변신을 대충 눈감아 준다는 점도 문제다.

現有股東對企業的這種改變 睜隻眼，閉隻眼的做法也存在問題。

4) 엇질러진 물 = 泼出去的水

例) 이미 엇질러진 물인데 이제 와서 후회해 봤자 아무 소용없잖아.

覆水難收，現在後悔也沒用啊。

7) 발걸음을 맞추다 = 合着步子; 步伐一致

例) 친구와 발걸음을 맞추어 함께 꿈 찾으러 가자!

和朋友合著步子一起去找夢想吧!

8) 손을 떼다 = 脱手不干

例) 일을 다 아물리지도 못하고 손을 떼게 되어 찝찝하다.

事情還沒做完就撒手不幹了，心裡很不踏實。

9) 고개를 숙이다 = 低头服气，谦卑之意

例) 고개를 숙여서 사과할 줄 아는 사람이 훌륭한 사람입니다.

會低頭認錯的人是偉大的人。

10) 눈치(가) 빠르다 = 有眼力见儿

例) 희정이는 조용해 보여도 무척 눈치가 빠르다.

希貞看上去安安靜靜的，實際上很 有眼力見兒。

3.2 異形同義的慣用語比較：

1) 하나를 보면 열을 안다 / 以近知远，以一知万

例) 하나를 보고 열을 안다고, 출근 첫날 지각하는 것을 보니 저 친구는 앞으로 무슨 일이든 제대로 못할 게 뻔하다.

俗話說以近知遠，以一知萬，看那人上班第一天就遲到的樣子，可以知道他以後什麼事都做不好。

2) 소 잃고 외양간 고친다 / 亡羊补牢

例) 학습 중에 문제가 생기면 우리는 제때에 보완해야 한다. 소 잃고 외양간 고치는 것은 늦지 않다.

學習中出現問題我們要及時補救,亡羊補牢,為時不晚。

3) 윗물이 맑아야 아랫물이 맑다 / 上梁不正下梁歪

例) 윗물이 맑아야 아랫물이 맑은 법이니 교사는 모름지기 학생들의 본보기가 되어야 한다.

上樑不正下樑歪, 老師應當是學生的楷模。

4) 귓등으로 듣다 / 耳边风

例) 동네 사람들은 처음에는 반신반의하여 귓등으로 넘겼습니다 나중에 솔깃이 듣고 말았습니다.

村裡的人一開始半信半疑, 當成了耳邊風, 後來卻被吸引住了。

5) 싼 게 비지떡 / 图贱买老牛; 便宜没好货

例) 속담에 싼 것 치고 좋은 물건이 없고, 좋은 물건은 싸지 않다 말이 있는데 내부 인테리어도 예외는 아니다.

俗話說便宜沒好, 貨好貨不便宜, 裝修也不例外!

6) 제 눈의 안경 / 情人眼里出西施

例) 제 눈에 안경인데 부모가 된 사람으로서도 뭘 더 말하겠어.

情人眼裡出西施, 作為父母也不好多說什麼。

7) 콧대가 높다 / 趾高气扬

例) 준기는 공부도 잘하고 돈도 많아서 무척이나 콧대가 높다.

俊基不僅學習好, 錢也多, 因此他為人很傲慢。

8) 이를 간다 / 咬牙切齿

例) 내 친구가 나를 무시해서 이를 갈고 공부를 열심히 해서 1등을 했다.

我的朋友瞧不起我, 我恨得咬牙切齒, 努力學習, 最後拿到了第一名。

9) 머리를 맞대다 / 碰头会

例) 머리를 맞대고 대책을 강구하다.

碰头研究对策。

10) 귀 기울이다 / 洗耳倾听

例) 그의 절실한 호소에 귀를 기울이는 사람은 아무도 없었다.

沒有人傾聽他的迫切呼籲。

11) 티끌 모아 태산 = 积少成多

例) 곡식 한 톨이라도 허술히 잃지 않으면 티끌 모아 태산 된다고.

哪怕是一粒糧食, 只要不輕易丟掉, 就會積少成多。

12) ※ 못을 박다 = 板上钉钉

例) 선생님께서 한번만 더 휴대폰을 만지면 휴대폰을 가져간다고 못을 막으셨다.

老師說只要再碰一次手機, 就拿走手機, 可說是板上釘釘了。

※ 못을 박다 / 伤人心

例) 자식이 부모님 가슴에 못박는 소리를 하고 어찌 편히 잘 수 있겠습니까.

子女說了傷害父母的話，怎麼還能睡安穩覺呢？

13) ※ 담을 쌓다 / 断绝往来

例) 우리는 말다툼을 크게 한 이후로 담을 쌓았다.

我們大吵一架後就一刀兩斷了。

※ 담을 쌓다 / 置身事外

例) 그는 세상과는 담을 쌓고 사시장철 지리산 속에서 산다.

他終年生活在智異山裡，過著與世隔絕的日子。

3.3 同形異義的慣用語比較：

1) 입 밖에 내다 / 漏口风

“입 밖에 내다”在韩语中，指的是“用语言表达某种想法或事实”的意思，但是在中文里一般是“指将秘密说出口，漏口风”的意思。

例) 한국인들은 서구화한 오늘이라 할지라도 ‘사랑’이란 말을 직접 입 밖에 내는 일이 없다.

韓國人即使在西方化的今天，也不會直接說出“愛”這個詞。

例) 나는 계속 품어 왔던 불만을 모두 입 밖에 냈다.

我把這段時間一直窩在心裡的不滿全部說了出來。

例) 戰士，他們在戰場上不漏口風，一諾千金。

전사들이여, 그들은 전장에서 입을 열지 않고 자신의 약속을 지켰다.

3.4 異形異義的慣用語比較：

1) 발을 빼다 / 洗手不干

例) 형은 이제 도박판에서 완전히 발을 뺐다.

哥哥現在已經金盆洗手，不再賭博了。

2) 앞뒤를 가리지 않다 / 不管三七二十一

例) 내 친구는 내 일 이라면 앞뒤를 가리지않고 도와준다.

只要是我的事，我朋友不管三七二十一地幫我。

3) ※ 열을 올리다 / 发怒

例) 그는 덜렁이니까 그에게 열 올리지 마라.

不要和他生氣，他是個半吊子。

※ 열을 올리다 / 热衷

例) 컴퓨터 사업에 열을 올리다.
热衷于电脑相关事业。

※ 열을 올리다 / 提高声势

例) 지자체마다 토산품 광고에 열을 올리고 있다.
各地政府正在掀起土特產廣告熱。

以上 2014~2023 年 TOPIK (Ⅱ) 考試中出現的韓語慣用語，通過對同形同義的慣用語比較，異形同義的慣用語比較；同形異義的慣用語比較；異形異義的慣用語比較等四個層面上的分析，探討了中韓慣用語的關係。

4. 韓語慣用語的學習方法

比較后，我們不難發現，韓語的慣用語在漢語中的詞彙素材上表現的形態多種多樣，有些是一般的詞組、有些是漢語的成語、有些是漢語的俗語；第二韓語的慣用語不能只能從字面意思去理解，要考慮它的引申義和具體放在句子中的意義；例如第三章列出的韓語慣用語‘못을 박다’在漢語中即可以作為‘板上釘釘、斬釘截鐵’又可以作為‘傷人心、在心口上捅刀子’來解釋，具體意思必須放在句子中去理解。那麼在韓語的慣用語學習方面就會有很多的難點，所以在學習過程中必須要找到對應的學習方法：

1. 使用對比的實際學習方法

同形同義的慣用語可以直接解釋后加以記憶。例如：

‘우물 안 개구리’= ‘井底之蛙’比喻那些見識短淺的人。

‘강 건너 불구경’= ‘隔岸觀火’比喻對別人的急難不加救助，而採取看熱鬧的態度。

‘꿈 깨라’= ‘別做夢了’就是要面對現實，不能老是活在自己的夢中。

‘해가 서쪽에서 뜨다’= ‘太陽從西邊升起’比喻難實現的問題或者某件事的困難程度。

‘말문을 열다’= ‘打開話匣子’比喻人開始嘮叨或說起話來沒完沒了。

‘얼굴이 두껍다’= ‘臉皮厚’意思指人不知羞耻。

‘밑 빠진 독에 물 붓기’= ‘填不滿的無底洞’比喻滿足不了的物质要求或者做不完的事。

同形同義的慣用語對於學習韓語的中國學習者在韓語學習的初級階段就可以很好的理解。

2. 使用對比與瞭解文化背景結合的學習方法

除了同形同義的慣用語之外，其餘的異形同義、同形異義、異形異義的慣用語都需要在學習的過程中通過對比的方法，將慣用語分類後，再將慣用語進行字面的解釋，然後再通過瞭解文化背景知識加以記憶。

例如：‘국수를 먹다（吃麵條）’=‘吃喜糖’

這是因為以前麵條在韓國是高級食品，同時麵條又是長的，結婚吃麵條就意味婚姻像麵條一樣綿長，所以在說結婚的時候會用到麵條一詞。

‘속 빈 강정（空心的 江米塊）’=‘空心蘿蔔’

江米塊是韓國的傳統小吃，韓國人很容易就能理解江米塊的寓意， 是指的中間 空心，外表華麗， 意思與漢語的‘空心蘿蔔’相同。

‘그림의 떡（畫中的米糕）’=‘畫中餅，水中月，鏡中花’

比喻一切事物都無實體，都是虛幻，不能成為現實。 因為韓國人吃米糕的歷史相當的悠長，並且米糕也伴隨著韓國人的生老病死和婚喪嫁娶，所以米糕天然被賦予極其豐厚的文明內在，韓國人對米糕的情感在日常生活中是隨處可見的。

‘물에 빠진 생쥐（掉進 水裡 的 老鼠）’=‘落湯雞’

是因為在韓國老鼠代表弱小的形象；

‘귀도 새도 모르게’=‘神不知，鬼不覺’

形容做事非常隱秘，別人一點也沒有察覺的意思相同。

以上都是韓中異形同義的慣用語。除了詞匯意義的不同，在詞匯素材方面，與韓語慣用語相對應的韓語諺語、歇後語、成語也不乏其數。‘도토리 키 재기 = 半斤八兩’；‘식은 죽 먹기 = 易如反掌’；‘눈이 빠지도록 = 望眼欲穿’；‘가시방석에 앉다 = 坐如針氈’。所以學習和理解韓國的歷史、文化、社會風俗等文化背景有關方面的學習也會有助於對韓語慣用語的學習和理解。

我們再來看看同形異義的慣用語，大部分的表面結構形式基本相同，表面的

字義也是基本相同，但是作為慣用語，其內部的含義不盡相同，如果不掌握其內意義的話，就很容易產生誤會：

漢語‘聳肩’： 多表示輕蔑、疑惑、驚訝等。

例： 他皺起眉頭，聳了聳肩，好像對自己的自然欲望信服。

韩语 ‘어깨를 으쓱거리다’: 有种炫耀的感觉，也有一种坦然和自豪的感觉。

例： 장학금을 받게 된다는 말에 어깨가 으쓱거린다.

聽說獲得了獎學金，高興得手舞足蹈。

韓中同形異義的慣用語，所占比率不是很多，所以對於這種類型的慣用語，在解釋以後放進文章中進一步瞭解就可以很快的熟記。最後是異形異義的慣用語，這一類的慣用語必須通過學習和理解韓國的歷史、文化、社會風俗等文化背景才能進一步的掌握好。

5. 結 論

本文對 2014~2023 年韓國語能力考試 TOPIK（Ⅱ）閱讀部分都會出現的慣用語的考題進行了對比分析。並針對分析結果提出了相對應的學習方法，現將結果歸納如下：

1. 作為東洋文化圈的韓中兩國，在慣用語學習時，可以通過對比分析的方法，將慣用語分類為：結構與意義相同的同形同義；韓中結構基本相同，但是意義不相同的同形異義；基本結構不同，但是意義相同的異形同義，結構與意義都不相同的異形異義慣用語。
2. 將分類後的慣用語按照不同的學習方法來進行學習與記憶；其中最重要的是除了單純的語言學習之外，更重要的是通過學習和理解兩國的歷史、文化、社會風俗等文化背景理解代表國家民族特色的語言內在含義，才能進一步的掌握好慣用語。

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從「多向同理性未了」出發：臺灣文化 / 地景的多重 脈絡詮釋

Starting from “Multidirectional Empathic Unsettlement”: A Palimpsestic Interpretation of Taiwan's Cultural Landscape

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摘要

近年來，人文科學的研究者在解殖與去中心化的思維潮流中，無論在教學及研究場域，都面臨新典範的衝擊。關於文化記憶或歷史敘事，學界逐漸傾向以多元視角，以及更具多元性的討論框架，取代線性化且單一視角的史觀。本文以臺灣文史學科的爭議出發，進一步辨析背後深層的原因。由於經歷南明、清領、日治、國民黨威權統治到民主臺灣，不同階段的文化意識，構築出臺灣不可共量，卻又同時並存的文化記憶樣態。這一「多向同理性未了」(Multidirectional Empathic Unsettlement)的文化記憶型態，銘刻在臺灣的文化地景裡。通過文化地景常見的「重層性」現象，我們反而更能理解建立在這種複雜歷史的狀態。本文以近年分別迎來設縣四百年和設縣三百年的兩個知名古都——臺南和彰化為例。兩大古都裡最具標誌性的文化地景——延平郡王祠和八卦山，都可充分展現臺灣文化地景的「重層」性質。他們的文化象徵被反覆象徵性的提取，但也展現出反覆的刮除。通過此兩個文化地景的實例，以重層脈絡的解析與呈現，本文希望為人文學科的教學和閱讀提出朝向多重理解、多重脈絡的共生閱讀模式。也期許在微觀歷史、多重脈絡的討論模式中，人文科學存在的意義可以更加朗現。

關鍵字：文化地景、歷史記憶、延平郡王祠、八卦山

一、前言：「家國」與「國文」的多向同理性未了

我任教的單位是「國文學系」，但在臺灣，我大部分的學術同行任職的單位名稱是「中國文學系」。在東亞文化圈裡，「循名責實」是一項重要的知識論與倫理學步驟。以目前臺灣的大學科系設置來觀察，中國文學系、國文系、華文系與臺灣（語）文學系的學科範疇彼此互相辯證，互有隸屬。⁶學科設置的糾葛與纏繞，正顯示這一現代學科建置時，背後複雜且纏繞的文化及政治脈絡。⁷2017 年前後，臺灣人文學界因為 108 課綱設置的相關疑義，特別是攸關國族認同形構的國語文及歷史兩大領域，都產生近年來最大規模的相關論戰。在國（語）文學科領域，這一論戰以國語文教材裡的「文言與白話」之爭引發話題⁸；在歷史領域，則以「取消中國史，將其內容納入東亞史」的史觀變革，進而引發是否「去中國化」的相干爭議。⁹文史教科書的編輯，牽涉一個國家如何教育學生理解自己國家的現狀與過去。而這套標準，也和人文學科研究的本質與信念相互影響、彼此辯證。語文學和歷史都有客觀的研究標準，但也有許多以影響我們主觀情感或判準的外部因素。

邇來引起巨大研究風潮的「華語語系研究」(Sinophone studies)，試圖提醒所有華語（文）學研究者，關於「中國性」(Chineseness) 因素的思考，並倡議以暫時擱置、放入引號中的去中心化嘗試，開展華語語系文學研究中過去被中心霸權所遮掩的全新向度。¹⁰其實所有圍繞華語語文學展開的相關討論，

⁶ 「國文學系」只出現在培育國語文師資的專職高等教育機構，原係我國教育部「師範教育法」保障的計畫招生系所，唯我國以「師資培育法」取代師範教育法後，中學師資的培養來源也開放給一般大學，不再限於師範大學或教育大學。而「中國文學系」的沿革，則與二戰後臺灣高等教育的復員與重建有關。如臺大中文系是原本日治時期臺北帝國大學文政學部析出的文學及法學兩院中，文學院初設三系中文、歷史、哲學之一。而中文系之名稱，傳承自中國近代高等教育史的學科建置，但國文系和中文系的學科定位其實殊無二致。另外黃得時早在 1934 年提出「臺灣文學」的倡議，但 1949 年以後的學院體制裡，並未容納臺灣文學。1994 年 11 月由清華大學中文系、文建會、賴和文教基金會舉辦的「賴和及其同時代的作家：日據時期台灣文學國際學術會議」在當時的媒體報導裡，以「臺灣文學第一次當主角」作為標題。顯示當時「臺灣文學」仍是先期的領域，臺灣最早設置的臺文科系則出現在 1997 年。以上相關資訊，可參考周祝瑛：〈台灣地區師資培育政策之檢討與展望〉，《中等教育》60 卷 3 期（2009.09），頁 8-20。林瑞明：《台灣文學與時代精神—賴和研究論集》（台北：允晨文化實業股份有限公司，1993 年），頁 3-11。

⁷ 根據梅家玲的考察，「國文」最初沒有明確嚴謹指涉的國族意識背景，但在戰後初期的語文教育論述裡，「國文」開始與「國族意識」及「文化想像」的形塑掛勾，進而在「語」與「文」、「文」與「白」之間的取舍，莫不是在「國族意識」和「文化想像」以及「語文形構」交相為用之下的「以資實用」與「文化傳承」。見梅家玲：《文學的海峽中線：從世變到文變》（臺北：聯經出版社，2023）第二章〈世變中的國・語・文——以一九四〇年代「大學國文」教材編選為起點的論析〉。

⁸ 兩方的聲名和相關文章非常多，另可見王家弘等著：《文白之爭：語文、教育、國族的百年戰場》（臺北：五南圖書出版社，2019）蒐集不同立場的學者回顧這場爭議。

⁹ 國語文科的文言／白話之爭或者還有文化傳承和實務應用等不同語文教育導向的爭論，歷史學科的討論則幾乎聚焦在這一課綱是否「去中國化」。可參考黃春木：〈從高中「中國史」課綱修訂爭議反思歷史課綱修訂與展望〉，《清華教育學報》第 38 卷第 10 期（2021.06），頁 73-105。

¹⁰ 史書美：〈何謂華語語系研究？〉，《文山評論：文學與文化》9 卷 2 期（2019.06），頁 105-

勢必都與歷史以及當下政治裡「何為中國」的想像與認同反覆對話、持續辯證。如金文京以東亞視角指出：「漢字」或「漢文」其實早已各自進入東亞文化圈的各文化體裡，不僅與語音分割，甚至各國都有屬於自己學習漢文的方式。這一筆談世界真正運作的是「漢文」，而非中國本身對東亞各國的文化影響力甚至政治掌控力。¹¹而離散至海外的華人，華語在歷史背景影響中，被標誌為身分認同之所繫，但馬華文學、臺灣文學裡對於「華文」的想像，卻也必須各自在自己的族群關係裡找到合適的擺放位置。換言之，關於「國語文」的討論，在十九世紀以降的東亞世界，幾乎是一個無法逃離國體、文體、以及建築在「同文」和「本土化」兩端思潮之上的「想像共同體」。

2017 年的課綱爭議與文白之爭，中文系的學者以贊成與反對文言文比例是否調降等兩大陣營，各自以「國語文是我們的屋宇」和「對本國語文教育改革的主張」來號召迴響、表達主張。而這背後顯然代表兩方陣營，各自對「國文」的學術內涵有著並不相同的想像。究其根源，臺灣本土意識的興起，以及「中華」因素（尤以 1949 年前後渡海來臺移民與其文化意識）在臺灣歷史進程裡不容抹滅，但不無暗影的影響力，使得雙方各自在「納中華入臺灣」和「以臺灣為中心」的兩種路線間彼此激辯。臺灣並非多語系國家，然而在同一語系語言的歷史記憶裡，大家對「失語」與「失憶」的創傷，與臺灣反覆遭遇政權更替的歷史際遇有關，也與各方可能都有著「多向同理性未了」的文化記憶特徵也有關。

在日治時代，原本作為反抗日本軍國政府統治和標誌臺灣人認同的漢文教育，卻在國民黨戒嚴統治時代，隨著新威權的黨國體制教育，翻轉成為另種形式的文化壓迫。1949 年渡海來臺的中國移民，本係為了保存「另一個中國」而來，初衷應是為了將殖民統治除魅的「去日本化，再中國化」¹²。但相關舉措，卻被視為另一種新型態的「文化殖民」。本土意識在一波一波襲來的壓迫夾縫裡艱難生長，終於在近三十年間取得突破性的茁壯，且隨著臺灣民主成果的穩固而日益成熟。然而近二十年間，本土意識面對的挑戰卻又是全新的「中國」局面。隨著新冷戰體制再臨，原本最具反共意味的「中華文化復興」與「尊孔崇儒」概念，反而成為中國懷柔外宣的利器。由於相同的語言和文化根源，「中國」強勢的政治經濟影響力，讓「臺灣」主體內部的「多向同理性未了」(Multidirectional Empathic Unsettlement)¹³，更被延伸外部因素對臺灣社會文化

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¹¹ 金文京：《漢文與東亞世界：從東亞視角重新認識漢字文化圈》（臺北：衛城出版，2016）。此書原本以日本發表，日文書名為《漢文と東アジア—訓読の文化圏》。

¹² 黃英哲有專著討論臺灣從殖民地解放後所必然經歷到的文化危機，進而論列台灣省行政長官公署在戰後初期，從事文化重建、清理殖民遺產的戰後台灣文化重建工作。見：《黃英哲去日本化」「再中國化」：戰後台灣文化重建（1945-1947）》（臺北：麥田，2017）。

¹³ 這一概念由臺籍學者楊孟軒提出。在他的著作 *The Great Exodus from China: Trauma, Memory, and Identity in Postwar Taiwan* 中，他探討 1949 年後渡臺族群對戰後台灣社會記憶(social remembering)與社會遺忘(social forgetting)的影響。他從記憶理論的角度切入，指出記憶的偶然性(contingency)、選擇性(selectivity)和建構(constructivism)，是這些外省族群的敘述流離，構建

認同的擾動與激化。課綱的變革爭議，其實也是前揭所述諸多紛爭歧異的總體性回應。正因為這些變革拉扯住社會裡不可共量，卻又同時共存的文化創傷記憶，進而再次產生對於國家未來發展方向、語文教育政策的路線爭議。

就人文研究者的本位立場思考，清理過往政治霸權打壓本土的陰暗遺產，是不可不為的職責。但罔顧中華因素在臺灣三、四百年來的歷史傳承，逕而將中文／中華異化與他者化的舉措，也實不利於本土文化的傳承。晚近人文學科面臨的嚴峻考驗，則又圍繞著雙語國家政策的紛擾，以及 AI 科技對所有語文學科的種種衝擊展開。當前本土意識的逐漸成熟，實務上仍無法解決目前臺灣本土語言、本土文化傳承的瀕危現象。尤其文史學科學生的大量流失，國家投資於應用學科與基礎學科資源的失衡，都讓人文教育的處境日益艱困。失去「語言／歷史／文化記憶」的深層原因，不再只是因為自上而下的霸權話語運作，而是根源於人文教育失能後，伴隨而來的失憶與失語癥候。因此在短期內仍無法解決社會記憶裡「不可共量，但同時並存」的狀況下，一種兼顧臺灣歷史重層性的文史研究模式，以及反對本質主義的思考框架，或許是目前臺灣人文教育的一道解方。

如果語言是我們的屋宇，那麼語言最終極的目的，應是為所有人在世界上的生活找到一種詩意棲居之法。德國哲學家海德格在其《詩·語言·意義》曾言：「詩的首要之務是將人帶回到土地上，使之歸屬土地。」¹⁴如果臺灣的文化本就深藏複雜的紋理，人文教育的目標不是將之簡化，而是將其歷程化。既然不同文化主體與政權反覆在同一塊土地上銘刻各自的文化記憶，那麼文史教育所要教會的閱讀模式，就不再是非黑即白、不可共量的情感認同與文化記憶。以下的兩個案例，都是臺灣重要的文化地景，共同的特徵是體現出島嶼歷史的重層性與層累性。而我也企圖通過這兩個案例，試圖呈現臺灣文史教育可能呈現的重層性與共存性框架。

二、 八卦山的多重意涵

八卦山位於彰化市東約一公里，舊名寮望山、定軍山，從其名稱可知這曾是重要的軍事要塞，也是古代戰場的遺跡。八卦山目前也是彰化市最重要的文化地景。「八卦山」之得名，來源於此處曾興建有八卦亭。清雍正九年（1731），因紀念此地曾鎮壓的平埔族叛亂，遂於此山興築「鎮番亭」。以現在的觀點觀之，漢族對於平埔族的壓迫，並通過「平定番社滋擾」的歷史敘事讓其不義行為合理化，實非可供歌頌之事。清領時期或已感此稱並不雅馴，很早就清領時期

文化創傷的根源。然而這近百萬移民的流入，因為迥異的歷史認同與文化情感，加上國共內戰後緊接著美蘇冷戰的對抗機制，形成許多不可共量但又同時共存的情感張力。楊孟軒試圖以「多向同理性未了」(Multidirectional Empathic Unsettlement)來嘗試為島嶼的文化創傷尋求一種和解共生的交流視角。楊孟軒著、蔡耀輝譯：《逃離中國——現代臺灣的創傷、記憶與認同》（臺北：臺大出版中心，2023）。

¹⁴ 原文是“Poetry is what first brings man onto the earth, making him belong to it, and thus brings him into dwelling”. Heidegger, Martin. *Poetry, Language, Thought*. Trans. Albert Hofstadter, New York, NY: Harper & Row, 1971.

方志中改稱為「八卦亭山」。亭臺形制雖以道教八卦為形制，本地卻沒有留下太多的道教意涵。¹⁵清代方志裡，「定寨望洋」和「豐亭春曉」皆是彰化（古稱半線）古城周圍著名的登臨聖地。但這些景色強調的是地理形勢之險要與視野之開闊。但述及八卦山，空間上登臨名勝的意涵不能完全概括其文化象徵。檢閱《全臺詩》中與八卦山相關的吟詠，幾乎全無例外地，會以詠史懷古的主題來呈現。

清領至日治數百年間，由於八卦山確實掌控出入彰化的重要通道，無論是以反清復明為號召的軍事行動，或者清廷想要重新掌控此地的治理權，八卦山都成為兵家必爭之地。許多壯烈的戰役皆發生於此，也因此八卦山在清領時期最重要的文化地景意義，是「戰場」或「忠魂埋骨之地」。清領時期陳周全（？-1795）、戴潮春（？-1864）等人反抗清朝統治時，皆在八卦山發生激戰。負責

清剿陳周全餘黨的嘉慶朝彰化知縣胡應魁（？-1807）以〈太極亭記事詩〉¹⁶寫下他修亭、平亂等始末。胡應魁以為八卦根源於太極，遂於八卦山側縣署後方推土為山，興築 24 尺高的太極亭。胡應魁詩筆歌詠道：「紅亭憶自初春築，碧

宇新將太極標。八卦列成分脈絡，一元資始見根苗」。但他撫今追昔，憶及當年

硝煙戰場荒涼的景況「園林此際推名勝，墟市當年悵寂寥。客喜如今符頌禱，

我懷在昔起憂焦。林陳構亂共誅戮，黃廖連謀復結腰。最易潛蹤山雜沓，況多

游手眾浮囂」。當年匪盜橫行，官府難以清剿，使得平靜的山林勝景變成危機潛

伏的煉獄。胡應魁畢竟是清廷官員，遂以「地靈有述能旋轉，邦本宜培怕動搖」

來說明立場，期許「但使官民指聯臂，那愁盜賊煽風謠」。官民和諧，是清領時期派任長官對自己治績的追求，他也同時希望戰禍能遠離這片祥和寧靜的土地。

但今天的八卦山，卻以另一個歷史時期的悲壯戰場更為人所熟知。乙未戰爭時期（1895）民兵領袖及黑旗軍將領吳湯興（1860-1895）及吳彭年（？-1895），都以八卦山為據點，在此壯烈赴死，被認為是對日軍入臺負隅頑抗、抵抗至死方休的重要精神象徵。¹⁷但耐人尋味的是日治時期，抗日的脈絡被同

¹⁵ 蔣敏全：〈八卦山脈與彰化建城的地理因緣〉，《彰化文獻》第 10 期（2007 年 12 月），頁 138-140。

¹⁶ 這是一首七言體的長篇歌行敘事詩，為了讀者閱讀的順暢，筆者將原詩拆解入行文中。但全詩的賞析和解讀，可參看廖美玉主編：《台灣古典詩選注：區域與城市》（台南：國立台灣文學館，2011）頁 335-359

¹⁷ 黃文吉：〈八卦山在臺灣古典詩中的意義〉，《國文學誌》第 8 期（2004 年 6 月），頁 241-272。

樣以「平亂」的歷史敘事被取代。八卦山頂樹立起了北白川宮能久親王（1847-1895）的御遺跡紀念碑。由於此地是臺灣人抗日戰爭中最激烈的戰場之一，相傳北白川能久親王當時在此遭遇反日軍隊的激烈抵抗後身受重傷，返日後旋即不治。日本政府政治開始其治理後，許多推廣八卦山旅遊的文化宣傳物件，便以日軍在八卦山的戰績為標竿，北白川能久親王的紀念碑也成為與八卦山溫泉一起聞名全台的旅遊景點。甚至也留下相傳出自北白川能久親王的漢詩，記錄著他對八卦山志在必得的征伐心情：

數百砲臺恰似虹，旌旗林立示威隆。螳螂斧豈龍車敵，彰化八卦一擊中。

以詩而論，這首詩實在稱不上傑作，甚至有好幾處韻腳不甚協洽。但詩雖平平，卻以日本皇族參與東亞軍事行動的歷史象徵另而被抄錄傳播。¹⁸原來在吳湯興的埋骨之地，同時也是日本軍國逞其雄威的地方，這也正印證了文化地景有時銘刻著幾乎完全不能相容的歷史記憶。

但現如今，八卦山在臺灣人的記憶裡，早已不是腥風血雨的戰場，而是以有著大佛像聞名全臺的宗教地景。臺人記憶裡低眉斂目的卦山大佛，其實亦是風雲萬象後被創造出的新興地景。由當時擔任縣長的陳錫卿與在地仕紳共同倡議興建，完全性地覆蓋了八卦山地景上日本軍國主義的痕跡，而以形象參考自鎌倉大佛，建築內部卻充分體現漢傳佛教之美的宗教地景形象，改變了我們對這個地景的認知與想像。¹⁹

八卦山的文化地景脈絡多端，一遍遍重寫與刮除的地方記憶，使得「抗暴」與「褒忠」的意義反覆交織、甚至互為辯證。然而不變的，興許是孤忠遺憤在詩文傳統裡永保常新的意義，與喪亂心靈的今古相映。國府來臺後，八卦山的歷史文化意義，被重新建構為對民族氣節的歌頌。

三、延平郡王祠的前世今生

就遺民為這個空間所賦予、寫入的記憶來說，照片中坐落於臺灣台南市的延平郡王祠，正反映了自南明以來的「渡來遺民」，在台南這個古老名城裡銘刻的空間歷史記憶。

¹⁸ 關於北白川能久親王在近代明治時期由政爭的敗者蛻變為受到官方推崇禮敬的變化，可參見吳佩珍：〈明治「敗者」史觀與殖民地台灣—以北白川宮征台論述為中心〉《臺灣文學研究學報》第20期（2015年4月），頁131-157。

¹⁹ 八卦山大佛的佛像是在1956年開始動工興建，1961年的浴佛節竣工，大佛高度七丈二尺，為當時亞洲第一大佛，也被認為是彰化代表性的地景。有關八卦山歷來文化認同的轉變，可參閱戴寶村：〈八卦山與彰化認同意象的發展〉，《彰化文獻》第2期（2001年3月），頁122-138。



「臺灣與南明」在研究領域上看似是很不相同的空間，但楊儒賓卻提出一種「兩岸性」的看法，縮合了臺灣與南明在文化意識上的某種共性。楊儒賓詮釋兩岸性的框架，其實也是和「如何看待中國」的關係性來切入的，他的說法如下：

但兩岸性的構造或許不僅限於近世臺灣，而是明鄭以來的臺灣史的演變，都是在臺灣內部因素以及兩岸之間關係的交錯中進行。一種現象，可以有各種解讀。對臺灣的思考確實可以從內部性的視角定位，也可以從大航海時代此框架下的移民島嶼的觀點看，本書則是從共在性的兩岸關係性省視。本書作者認為關係即是臺灣的本質，而臺灣與周遭世界的各種關係中，兩岸的關係性應當是臺灣最重要的歷史性格。²⁰

文化地景出現的重層現象來自於歷史，但是重層現象之所以重要，是因為它們具現著兩股不同力量的對抗與拉扯，也讓其後生活於此間的人們必須在這些重層的關係性之間理解自我。

延平郡王祠是祭拜鄭成功（1624-1662）及其部將的地方。在清領前期，由於鄭成功是曾高舉「反清復明」口號的重要反清勢力，因此當其舊部將施琅（1621-1696）在澎湖海戰取得重大勝利，進一步結束了鄭氏家族在臺灣的統治後。此地一開始僅被稱為「開山王廟」，也即迴避掉鄭成功政權作為南明政權

²⁰ 楊儒賓：《思考中華民國》（臺北：聯經出版社，2023），頁1

的標籤，僅將他視為「開闢此地的祖先」形象。

清領時期以馬關條約作為結束，日本人進入這座臺灣最早開發的古城後，見到這座奉祀著他們江戶時期重要劇作家近松門左衛門的《國姓爺合戰》主人公鄭成功的信仰空間，於是重建了此處，並置入壯麗的鳥居，稱為開山神社。鄭成功不是中華文化裡孤臣孤忠的南明郡王，而是壯麗出場，充分表現日本人當時華夷意識形態的國姓爺。

國民政府時期，則在原有的神社鳥居上鐫刻上國民黨黨徽乃至於「忠肝義膽」四字。我們當然可以解釋為，歷代掌權者都用自己的政治權力，定義與改造了這個空間。但其實也不妨調整方向思考，這個空間，讓歷代的掌權者，都必須將這個已經烙印在空間裡頭的遺民性質乃至於其信念，涵納入自身的政治話語脈絡中。

延平郡王祠內有兩幅楹聯，我認為很能表現某種渡來遺民所形塑的歷史經驗。首先是入口處這個在民國五十二年，也即西元 1963 年由當時擔任國防部長白崇禧初擬，再經由文史館員黃典權修改，題寫上的「孤臣秉孤忠，五馬奔江，

留取汗青垂宇宙，**正人扶正義**，七鯤拓土，莫將成敗論英雄」。受後現代史學訓練的學者，絕不陌生於把歷史視作是勝利者留下教科書這樣的論述語言。但這處楹聯裡卻顯示出，在渡來遺民銘刻的文化記憶裡，成王敗寇，並非決定歷史或文化記憶延續的唯一標準。我會認為，正是遺民的姿態以及遺民的論述，使那些未必是勝利者的人，在此可以展現出一種充分的抵抗性與對峙性，並且通過空間的存在將其延續。

南明文化其實有一種強力的遺民精神，被楊儒賓指出鄭氏家族在臺灣實質統治的時間或許不長，但這一種始終勇於抵抗，絕不輕言放棄的精神質地卻深刻形塑了臺灣人的文化認同。要以一個島嶼去對抗量體遠超於己的巨大帝國霸權是需要極大勇氣的，在傳統遺民論述裡，遺民最後的結局就是放棄抵抗、終結離散，承認遺民不能世襲。可是臺灣這一處充滿了「渡來遺民」的天地裡，遷移就是為了抵抗。為了去對抗那個他無力翻轉的歷史現實，為了延長文化記憶的時間。比如儒家的朱舜水，或作為僧侶的隱元隆琦，他們移居的土地是日本，而日本陽明學或日本黃蘗宗，其文化的開端就來自一群在明亡以後仍然不願意就此接受政治現實，試圖通過移居他處來換取精神上永恆的抵抗型態。對臺灣來說，1949 年時接近百萬人的流亡遷徙，也為臺灣重新召喚起這曾遺民型態的精神質地。它的存在往往伴隨著另一個它者的強大而更顯得必須堅持，他的抵抗，也是失土失國者永不放棄的頑強。筆者那其實是一種求生的意志，也是臺灣人面對各種政權統治時沒有改變的初衷。延平郡王祠另一幅著名的楹聯，則來自於清朝官員沈葆楨（1820-1879）。沈葆楨在牡丹社事件後，被清朝政府

派來台灣負責籌辦防務。當他進入府城，要重新定義和尊奉眼前這個充滿歷史氣息的空間時，他所寫下的著名楹聯，則是說「開萬古得未曾有之奇，洪荒留

此山川，作遺民世界；極一生無可如何之遇，缺憾還諸天地，是創格完人。」

他眼中的臺灣，至少就其南明所賦予的文化意義而言，正是一個「遺民世界」。在一個清朝官員的楹聯裡，出現對遺民的理解與接受。某種程度固然得力於時間的更替，但至少在沈葆楨的理解裡，他與鄭成功原本不可共量的文化認同在文人的精神天地裡，得到了對重層歷史現象的理解與尊重。趙園討論「小一代遺民」處境時，曾以「參與歷史記憶的敘述工程」來探討遺民後代的生命情境，以及其通過著述以繼志述事的抉擇。²¹將眼光放眼至同樣移居海外的遺民群體，當朱舜水（1600-1682）或隱元隆琦（1592-1673），選擇在日本經邦弘化、深耕儒學，或者播揚佛法、開宗立派，在他們人生的歸宿言，其「不歸」，正成就其矢志不渝的抵抗與念念不忘。當「故國」再無興復之望，「異邦」成為渡來遺民們「終身不改衣冠」的埋骨之鄉²²，或「聊通一脈貫東海」的禪宗慧命所續。²³遺民的出處選擇在異鄉，不再只有仕與不仕、死或不死的僵局，而是落地之後，將抵抗轉換為另種可被記憶、可被持續理解和感知的歷史脈絡和文化形式，且將之銘刻在空間紋理中。

楊儒賓分析明鄭政權在台灣的影響脈絡時曾指出「在臺二十三年的明鄭政權受限於歷史條件，沒有留下文化種子大幅成長的空間，但它卻是抵抗滅亡它的文化母體的異族政權最倔強的反抗者」²⁴。就實際事功論之，臺南孔廟、延平郡王祠、寧靖王的忠義形象等，都有恃乎後之來者的追憶、神聖化與重新脈絡化；並非僅由遺民自身，即可完成深化的歷史敘事或建構。但「倔強反抗者」的基因，卻可以代代相傳在文化體質裡。臺灣的文化想像及國族論述裡，必有通過「渡來遺民」形構而成的抵抗性格與文化層累，它不需臣屬歸附於任一不屬於它的正統或治統，抵抗意識遂成為凝聚這一想像共同體之本質。渡來遺民通過渡海的遷居歷程，獲致與原生文化母體、原居土地不再相同的「遺民」脈

²¹ 趙園，《想像與敘述》（北京：北京師範大學出版社，2015），頁133。

²² 鄭毓瑜分析朱舜水通過〈遊後樂園賦〉中體認、安頓的遺民心事，與以海外天地的風景與理想實現，終結其無所依傍的遺民心事。參鄭毓瑜，〈流亡的風景——〈遊後樂園賦〉與朱舜水的遺民書寫〉，收入《文本風景：自我與空間的相互定義》（臺北：麥田，2013 修訂版），頁193-236。

²³ 廖肇亨指出東渡日本，創立黃蘗宗的隱元禪師，其遺民立場相當堅定，晚年卻以隱逸和開宗立派安身。見廖肇亨，〈隱元禪師詩歌中的兩種聲音：以晚年詩作為中心〉，收入《忠義菩提：晚明清初空門遺民及其節義論述探析》（臺北：中研院文哲所，2013），頁328-345。明末東渡遺民對於日本文化所樹立的種種影響，亦可參閱韋祖輝，《海外遺民竟不歸——明遺民東渡研究》（北京：商務，2017）。

²⁴ 楊儒賓，〈明鄭亡後無中國〉，《中正漢學研究》31期（2018年6月），頁22。

絡。他保持著原居地的文化形式甚至情感，卻未必只能理解為不可分割的血緣性想像。遺民意識或遺民所形成的文化體質，使其將致力成為抵抗其存在威脅的最倔強反抗者，它毋須去探問這些反抗意識，是否為空間之「固有」資本；實際上，它需要思考的是這些繼承或者移植來的文化資本，如何轉換為落腳安身的文化形式。

四、 結語

奠基於特定歷史文化情境下的地景書寫，往往代表著一個群體、一個世代、一種立場，對於地景產生賦義（**connotation**）的能動性。²⁵文學性文本（**literary text**）的特徵是在文與辭的字面意義外，存在作者賦予文本的、文本所賴以生存寄託的歷史情境的，種種由文本世界聯繫至外部世界的意義構築過程（**process of signification**）。而文化的地景並不只是一種客觀的存在，它更是一種拆解重層、思考脈絡的歷程。

作為一個臺灣的人文學科研究者，面對島上的中國／臺灣、中華／臺灣，抑或臺灣不同族群之間語言與文化的問題，都有許多的歷史難題要面對，因為「臺灣」作為一個共同體，內部本身就存在著文化記憶的多向同理性未了。無論是課綱爭議、島內族群彼此的拉扯，也緣此而生。

但如果這塊土地本身就存在過那樣多維度的跨越與共生，那樣面向的往來互動，那麼混雜與重層、不可共量卻又彼此共存的歷史脈絡，正是我們棲居其間的居所。如果記憶決定我們認同建構的方式，如果國語文式我們的屋宇，那麼這層屋宇必然是多次重修，且層層覆蓋的。追求「純正」對於臺灣文化地景而言，其實反而是種中心化，且落入本質主義的迷思。當我們不斷以去中心化、多元與除魅作為人文研究的目標時，自然無需擔心島上對於文史學科的眾聲喧嘩。正因為容許百家爭鳴，也容許各種「多向同理性未了」的認同脈絡彼此對話。當我們看的見地景裡互相辯證的脈絡時，就會體認——記憶與遺忘（**memory and oblivion**），總是同時發生。因此這些文本風景裡所銘刻的文學記憶、文化地景裡映現的多重敘事，總是值得我們將之一一指認，並且以一種嘗試全部記取的方式開展可能的對話與共生。

²⁵ 廖美玉在為「《全臺詩》分類主題詮釋暨編纂、出版計畫」之「區域與城市」撰寫導言時曾指出：「美一個人對城市的感受、記憶，多少是按照自己的經歷及與意願對所見事物進行選擇、組織並賦予意義。不同的人對同一城市有不同的觀察面向，許多觀察者的書寫交會而出的城市身世，也許是零碎、片面、不和諧甚至是矛盾的，卻恰巧可以映現出城市的複雜性與多元性」。見廖美玉主編：《臺灣古典詩選注：區域與城市》（臺南：國立臺灣文學館，2011年）〈總敘〉，頁25。



SESSION 4

POLITICS & SOCIETY



러시아-우크라이나전쟁이 원유시장과 주식시장의 연계성에 미치는 영향에 관한 실증연구

이나(광주대학교)

정대성(광주대학교)

2024.07.03

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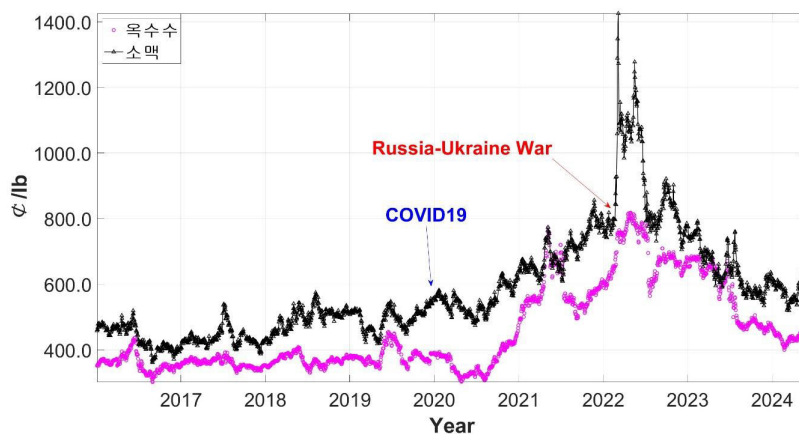
III / 실증결과

IV / 결론

● **우크라이나와 러시아는 세계 상위 5대 곡물 수출국, 곡물시장의 가격 변동성 특히 옥수수**
수와 소맥가격이 급등함.

- 옥수수 최저 가격 2020년 4월 29일 302 ¢ /lb, 최고가격 2022년 4월 29일 818 ¢ /lb
- 소맥(밀) 최저 가격 2020년 6월 26일 474 ¢ /lb, 최고가격 2022년 3월 7일 1,425.2 ¢ /lb
- 2018~2020년 기준 전 세계 시장 점유율 해바라기씨유 72.7%(우크라이나 49.6%, 러시아 23.1%), 밀 34.1%(10%, 24.1), 보리 26.8%(12.6%, 14.2%), 옥수수 17.4%(15.3%, 2.1%)를 담당함.

[Fig.2] 옥수수, 소맥 가격 추이

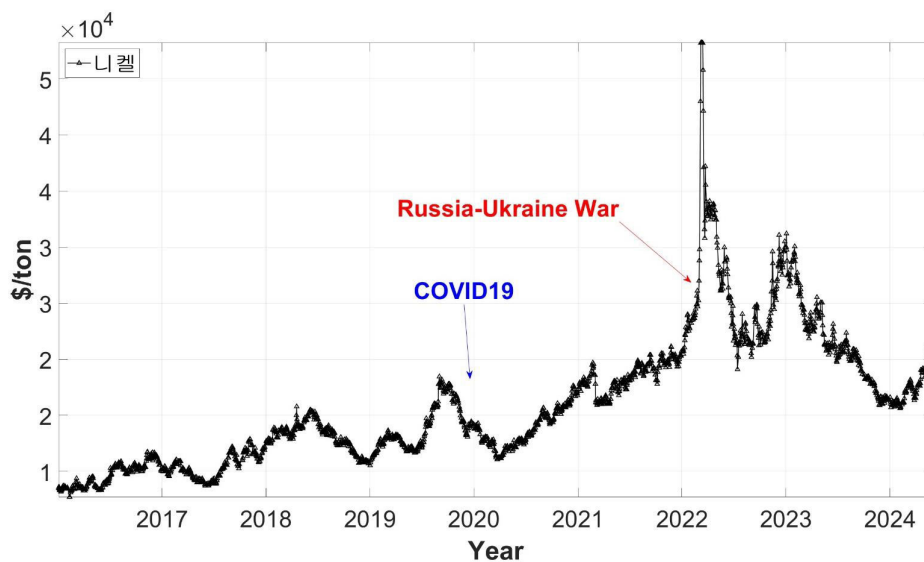


3

● **러시아와 우크라이나의 글로벌 생산비중이 높은 니켈 가격은 2022년 3월 10일**
48,241\$/ton을 기록하며 전년 가격(16,040/to)n 대비 3배 상승한 후 가격이 급락함.

- 6대 비철금속인 니켈 생산 러시아 세계 1위(11.2%)

[Fig. 3] 니켈가격 추이



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2. 연구자료 및 연구방법

2.1 연구자료

- 연구대상

- 10개 주가지수(1-10)
- 3개 선물지수(11-13)

- 자료출처: DataGuide

- 자료빈도: 일별자료

- 연구기간:

- 전체표본기간(All) : 2016년 1월 4일~ 2024년 5월 31일(2067 days)
- 코로나19 발생 이전기간(Pre) : 2016년 1월 4일~2020년 3월 10일(1025 days)
- 코로나19 발생 이후기간(COVID19) : 2020년 3월 11일~2022년 2월 23일(483 days)
- 러시아-우크라이나 전쟁 발생 이후기간(War): 2022년 2월 24일~2024년 5월 31일(557 days)

No	Code	ItemName	No	Code	ItemName
1	US	GSPC	11	WTI	WTI-1M(\$/bbl)
2	UK	FTSE	12	NaturalGas	천연가스 (선물, IPE)(\$/mmBtu)
3	FR	FCHI	13	DXY	미국달러지수 (선물, NYBOT)(Pt)
4	GER	GDAXI			
5	ITA	FTSEMIB			
6	CAN	SPTSX60			
7	JP	NK			
8	KOR	KS11			
9	CHN	SSEC			
10	RUS	RTSI			

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2.2 연구방법

- Diebold와 Yilmaz(2012)의 변동성전이지수를 사용함.

- 변동성전이지수는 VAR모형에서 측정된 일반화된 예측오차분산을 각 행의 예측오차 분산분해행렬로 나누어 표준화하여 측정함.

$$\widetilde{\theta}_{ij}(H) = \frac{\theta_{ij}^G(H)}{\sum_{j=1}^N \theta_{ij}^G(H)} \quad \left(\text{단, } \theta_{ij}^G(H) = \frac{\theta_{ij}^{ij} \sum_{h=0}^{H-1} (e'_{ij} A_h \sum e_j)^2}{\sum_{h=0}^{H-1} (e'_{ij} A_h \sum A_h e_j)} \right)$$

[Fig. 4] 변동성전이지수 매트릭스

	x_1	x_2	...	x_n	Contribution From Others (SP_i^{from})
x_1	$\bar{\theta}_{11}$	$\bar{\theta}_{12}$	...	$\bar{\theta}_{1n}$	$\sum_{j=1}^n \bar{\theta}_{1j}$
x_2	$\bar{\theta}_{21}$	$\bar{\theta}_{22}$	...	$\bar{\theta}_{2n}$	$\sum_{j=2}^n \bar{\theta}_{2j}$
$\vdots$	$\vdots$	$\vdots$	$\ddots$	$\vdots$	$\vdots$
x_n	$\bar{\theta}_{n1}$	$\bar{\theta}_{n2}$	...	$\bar{\theta}_{nn}$	$\sum_{j=1}^n \bar{\theta}_{nj}$
Contribution to Others (SP_i^{to})	$\sum_{i=1}^n \bar{\theta}_{i1}$	$\sum_{i=2}^n \bar{\theta}_{i2}$	...	$\sum_{i=1}^n \bar{\theta}_{in}$	TSI= $\frac{1}{n} \sum_{i,j=1}^n \bar{\theta}_{ij}$

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2.2 연구방법

- 총변동성전이지수(TSI): 표준화된 예측오차분산의 비대각요소의 합계를 표준화된 분산분해에서 유입전이효과(또는 유출전이효과)의 합을 변수 개수 n 개로 나누어 식 (1)와 같이 측정함.

$$TSI(H) = \frac{\sum_{i \neq j}^N \tilde{\theta}_{ij,s}^G(H)}{\sum_{i,j=1}^N \tilde{\theta}_{ij}^G(H)} \times 100 \quad (1)$$

- 유출전이효과(SP_i^{to}): 관심 변수(i)의 충격이 다른 변수(j)의 변화에 주는 영향을 의미함

$$SP_i^{to} = \sum_{j=1, i \neq j}^N \tilde{\theta}_{ij,s}^G(H) \times 100 \quad (2)$$

- 유입전이효과(SP_i^{from}): 다른 변수(j)의 충격이 관심 변수(i)의 변화를 설명하는 효과를 의미함.

$$SP_i^{from} = \sum_{j=1, i \neq j}^N \tilde{\theta}_{ij,s}^G(H) \times 100 \quad (3)$$

- 순전이효과(NET): 관심변수 i 의 순수한 전이효과를 의미함.

$$NET_i = SP_i^{to} - SP_i^{from} \quad (4)$$

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3. Empirical results

- 수익률 기초통계량(%)

	Min	Median	Mean	Max	Std	Skew.	Kurt.	No.
US	-11.98	0.04	0.05	9.38	1.16	-0.50	18.47	2,067
UK	-10.87	0.03	0.02	9.05	1.01	-0.84	17.01	2,067
FR	-12.28	0.06	0.03	8.39	1.18	-0.95	15.68	2,067
GER	-12.24	0.05	0.04	10.98	1.20	-0.60	15.17	2,067
ITA	-16.92	0.08	0.03	8.93	1.39	-1.61	21.51	2,067
CAN	-12.51	0.05	0.03	12.39	1.00	-0.84	46.11	2,067
JP	-14.61	0.00	0.04	9.40	1.30	-0.93	16.12	2,067
KOR	-8.39	0.06	0.02	8.60	1.06	-0.05	10.39	2,067
CHN	-7.72	0.00	0.00	6.02	1.08	-0.64	9.47	2,067
RUS	-38.30	0.05	0.04	26.12	2.04	-2.74	79.22	2,067
WTI	-45.21	0.14	0.09	37.66	3.24	0.02	46.52	2,067
NaturalGas	-40.87	0.00	0.23	93.02	6.38	3.50	45.34	2,067
DXY	-2.14	0.00	0.00	2.19	0.43	-0.17	5.23	2,067

- 변동성 기초통계량(%)

	Min	Median	Mean	Max	Std	Skew.	Kurt.	No.
US	0.00	0.47	0.73	11.98	0.90	4.04	32.81	2,067
UK	0.00	0.44	0.66	10.87	0.76	3.89	33.37	2,067
FR	0.00	0.53	0.78	12.28	0.88	3.83	30.63	2,067
GER	0.00	0.54	0.80	12.24	0.89	3.66	30.43	2,067
ITA	0.00	0.66	0.93	16.92	1.03	4.58	48.32	2,067
CAN	0.00	0.41	0.59	12.51	0.81	7.04	84.68	2,067
JP	0.00	0.62	0.87	14.61	0.96	3.79	33.81	2,067
KOR	0.00	0.55	0.74	8.60	0.75	3.06	21.81	2,067
CHN	0.00	0.50	0.73	7.72	0.80	2.79	15.94	2,067
RUS	0.00	0.83	1.21	38.30	1.65	8.83	157.74	2,067
WTI	0.00	1.31	1.91	45.21	2.62	7.08	84.50	2,067
NaturalGas	0.00	2.00	3.46	93.02	5.36	6.43	72.64	2,067
DXY	0.00	0.24	0.31	2.19	0.30	1.78	8.03	2,067

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상관계수 매트릭스

	US	UK	FR	GER	ITA	CAN	JP	KOR	CHN	RUS	WTI	NaturalGas	DXY
US	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.76	0.00
UK	0.53	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.63	0.01
FR	0.58	0.86	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00
GER	0.58	0.82	0.93	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00
ITA	0.54	0.76	0.87	0.86	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00
CAN	0.80	0.64	0.63	0.61	0.60	1.00	0.00	0.00	0.00	0.00	0.00	0.43	0.00
JP	0.70	0.50	0.56	0.56	0.53	0.59	1.00	0.00	0.00	0.00	0.00	0.96	0.80
KOR	0.25	0.39	0.40	0.38	0.30	0.30	0.32	1.00	0.00	0.00	0.00	0.02	0.00
CHN	0.15	0.22	0.20	0.20	0.15	0.18	0.17	0.37	1.00	0.00	0.00	0.43	0.00
RUS	0.24	0.44	0.44	0.42	0.40	0.32	0.22	0.24	0.15	1.00	0.00	0.00	0.00
WTI	0.24	0.27	0.23	0.20	0.24	0.33	0.22	0.09	0.11	0.24	1.00	0.00	0.00
NaturalGas	0.01	-0.01	-0.04	-0.05	-0.04	0.02	0.00	-0.05	-0.02	-0.07	0.09	1.00	0.07
DXY	-0.15	-0.05	-0.11	-0.10	-0.11	-0.13	0.01	-0.11	-0.07	-0.16	-0.08	0.04	1.00

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전체기간 변동성전이효과 실증분석결과

● 전체기간의 총변동성전이지수는 57.1%(=742/13)로 나타남.

- 유출전이효과 상위 3개 상품: FR, GER, UK
- 유입전이효과 상위 3개 상품: FR, GER, UK

Panel A. All Sample(TSP = 57.1%)

	US	UK	FR	GER	ITA	CAN	JP	KOR	CHN	RUS	WTI	Natural Gas	DXY	유입효과
US	25.5	8.6	10.3	10.2	8.6	16.7	12.2	2.9	0.7	1.9	1.5	0.0	1.0	74.5
UK	7.4	22.4	16.2	14.6	12.7	9.5	6.9	3.5	1.0	4.0	1.7	0.0	0.1	77.6
FR	7.9	14.4	20.1	17.4	15.3	8.3	7.7	3.2	0.7	3.5	1.2	0.0	0.2	79.9
GER	8.0	13.5	18.1	20.9	15.3	8.0	7.6	3.2	0.8	3.4	0.9	0.1	0.2	79.1
ITA	7.1	12.8	17.2	16.6	22.8	8.2	7.2	2.3	0.5	3.5	1.4	0.0	0.3	77.2
CAN	15.6	10.6	10.6	9.8	9.4	24.9	8.8	3.3	0.8	2.8	2.8	0.0	0.7	75.1
JP	14.1	8.5	10.6	10.1	8.9	10.5	28.0	4.7	1.2	1.8	1.7	0.0	0.0	72.0
KOR	8.2	7.4	8.6	8.5	6.2	7.7	8.1	35.5	3.8	2.6	1.4	0.1	1.9	64.5
CHN	3.6	3.3	3.2	3.2	2.1	2.9	3.4	7.2	67.6	1.6	1.3	0.0	0.5	32.4
RUS	3.9	8.4	8.2	7.7	7.1	5.7	3.5	2.3	0.9	47.5	3.0	0.2	1.4	52.5
WTI	3.6	4.9	3.7	2.7	3.8	7.3	3.1	0.8	1.0	3.8	64.0	0.6	0.7	36.0
NaturalGas	0.1	0.1	0.1	0.3	0.1	0.1	0.0	0.2	0.1	0.5	0.9	97.3	0.2	2.7
DXY	4.2	0.9	1.9	1.6	1.7	3.2	0.3	1.1	0.4	2.2	0.6	0.2	81.6	18.4
유출효과	83.7	93.5	108.6	102.7	91.2	88.0	69.0	34.8	11.8	31.5	18.4	1.4	7.3	742.0

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[Table 4-Panel B] COVID-19 이전기간 변동성전이효과 실증분석결과

● 코로나19발생이전기간의 총변동성전이지수는 60.1%(=780.8/13)로 나타남.

- 유출전이효과 상위 3개 상품: UK, FR, GER
- 유입전이효과 상위 3개 상품: UK, FR, GER

Panel B. Pre(TSP =60.1%)

	US	UK	FR	GER	ITA	CAN	JP	KOR	CHN	RUS	WTI	Natural Gas	DXY	유입효과
US	25.7	8.4	9.9	8.9	7.0	14.4	14.3	3.1	1.0	2.4	4.7	0.1	0.1	74.3
UK	8.3	22.3	15.5	13.4	10.8	8.4	7.7	3.5	0.9	4.5	4.0	0.4	0.4	77.7
FR	8.3	13.3	19.4	16.4	14.0	7.8	9.0	3.5	0.6	4.1	3.3	0.2	0.3	80.6
GER	8.0	12.5	17.8	20.7	13.9	7.1	9.1	3.3	0.8	3.6	2.6	0.2	0.4	79.3
ITA	6.7	11.2	16.9	15.6	23.4	7.3	8.2	2.7	0.5	3.8	3.5	0.1	0.1	76.6
CAN	14.1	9.1	9.9	8.4	7.8	25.4	10.0	3.0	0.9	3.8	7.3	0.1	0.2	74.6
JP	14.0	8.1	10.9	10.4	8.6	9.9	24.8	4.8	1.5	2.3	3.8	0.1	0.8	75.2
KOR	8.9	7.5	9.0	8.1	5.7	6.4	8.6	35.3	4.2	3.4	2.3	0.2	0.5	64.7
CHN	5.0	3.9	3.4	3.6	2.1	3.0	4.2	7.1	63.8	2.2	1.7	0.1	0.1	36.2
RUS	6.8	8.6	8.7	7.1	6.8	9.0	4.7	2.4	0.6	36.0	8.0	0.2	1.1	64.0
WTI	7.1	7.1	6.6	5.0	5.9	11.6	5.9	2.0	0.9	6.9	40.1	0.5	0.3	59.9
NaturalGas	0.2	1.5	0.5	0.4	0.3	0.5	0.2	0.4	0.1	0.7	1.4	93.1	0.6	6.9
DXY	0.2	1.6	1.1	1.7	0.2	0.2	3.0	0.5	0.4	0.7	0.8	0.2	89.2	10.8
유출효과	87.5	92.7	110.3	99.0	82.9	85.7	84.8	36.3	12.5	38.4	43.4	2.4	5.0	780.8

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[Table 4-Panel C] COVID-19 기간 변동성전이효과 실증분석결과

● 코로나19발생이전기간의 총변동성전이지수는 61.8%(=802.9/13)로 나타남.

- 유출전이효과 상위 3개 상품: FR, GER, ITA
- 유입전이효과 상위 3개 상품: UK, FR, GER

Panel C. COVID(TSP =61.8%)

61.8	US	UK	FR	GER	ITA	CAN	JP	KOR	CHN	RUS	WTI	Natural Gas	DXY	유입효과
US	21.9	9.2	10.6	10.7	10.1	15.6	10.7	3.2	0.8	4.6	0.8	0.1	1.5	78.1
UK	7.0	19.9	15.8	14.3	14.2	8.8	7.4	3.5	0.8	7.0	0.7	0.0	0.5	80.1
FR	7.4	14.5	18.3	15.9	15.4	7.6	8.3	3.4	0.7	7.0	0.6	0.0	0.8	81.7
GER	7.7	13.7	16.5	18.9	15.5	7.9	7.7	3.2	0.6	6.7	0.5	0.0	0.9	81.1
ITA	7.1	13.9	16.4	16.1	20.1	7.3	7.6	2.5	0.5	7.1	0.7	0.1	0.7	79.9
CAN	15.2	10.5	10.6	10.5	9.9	22.2	8.2	4.0	0.8	5.8	1.2	0.0	1.0	77.8
JP	12.5	9.6	11.4	10.2	9.9	9.8	23.5	4.8	1.3	5.0	0.7	0.1	1.2	76.5
KOR	6.6	6.8	7.9	8.0	5.9	7.1	8.9	34.7	4.2	5.4	1.3	0.0	2.9	65.3
CHN	3.4	2.5	2.5	2.1	1.8	2.5	3.4	8.8	66.7	2.1	0.9	0.1	3.1	33.3
RUS	5.7	10.4	11.5	10.6	10.7	7.4	5.8	2.9	1.0	29.5	2.9	0.0	1.5	70.5
WTI	2.0	2.8	2.8	2.2	2.8	4.0	1.3	0.4	0.8	7.1	72.5	0.3	0.9	27.5
NaturalGas	0.7	0.4	0.3	0.4	0.5	0.9	0.2	0.2	0.3	0.3	0.5	94.9	0.6	5.1
DXY	7.2	3.0	5.3	4.9	3.9	6.1	5.4	3.1	0.9	4.7	1.1	0.4	54.1	45.9
유출효과	82.4	97.4	111.6	106.0	100.7	85.2	74.9	40.1	12.8	63.0	12.0	1.2	15.8	802.9

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[Table 4-Panel D] 전쟁 발생 이후 변동성전이효과 실증분석결과

- 러시아-우크라이나 전쟁 발생 이후기간의 총변동성전이지수는 55.2%(=717.8/13)로 나타남.
- 유출전이효과 상위 3개 상품: FR, GER, ITA
- 유입전이효과 상위 3개 상품: FR, GER, ITA

Panel D. War(TSP = 55.2%)

	US	UK	FR	GER	ITA	CAN	JP	KOR	CHN	RUS	WTI	Natural Gas	DXY	유입효과
US	29.9	4.9	8.2	9.1	7.6	18.2	14.3	1.5	0.4	0.4	0.6	0.1	4.7	70.1
UK	5.2	27.3	16.3	14.6	14.7	10.0	5.0	2.0	1.1	0.3	1.8	0.5	1.3	72.7
FR	6.7	13.3	22.4	18.9	17.2	8.2	6.2	1.9	0.7	0.4	1.0	0.8	2.3	77.6
GER	7.3	12.0	19.0	22.5	17.4	8.1	6.2	1.7	0.7	0.5	0.5	1.4	2.8	77.5
ITA	6.0	12.7	18.2	18.3	23.9	8.3	5.6	1.2	0.4	0.5	1.3	0.8	2.6	76.1
CAN	16.2	9.5	9.8	9.5	9.5	26.6	9.4	1.5	0.7	0.4	2.2	0.1	4.6	73.4
JP	16.2	5.7	9.2	9.2	8.2	12.0	33.8	2.8	0.8	0.0	0.7	0.2	1.1	66.2
KOR	9.4	6.2	7.5	7.7	7.8	10.3	6.4	34.8	2.7	0.6	1.2	0.8	4.6	65.2
CHN	1.3	3.2	3.1	2.7	2.4	3.1	1.4	5.7	73.7	0.7	1.4	0.3	1.0	26.3
RUS	0.8	1.3	1.4	1.9	1.9	1.5	0.2	1.3	0.6	81.3	1.4	1.6	5.0	18.7
WTI	1.9	3.6	1.6	0.9	2.0	6.9	1.9	0.7	1.9	1.2	72.6	1.7	3.1	27.4
NaturalGas	0.3	1.3	2.5	4.6	2.7	0.7	0.8	1.8	0.2	0.7	1.9	82.2	0.3	17.8
DXY	8.6	3.6	6.2	6.5	6.6	9.6	1.4	0.3	0.4	3.2	2.0	0.3	51.3	48.7
유출효과	80.0	77.4	103.1	103.8	98.0	97.0	58.8	22.4	10.7	8.8	15.9	8.5	33.5	717.8

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[Table 5] 변동성유출전이효과와 변동성유입전이효과

- 유출전이효과 상위 1위 자산은 FR(전체기간, 코로나이전기간, 코로나이후기간), GER(전쟁발생이후)로 나타남.
- 유입전이효과 상위 1위 자산은 FR

Panel A. 유출전이효과

No.	All data	Pre	COVID	War
FR	108.6	110.3	111.6	103.1
GER	102.7	99.0	106.0	103.8
UK	93.5	92.7	97.4	77.4
ITA	91.2	82.9	100.7	98.0
CAN	88.0	85.7	85.2	97.0
US	83.7	87.5	82.4	80.0
NaturalGas	1.4	2.4	1.2	8.5
JP	69.0	84.8	74.9	58.8
DXY	7.3	5.0	15.8	33.5
WTI	18.4	43.4	12.0	15.9
CHN	11.8	12.5	12.8	10.7
RUS	31.5	38.4	63.0	8.8
KOR	34.8	36.3	40.1	22.4

Panel B. 유입전이효과

No.	All data	Pre	COVID	War
FR	79.9	80.6	81.7	77.6
GER	79.1	79.3	81.1	77.5
UK	77.6	77.7	80.1	72.7
ITA	77.2	76.6	79.9	76.1
CAN	75.1	74.6	77.8	73.4
US	74.5	74.3	78.1	70.1
NaturalGas	2.7	6.9	5.1	17.8
JP	72.0	75.2	76.5	66.2
DXY	18.4	10.8	45.9	48.7
WTI	36.0	59.9	27.5	27.4
CHN	32.4	36.2	33.3	26.3
RUS	52.5	64.0	70.5	18.7
KOR	64.5	64.7	65.3	65.2

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[Table 6] [Fig 5] 순전이효과

- FR, GER, UK, ITA, CAN, US는 모든 기간에서 양(+)의 순전이효과 값을 보이며 자산시장에서 정보발신자의 역할을 함.
- NatureGas, DXY, WTI CHN, RUS, KOR는 모든 기간에서 음(-)의 순전이효과 값을 보이며 자산시장에서 정보발신자의 역할을 함.

No.	All data	Pre	COVID	War
FR	28.7	29.6	29.9	25.4
GER	23.6	19.7	24.9	26.3
UK	15.8	15.0	17.3	4.7
ITA	14.0	6.3	20.8	21.9
CAN	13.0	11.1	7.3	23.6
US	9.2	13.2	4.2	9.9
NaturalGas	-1.3	-4.5	-3.9	-9.4
JP	-3.0	9.6	-1.6	-7.4
DXY	-11.0	-5.8	-30.1	-15.2
WTI	-17.6	-16.5	-15.5	-11.6
CHN	-20.6	-23.7	-20.5	-15.6
RUS	-21.0	-25.6	-7.4	-9.9
KOR	-29.7	-28.5	-25.2	-42.9

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4. Conclusions

- 주요 분석 결과를 요약하면 다음과 같다.
- 러시아-우크라이나 전쟁 발생은 오일과 자산시장에 변동성전이현상을 심화시키는 것으로 나타남.
- 총변동성전이지수는 전체기간 57.1%, 코로나19 발생 이전기간 60.1%, 코로나 발생 이후기간 61.8%로 나타났으며, 러시아-우크라이나 전쟁 발생 이후 기간 55.2%로 전이현상이 관찰됨.
 - 유입전이효과와 유출전이효과에 있어서 FR의 전이효과가 높게 나타나고 있으며, 유출전이효과에 있어서는 전쟁기간을 제외하고 FR이 가장 높게 나타나며, 전쟁 발생 이후 기간에는 GER이 높게 나타남.
 - FR, GER, UK, ITA, CAN, US는 모든 기간에서 양(+)의 순전이효과 값을 보이며 자산시장에서 정보발신자의 역할을 함. NatureGas, DXY, WTI CHN, RUS, KOR는 모든 기간에서 음(-)의 순전이효과 값을 보이며 자산시장에서 정보발신자의 역할을 함.

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미중무역전쟁과 불확실성, 그리고 금융시장의 연계성

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2024.07.03

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2. 연구자료 및 연구방법



2.1 연구자료

- 연구대상
 - 미국, 일본, 한국, 중국
- 자료출처: DataGuide
- 자료빈도: 일별자료
- 연구기간:
 - 전체표본기간(All) : 2016년 1월 4일~2022년 7월 29일(2067 days)
 - 무역전쟁 이전기간(Pre) : 2016년 1월 4일~2018년 3월 22일(1025 days)
 - 무역전쟁 발생 이후기간(TradeWar) : 2018년 3월 23일~2020년 3월 10일(483 days)
 - 코로나19 발생 이후기간(COVID19) : 2020년 3월 11일~2024년 5월 31일(557 days)

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2.2 연구방법

- Diebold와 Yilmaz(2012)의 변동성전이지수를 사용함.
- 변동성전이지수는 VAR모형에서 측정된 일반화된 예측오차분산을 각 행의 예측오차 분산분해행렬로 나누어 표준화하여 측정함.

$$\widetilde{\theta}_{ij}(H) = \frac{\theta_{ij}^G(H)}{\sum_{j=1}^N \theta_{ij}^G(H)} \quad \left(\text{단, } \theta_{ij}^G(H) = \frac{\theta_{ij}^{ij} \sum_{h=0}^{H-1} (e'_{ij} A_h \sum e_j)^2}{\sum_{h=0}^{H-1} (e'_{ij} A_h \sum A_h e_j)} \right)$$

[Fig. 4] 변동성전이지수 매트릭스

	x_1	x_2	...	x_n	Contribution From Others (SP_i^{from})
x_1	$\bar{\theta}_{11}$	$\bar{\theta}_{12}$	...	$\bar{\theta}_{1n}$	$\sum_{j=1}^n \bar{\theta}_{1j}$
x_2	$\bar{\theta}_{21}$	$\bar{\theta}_{22}$	...	$\bar{\theta}_{2n}$	$\sum_{j=2}^n \bar{\theta}_{2j}$
$\vdots$	$\vdots$	$\vdots$	$\ddots$	$\vdots$	$\vdots$
x_n	$\bar{\theta}_{n1}$	$\bar{\theta}_{n2}$	...	$\bar{\theta}_{nn}$	$\sum_{j=1}^n \bar{\theta}_{nj}$
Contribution to Others (SP_i^{to})	$\sum_{i=1}^n \bar{\theta}_{i1}$	$\sum_{i=2}^n \bar{\theta}_{i2}$	...	$\sum_{i=1}^n \bar{\theta}_{in}$	TSI= $\frac{1}{n} \sum_{i,j=1}^n \bar{\theta}_{ij}$

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2.2 연구방법

- 총변동성전이지수(TSI): 표준화된 예측오차분산의 비대각요소의 합계를 표준화된 분산분해에서 유입전이효과(또는 유출전이효과)의 합을 변수 개수 n 개로 나누어 식 (1)와 같이 측정함.

$$TSI(H) = \frac{\sum_{i,j=1}^N \tilde{\theta}_{ij,s}^G(H)}{\sum_{i,j=1}^N \tilde{\theta}_{ij}^G(H)} \times 100 \quad (1)$$

- 유출전이효과(SP_i^{to}): 관심 변수(i)의 충격이 다른 변수(j)의 변화에 주는 영향을 의미함

$$SP_i^{to} = \sum_{j=1, j \neq i}^N \tilde{\theta}_{ij,s}^G(H) \times 100 \quad (2)$$

- 유입전이효과(SP_i^{from}): 다른 변수(j)의 충격이 관심 변수(i)의 변화를 설명하는 효과를 의미함.

$$SP_i^{from} = \sum_{j=1, j \neq i}^N \tilde{\theta}_{ij,s}^G(H) \times 100 \quad (3)$$

- 순전이효과(NET): 관심변수 i 의 순수한 전이효과를 의미함.

$$NET_i = SP_i^{to} - SP_i^{from} \quad (4)$$

3. Empirical results

- 수익률 기초통계량(%)

전체기간								
	Min	Median	Mean	Max	Std	Skew.	Kurt.	No.
GSPC	-11.98	0.04	0.05	9.38	1.16	-0.50	18.47	2067
NK	-14.61	0.00	0.04	9.40	1.30	-0.93	16.12	2067
KS11	-8.39	0.06	0.02	8.60	1.06	-0.05	10.39	2067
SSEC	-7.72	0.00	0.00	6.02	1.08	-0.64	9.47	2067
무역전쟁이전기간								
	Min	Median	Mean	Max	Std	Skew.	Kurt.	No.
GSPC	-4.1	0.04	0.05	2.81	0.73	-0.98	8.72	543
NK	-8.11	0.03	0.03	4.77	1.33	-1.03	10.99	543
KS11	-3.09	0.06	0.05	2.3	0.7	-0.52	5.08	543
SSEC	-7.04	0.06	0	6.02	1.07	-1.52	15.04	543
무역전쟁이후기간								
	Min	Median	Mean	Max	Std	Skew.	Kurt.	No.
GSPC	-7.6	0.05	0.03	4.96	1.09	-0.72	11.29	481
NK	-7.58	0	0	5.77	1.19	-0.68	8.5	481
KS11	-4.44	0.04	-0.04	3.53	0.92	-0.78	5.91	481
SSEC	-7.72	0	0	5.6	1.26	-0.55	7.77	481
코로나19 이후기간								
	Min	Median	Mean	Max	Std	Skew.	Kurt.	No.
GSPC	-11.98	0.05	0.07	9.38	1.35	-0.35	17.29	1041
NK	-5.62	0.03	0.09	9.4	1.25	0.39	8.51	1041
KS11	-8.39	0.07	0.04	8.6	1.25	0.14	9.52	1041
SSEC	-5.13	0	0.01	5.71	0.98	-0.09	6.35	1041

수익률전이효과 실증분석결과

- 전체기간의 수익률 총변동성전이 지수는 33.4%로 나타남.
- 무역전쟁 이후 총변동성전이가 증가, 코로나 19발생이후 감소하나 무역전쟁이전보다는 높음

Panel A. 전체기간(TSP = 33.4%)

	GSPC	NK	KS11	SSEC	유입효과
GSPC	62.0	29.2	6.8	2.1	38.0
NK	29.4	58.5	9.4	2.6	41.5
KS11	14.7	13.9	64.0	7.3	36.0
SSEC	4.5	4.3	9.3	81.9	18.1
유출효과	48.7	47.4	25.5	12.0	133.6

Panel B. 무역전쟁이전(TSP = 30.6%)

30.6	GSPC	NK	KS11	SSEC	유입효과
GSPC	61.7	31.6	5.3	1.4	38.3
NK	29.9	59.0	9.6	1.5	41.0
KS11	15.9	13.0	67.6	3.5	32.4
SSEC	4.6	1.8	4.3	89.3	10.7
유출효과	50.3	46.4	19.2	6.4	122.3

Panel C. 무역전쟁 이후(TSP = 41.7%)

41.7	GSPC	NK	KS11	SSEC	유입효과
GSPC	54.4	35.9	6.9	2.9	45.6
NK	34.5	49.5	10.9	5.1	50.5
KS11	14.4	17.3	58.0	10.3	42.0
SSEC	7.1	9.3	12.5	71.1	28.9
유출효과	55.9	62.5	30.2	18.3	167.0

Panel D. 코로나 발생이후(TSP = 32.8%)

32.8	GSPC	NK	KS11	SSEC	유입효과
GSPC	62.2	30.0	6.0	1.7	37.8
NK	30.7	59.2	8.3	1.8	40.8
KS11	13.9	13.2	64.6	8.3	35.4
SSEC	3.5	3.1	10.7	82.7	17.3
유출효과	48.1	46.4	25.0	11.9	131.3

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변동성전이효과 실증분석결과

- 전체기간의 변동성 총변동성전이 지수는 22.3%로 나타남.
- 무역전쟁 이후 감소, 코로나 발생이후 최저

Panel A. 전체기간(TSP = 22.3%)

22.3	GSPC	NK	KS11	SSEC	
GSPC	69.1	21.0	8.5	1.4	30.9
NK	23.8	70.1	4.8	1.3	29.9
KS11	13.5	7.5	77.4	1.6	22.6
SSEC	2.3	1.3	2.3	94.1	5.9
유출효과	39.6	29.8	15.7	4.3	89.4

Panel B. 무역전쟁이전(TSP = 27.7%)

27.7	GSPC	NK	KS11	SSEC	
GSPC	64.3	22.8	6.8	6.1	35.7
NK	24.4	65.3	6.6	3.7	34.7
KS11	12.4	8.9	76.2	2.4	23.8
SSEC	10.0	4.6	1.9	83.5	16.5
유출효과	46.7	36.3	15.4	12.3	110.7

Panel C. 무역전쟁 이후(TSP = 26.3%)

26.3	GSPC	NK	KS11	SSEC	
GSPC	60.5	30.2	8.4	0.9	39.5
NK	33.3	59.3	5.7	1.6	40.7
KS11	8.6	6.6	82.2	2.6	17.8
SSEC	1.8	1.7	3.8	92.7	7.3
유출효과	43.7	38.5	18.0	5.1	105.3

Panel D. 코로나 발생이후(TSP = 21.1%)

21.1	GSPC	NK	KS11	SSEC	
GSPC	71.3	21.1	6.7	0.9	28.7
NK	24.0	69.9	5.7	0.3	30.1
KS11	11.1	8.7	78.6	1.7	21.4
SSEC	1.2	0.2	2.6	96.0	4.0
유출효과	36.4	29.9	15.1	2.9	84.2

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수익률 순전이효과

• 기간에 관계 없이 미국, 일본은 양(+)의 순전이효과

• 양(+)의 순전이효과

- 무역전쟁이전: 미국, 일본/무역전쟁이후: 미국, 일본/코로나19발생이후: 미국, 일본

	전체기간			무역전쟁이전		
	유출전이	유입전이	순전전이	유출전이	유입전이	순전전이
GSPC	48.7	38.0	10.7	50.3	38.3	12.1
NK	47.4	41.5	5.9	46.4	41.0	5.4
KS11	25.5	36.0	-10.5	19.2	32.4	-13.2
SSEC	12.0	18.1	-6.1	6.4	10.7	-4.3
	무역전쟁이후			코로나19발생이후		
	유출전이	유입전이	순전전이	유출전이	유입전이	순전전이
GSPC	55.9	45.6	10.3	48.1	37.8	10.3
NK	62.5	50.5	12.1	46.4	40.8	5.6
KS11	30.2	42.0	-11.8	25.0	35.4	-10.4
SSEC	18.3	28.9	-10.5	11.9	17.3	-5.4

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변동성 순전이효과

• 기간에 관계 없이 미국은 양(+)의 순전이효과

• 양(+)의 순전이효과

- 무역전쟁이전: 미국, 일본/무역전쟁이후: 미국, 한국/코로나19발생이후: 미국

	전체기간			무역전쟁이전		
	유출전이	유입전이	순전전이	유출전이	유입전이	순전전이
GSPC	39.6	30.9	8.7	46.7	35.7	11.0
NK	29.8	29.9	-0.1	36.3	34.7	1.6
KS11	15.7	22.6	-6.9	15.4	23.8	-8.4
SSEC	4.3	5.9	-1.6	12.3	16.5	-4.2
	무역전쟁이후			코로나19발생이후		
	유출전이	유입전이	순전전이	유출전이	유입전이	순전전이
GSPC	43.7	39.5	4.2	36.4	28.7	7.7
NK	38.5	40.7	-2.1	29.9	30.1	-0.2
KS11	18.0	17.8	0.2	15.1	21.4	-6.3
SSEC	5.1	7.3	-2.2	2.9	4.0	-1.2

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4. Conclusions



- 주요 분석 결과를 요약하면 다음과 같다.

1. 수익률전이효과 실증분석결과; 전체기간의 수익률 총변동성전이지수는 33.4%로 나타남.

무역전쟁 이후 총변동성전이가 증가, 코로나 19발생이후 감소하나 무역전쟁이전보다는 높음

2. 변동성전이효과 실증분석결과; 전체기간의 변동성 총변동성전이지수는 22.3%로 나타남.

무역전쟁 이후 감소, 코로나 발생이후 최저

3. 수익률 순전이효과

- 기간에 관계 없이 미국, 일본은 양(+)의 순전이효과

- 양(+)의 순전이효과: 무역전쟁이전: 미국, 일본/무역전쟁이후: 미국, 일본/코로나19발생이후: 미국, 일본

4. 변동성 순전이효과: 기간에 관계 없이 미국은 양(+)의 순전이효과

- 양(+)의 순전이효과: 무역전쟁이전: 미국, 일본/무역전쟁이후: 미국, 한국/코로나19발생이후: 미국

The End

Q&A