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目录 CONTENTS

BUSINESS	
01	**Zhang Zhen Bo , Xia Zhen Zhou** A Study on The Impact of Financial Mismatch on Green Innovation Performance of Enterprises: Evidence from Listed Companies in China
23	**Zezhou Jin** Valuation of Interest Rate Swaps Under a Discrete-Time No-Arbitrage Framework: Theory, Derivations,and Numerical Applications
36	**Fu Ming** Low-Carbon Transformation and Enterprise Digitalization: Evidence from China's Manufacturing Industry
60	**Peihuan Luo, Abdul Rashid bin Abdullah** Developing Business Strategy for A Smart PillowStart-Up in The Malaysian Bedding Industry:A Case Study of Urspillow Inc.
SOCIAL SCIENCE	
82	**Wu Yun Dong, Kong Wei Jian, Lv Ting Ting** Strategies for Enhancing Subjective Well-Being in Art and Design Students: Evidence from Three Higher Vocational Colleges in Quanzhou, Fujian Province, China
99	**Saka Kunhan Lee** Understanding the Other in a Foreign Land：A Preliminary Case Study of Malay Language Learning Texts among Hakka and Cantonese Migrants in British Malaya
128	**陈佳杰 (TAN Jia Keat)** 潮汕移民家书（侨批）与口述历史的文化记忆：以马来西亚槟城张氏家族为考察对象 Cultural Memory of Chaoshan Migrant Letters (Qiaopi) and Oral History: A Case Study of the Teo's Family in Penang, Malaysia
148	**阮氏黄莺、梁云辉（Nguyễn Thị Hoàng Oanh & Lương Vân Huy）** 七府古庙：越南南方华人信仰中心的历史、建筑与文化传承 That Phu Temple：History, Architecture, and Cultural Heritage of a Chinese Community Religious Center in Southern Vietnam
161	**Guidelines to Authors**

BUSINESS

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A Study on The Impact of Financial Mismatch on Green Innovation Performance of Enterprises: Evidence from Listed Companies in China

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Abstract

Using Chinese listed companies from 2011 to 2022 as the research object, this study employs a two-way fixed effects model to empirically examine the impact of financial mismatch on corporate green innovation performance. The findings are as follows: First, based on regression analysis of the listed company sample and robustness tests, financial mismatch inhibits the development of both the "quantity" and "quality" of corporate green innovation; Second, regional heterogeneity analysis reveals that the impact of financial mismatch on the "quantity" and "quality" of corporate green innovation is significantly negative in eastern and western regions, while the impact is not significant in central regions; Enterprise heterogeneity analysis reveals that financial mismatch inhibits the "quality" and "quantity" of green innovation in technology-intensive enterprises, while its impact on the "quantity" and "quality" of green innovation in labor-intensive enterprises and the "quantity" of green innovation in asset-intensive enterprises is not significant. However, it promotes the "quality" of green innovation in asset-intensive enterprises; Third, financial mismatch inhibits the development of corporate green innovation through the financing constraint pathway. This explains the substantive impact of financial mismatch on corporate green innovation behavior, providing data support for optimizing financial resource allocation and promoting green innovation development.

Keywords: Financial mismatch, corporate green innovation, financing constraints

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1.0 Introduction

China's past economic growth has primarily relied on the input of factors such as labor, land, and capital. While this model has been significantly successful, its limitations have become increasingly evident and unsustainable. Amid the ongoing global pandemic, the world economy has been experiencing a broad decline, and enterprises face multiple pressures, including shrinking demand, disrupted supply chains, and weakened expectations, which have led to exceptionally difficult business conditions. In this context, the traditional factor-driven model can no longer effectively support sustained economic growth. Faced with this challenge, China must urgently transition from a factor-driven model to one driven by innovation to sustain its economic development.

Meanwhile, China is at a pivotal stage of economic transformation and upgrading, with a large population, substantial resource constraints, and pressing environmental challenges. Thus, prioritizing green technological innovation in Chinese enterprises is imperative. However, enterprises face significant challenges in green innovation due to high investment costs and long R&D cycles, resulting in financial constraints and inefficient resource allocation. Among these, financial misallocation is a particularly significant issue. Therefore, in-depth research into financial misallocation and its mechanisms is crucial to constructing a financial system framework that effectively supports green innovation within enterprises. This would enable enterprises to better access and utilize financial resources, strengthen their green innovation capacity, and achieve breakthroughs in the green transformation process, thereby promoting the coordinated development of the economy, society, and the environment.

2.0 Literature Review

To clarify the research context and identify the theoretical gap, this section systematically combs the relevant literature from four thematic streams, and constructs a cumulative argument to lay the foundation for subsequent research hypotheses.

2.1 Measurement of Financial Mismatch

The measurement of financial mismatch is the basis for empirical research, and existing studies mainly form two technical paradigms based on different theoretical perspectives. The first is the factor price distortion-based micro-econometric method, which quantifies the degree of financial mismatch by the deviation between the actual factor price of enterprises and the optimal equilibrium price. For example, Brandt et al. (2013) proposed the capital cost deviation method, which measures the individual mismatch level by

comparing the gap between the capital cost of a single enterprise and the industry average; Aoki (2012) further improved this method and constructed a simple accounting framework to identify the impact of resource mismatch on total factor productivity. The second is the production efficiency-based frontier analysis method, which evaluates the efficiency of financial resource allocation from the perspective of marginal output. Representative methods include Stochastic Frontier Analysis (SFA) (Yang et al., 2019; Li et al., 2018), Data Envelopment Analysis (DEA) (Kablan, 2009; Liao et al., 2020), and Wurgler's (2000) capital allocation efficiency model. The core idea of this paradigm is that the closer the marginal output elasticity of financial resources is to the optimal level, the lower the degree of mismatch. These measurement methods provide a solid technical basis for subsequent research, but most of them focus on the overall financial mismatch, and lack targeted improvement for the characteristics of green innovation activities.

2.2 Financial Mismatch and Corporate Innovation Performance

A large number of studies have confirmed that financial mismatch is an important factor restricting corporate innovation. From the perspective of resource allocation, financial mismatch leads to the distortion of capital flow, making financial resources deviate from high-efficiency innovation projects and flow to low-productivity fields, thus crowding out corporate R&D investment (Ji et al., 2025; Li & Pang, 2023). From the perspective of risk transmission, the credit market friction caused by financial mismatch increases the risk premium of corporate innovation activities, and enterprises tend to reduce long-term R&D investment to avoid risks (Li & Zhao, 2022; Wang et al., 2024). From the perspective of institutional distortion, financial mismatch induces credit rent-seeking behavior. Enterprises that obtain preferential capital through rent-seeking form organizational inertia and reduce innovation motivation, while enterprises facing financing discrimination have to bear additional rent-seeking costs, which further squeezes R&D funds (Zhou, 2013; Fungáčová et al., 2015). However, these studies mostly focus on the “general innovation” of enterprises, and lack in-depth discussion on the impact of financial mismatch on “green innovation” which has the dual attributes of public goods and high risk.

2.3 Financial Mismatch and Green Innovation

With the rise of green development, a small number of studies have begun to explore the relationship between financial mismatch and corporate green innovation. Whited & Zhao (2021) pointed out that financial mismatch will exacerbate the misallocation of environmental resources and indirectly inhibit the improvement of corporate green total factor productivity; Li et al. (2024) further found that financial mismatch will increase environmental pollution by reducing green technology investment; Wang et al. (2024) verified that fintech

can mitigate credit mismatch and thus promote green innovation, indirectly reflecting the inhibitory effect of financial mismatch on green innovation. However, the existing research on this theme still has obvious shortcomings: First, the research perspective is relatively single, mostly focusing on the direct impact, and lack of analysis on the intermediate transmission mechanism; Second, the measurement of green innovation is mostly limited to a single dimension, and fails to distinguish the differential impact of financial mismatch on the "quantity" and "quality" of green innovation; Third, the heterogeneous characteristics of the impact are not fully explored, and the differences in the impact effects under different regional and enterprise type backgrounds are not clarified.

2.4 Mediating Role of Financing Constraints

Financing constraints are widely regarded as a key channel connecting financial mismatch and corporate innovation. According to the pecking order theory and information asymmetry theory, financial mismatch will increase the external financing cost of enterprises and reduce the availability of funds, thus forming financing constraints (Li et al., 2023; Yin & Wang, 2025). For innovation activities with high investment, long cycle and uncertain return, financing constraints will directly lead to insufficient R&D investment (Aghion et al., 2012). In the field of green innovation, the high specificity of green technology and the long payback period of projects make enterprises more dependent on stable financial support. However, existing studies have not systematically analyzed how financial mismatch affects the "quantity" and "quality" of green innovation through financing constraints, and the theoretical chain between the three is still unclear.

2.5 Research Gap and Research Orientation

To sum up, the existing literature has laid a preliminary foundation for understanding the relationship between financial mismatch, financing constraints and corporate innovation, but there are still three core research gaps: First, the research on financial mismatch and green innovation is relatively scattered, lacking a systematic theoretical framework and empirical test targeting the dual dimensions of green innovation "quantity" and "quality"; Second, the intermediate mechanism of financing constraints needs to be further clarified, especially the specific transmission path combining the characteristics of green innovation; Third, the heterogeneous impact of financial mismatch on green innovation under different regional and enterprise type contexts has not been fully revealed. Therefore, this paper takes Chinese listed companies as the research object, constructs a theoretical framework of "financial mismatch → financing constraints → corporate green innovation", and examines the direct impact, mediating mechanism and heterogeneous

characteristics of financial mismatch on green innovation, so as to make up for the above research gaps.

In contrast to existing literature, this paper focuses on Chinese listed companies from 2011 to 2022 and uses a panel fixed-effects model to empirically examine the impact of financial misallocation on corporate green innovation. The key contributions of this study are as follows: First, by applying relevant econometric models, this study empirically validates the specific impact of financial misallocation on corporate green innovation performance, revealing the variation in the effects of financial misallocation and its underlying mechanisms across different contexts. Second, from the perspective of financing constraints, this paper explores the intrinsic mechanisms through which financial misallocation affects corporate green innovation performance. Third, by analyzing the heterogeneous impacts across different types of firms and geographical locations, this study identifies how financial misallocation influences the differentiated pathways to corporate innovation capabilities and explains the substantive effects of financial misallocation on corporate green innovation behavior. These findings provide empirical support for policymaking, offering insights into optimizing financial resource allocation and fostering green innovation development.

3.0 Theoretical Analysis and Research Hypothesis

3.1 The Direct Impact of Financial Misallocation on Corporate Green Innovation Performance

According to the Pareto optimality theory, the core of financial mismatch lies in market failure, manifested as the deviation of financial resource allocation from an efficient equilibrium state. This phenomenon exhibits unique structural characteristics within China's financial markets. Integrating financial resource allocation theory with information asymmetry theory, this paper analyzes its direct impact mechanisms on corporate green innovation from three perspectives:

First, it reduces the resource allocation efficiency of green innovation. Optimal factor allocation theory posits that financial resources should flow toward sectors with the highest marginal output. However, the temporal, scale, and structural imbalances triggered by financial mismatch compel enterprises to redirect resources toward short-term profit-generating projects. This leads to uneven resource allocation for green innovation, inefficient capital utilization, and deviation from optimal resource allocation efficiency, ultimately undermining enterprises' long-term green innovation capabilities. Moreover, under the backdrop of increasingly stringent environmental regulations, such efficiency losses are further amplified.

Second, it heightens operational risks associated with green innovation.

Financial misallocation simultaneously increases both financial risk and operational uncertainty for enterprises. According to risk aversion theory, high risk and uncertainty cause enterprises to become cautious, even conservative, in green innovation decisions, thereby reducing the frequency and intensity of innovation activities.

Third, it induces credit rent-seeking and distorts innovation incentives. In a bank-dominated financial system, the scarcity of credit resources and the concentration of allocation power can easily foster rent-seeking behavior, directly hindering green innovation. On one hand, firms benefiting from positive mismatches can secure stable returns or excess profits through credit rent-seeking, fostering R&D inertia. Moreover, the crowding-out effect of rent-seeking on R&D investment causes firms to neglect long-term strategic investments in green innovation (Zhou & Wu, 2013). On the other hand, firms facing negative mismatches must resort to rent-seeking to obtain credit resources, which inflates actual financing costs (far exceeding nominal interest rates). The funds obtained are predominantly short-term loans (0, which not only compresses innovation profit margins but also increases the risk of R&D activities, ultimately suppressing green innovation investment.

In summary, financial mismatch imposes direct constraints on corporate green innovation through three pathways—inefficient resource allocation, heightened risk, and distorted incentives — significantly inhibiting the pursuit of green innovation activities.

Hypothesis H1: Financial misallocation will hinder the development of corporate green innovation.

3.2 Financial Misallocation Indirectly Inhibits Corporate Green Innovation Performance Through Financing Constraints

Based on the theories of information asymmetry and Pecking Order, corporate financing constraints primarily arise from external financing cost premiums, which manifest as high financing costs, limited access to financing channels, and mismatched loan durations. First, from the perspective of scale misallocation, according to the theory of optimal allocation of production factors, green innovation projects require sustained large-scale funding for research and development equipment, talent reserves, and experimental validation. However, there is a significant gap in the financial market's supply. For example, the average funding requirement for research and development projects in China's new energy vehicle sector exceeds 1 billion yuan, while small and medium-sized enterprises (SMEs) typically receive less than 50 million yuan in credit support. The vast disparity in funding amounts makes it difficult for firms to establish a comprehensive RD system, forcing them to reduce investments in critical areas, which ultimately lowers the technological content and industrial feasibility of green innovation outcomes. Second, from

the perspective of structural misallocation, there is a conflict between the long-term, low-cost funding needs of green innovation projects and the short-term, high-cost financing available in financial markets. Taking the photovoltaic industry as an example, the payback period for project investment is typically 8-10 years, while bank loan terms usually range from 3 to 5 years, forcing firms to rely on high-cost, non-standard financing to bridge the funding gap. Moreover, if firms accept high-interest short-term loans, they not only bear the burden of high interest costs but also face challenges from interest rate fluctuations and the pressure of loan renewal. This mismatch leads to an increase in financial expenses, which in turn crowds out the funds available for green innovation investment. Lastly, from the perspective of term mismatching, it exacerbates firms' liquidity risks and undermines their ability to plan for long-term green innovation. The mismatch between short-term financing and the long duration of green innovation projects forces firms to frequently refinance, raising the risk of disruptions in their funding chains. This uncertainty prompts firms to adopt conservative strategies, shorten RD cycles, avoid high-risk technological explorations, and opt for low-innovation technological paths instead. Ultimately, this delays the development of breakthrough green technologies and weakens firms' competitive advantage in the global green market.

In summary, we propose **Hypothesis H2:** Financial misallocation inhibits corporate green innovation performance through financing constraints.

3.3 The Regional Heterogeneity of Financial Mismatch on Corporate Green Innovation Performance

Due to differences in economic development levels, financial market maturity, policy environments, and industrial structures across regions, the impact of financial misallocation on corporate green innovation performance varies across different regions.

In the eastern region, due to its advanced economy, mature financial markets, and strong policy support, firms are relatively well-equipped to handle issues related to financial misallocation. First, the developed economy in the eastern region enables firms to possess strong self-financing capabilities, allowing them to secure necessary funds through internal capital accumulation and diversified financing channels. Additionally, local governments have implemented various incentive policies, including tax reductions, fiscal subsidies, and low-interest loans, to support green innovation projects, significantly easing firms' financing pressures. However, despite the abundance of financial resources in the eastern region, these resources are often concentrated in a few large firms and specific industries, making it difficult for small and medium-sized enterprises (SMEs) and emerging sectors to access adequate funding. This uneven distribution of resources exacerbates financial misallocation and restricts many firms' investment in green

innovation. Furthermore, although the eastern region is economically developed, the financing costs for firms remain high. Financial institutions, such as banks, tend to allocate funds to low-risk projects, and due to the high risks and long return periods associated with green innovation projects, these firms often struggle to secure low-cost financing, which negatively impacts their motivation for green innovation. Therefore, the effects of financial misallocation on corporate green innovation performance in the eastern region require specific analysis based on empirical research. In contrast, due to the economic gap, firms in the western region possess weaker self-financing capabilities and are more reliant on external financing. The underdeveloped financial market in this region makes it difficult for firms to identify appropriate financing channels. Furthermore, there are fewer local financial institutions, and the financial products available are limited. As a result, firms often have no choice but to rely on high-cost, short-term loans, which fail to meet the long-term funding needs of green innovation projects. Moreover, local government support for green innovation is relatively weak, with a lack of specialized support and incentive measures, which makes it difficult for firms to access policy-driven financial assistance. As a result, in the western region, due to the underdeveloped financial market and insufficient policy support, firms face more severe financing constraints, which adversely affect their green innovation performance. The central region, with its moderate level of economic development, financial market maturity, and policy support, presents a more balanced situation. The impact of financial misallocation on corporate green innovation performance in this region is likely to exhibit a buffering effect. Although firms in the central region generally lag behind their eastern counterparts in terms of green innovation capacity, the relatively well-developed financial system in the central region can still foster some green innovation leaders.

In conclusion, we propose **Hypothesis H3**: There is heterogeneity in the impact of financial misallocation on corporate green innovation performance across the eastern, central, and western regions.

3.4 The Heterogeneity of Enterprise Types in the Impact of Financial Mismatch on Corporate Green Innovation Performance

The impact of financial misallocation on corporate green innovation performance varies across different types of firms. This heterogeneity is particularly evident between labor-intensive, technology-intensive, and asset-intensive firms.

Firstly, labor-intensive firms, whose production and operations primarily depend on a large workforce, have a relatively low reliance on capital. Therefore, the impact of financial misallocation on these firms is relatively minor. In contrast, technology-intensive firms face a very different situation.

These firms rely on advanced technology and significant RD investments for production and operations, and their green innovation activities require substantial financial support. Such funding needs are often uncertain and high-risk, and financial misallocation can severely constrain RD investments in technology-intensive firms, directly impacting their green innovation performance. Financing difficulties and capital shortages may prevent firms from continuing their innovation projects, thereby hindering the implementation and promotion of green innovation. Consequently, the impact of financial misallocation on the green innovation performance of technology-intensive firms is significant. Similarly, asset-intensive firms face comparable challenges. These firms depend on significant fixed assets for production and operations and require substantial capital to purchase and maintain equipment, facilities, and other assets. Financial misallocation can prevent asset-intensive firms from securing sufficient funds for equipment upgrades and technological transformation, thus affecting their green innovation performance. A lack of financial support may lead to aging equipment and outdated technologies, severely hindering the improvement of a firm's green innovation capabilities. However, when asset-intensive firms face financial misallocation, they may become more cautious in allocating and utilizing their existing resources to ensure that green innovation projects proceed smoothly, thereby avoiding resource waste and improving the quality of innovation outcomes. Therefore, the specific impact of financial misallocation on asset-intensive firms requires further empirical analysis.

In conclusion, we propose **Hypothesis H4**: The impact of financial misallocation on corporate green innovation performance exhibits heterogeneity across different firm types.

4.0 Methodology

4.1 Variable Setting and Data Description

4.1.1 Dependent Variable

Currently, the measurement of corporate green innovation performance is primarily divided into two categories: one involves questionnaire surveys, though this method carries significant subjectivity; the other utilizes data related to green patents for assessment. This study adopts the method of existing research and uses the total number of green patents filed by a firm annually to measure its green innovation performance for that year (Rauf et al., 2024). Furthermore, green patent data not only reflects the "quantity" of green innovation but also indicates its "quality". Therefore, this study selects the number of green patents filed annually and the number of green invention patents filed as proxies for the "quantity" and "quality" of green innovation, respectively.

4.1.2 Core Explanatory Variable

This study builds on the work of existing research and uses the degree of capital utilization to quantify the extent of financial misallocation across different industries (Yin et al., 2025). The specific method is as follows: Financial Misallocation Index = (Interest Rate Industry Average Interest Rate) / Industry Average Interest Rate.

4.1.3 Controlled Variable

This study selects the following control variables: firm size (Size), return on assets (ROA), proportion of independent directors (Indep), Tobin's Q (TobinQ), capital intensity (CAP), debt-to-equity ratio (Lev), cash flow ratio (Cashflow), proportion of the largest shareholder (Top1), and proportion of tangible assets (Tangible). These variables correspond respectively to dimensions such as a firm's resource endowment, profitability and operational capabilities, corporate governance structure, market valuation, and financial risk. Each of these dimensions may independently influence both the "quantity" and "quality" of a firm's green innovation. Incorporating them into the model effectively eliminates interference from irrelevant factors and avoids estimation biases caused by omitted variables. This approach enables more precise identification of the causal relationship between financial mismatch and corporate green innovation performance, thereby enhancing the robustness and credibility of empirical findings as shown in Table 1.

4.1.4 Mediating Variable

Building on the approach of existing research, this study constructs a financing constraint (SA) index to measure the degree of financing constraints faced by firms (Fungáčová et al., 2015)0. A higher SA index indicates a greater severity of financing constraints.

4.2 Data sources and Descriptive Statistics of Variables

The sample for this study includes listed companies from Chinese listed companies in Shanghai and Shenzhen from 2011 to 2022. Companies classified as ST (Special Treatment) and those with substantial missing data were excluded. For companies with minor missing data, interpolation methods were applied to impute the missing values. The financial data were obtained from the CSMAR and Wind databases. Descriptive statistics of the data are presented in Table 2.

Table 1: Variablede Scription

Variable Name	Variable Symbol	Variable Definition
Green Innovation Quantity	gin	The number of green patents filed + 1, logged
Green Innovation Quality	ginq	The number of green invention patents filed + 1, logged
Financial Misallocation	fm	(Interest rate - Industry average interest rate) / Industry average interest rate
Firm Size	Size	The natural logarithm of total assets in a year
Returnon Assets	ROA	Net profit / Average total assets for the year
Proportion of Independent Directors	Indep	Number of independent directors / Total number of directors
Tobin's Q	TobinQ	(Market value of circulating shares + Non-circulating shares × Book value per share + Liabilities) / Total assets
Capital Intensity	CAP	Total assets / Operating income
Debt-to-Equity Ratio	Lev	Total liabilities at year-end / Total assets at year-end
CashFlow Ratio	Cashflow	Net cash flow from operating activities / Total assets
Proportion of the Largest Shareholder	Top1	Number of shares held by the largest shareholder / Total number of shares
Proportion of Tangible Assets	Tangible	(Total assets - Net intangible assets - Net goodwill) / Total assets

Table 2: Descriptive Statistics

VarName	Obs	Mean	SD	Min	Median	Max
gin	22,156	0.350	0.785	0.000	0.000	6.848
ginq	22,156	0.238	0.638	0.000	0.000	6.328
fm	22,156	1.271	28.652	0.000	0.481	3527.476
Size	22,156	22.275	1.309	19.585	22.086	26.452
ROA	22,156	0.038	0.065	-0.373	0.037	0.247
Indep	22,156	37.642	5.380	28.570	36.360	60.000
TobinQ	22,156	1.994	1.313	0.802	1.582	15.607
CAP	22,156	2.502	2.081	0.378	1.916	18.942
Lev	22,156	0.426	0.202	0.032	0.419	0.908
Cashflow	22,156	0.047	0.068	-0.199	0.046	0.267
Top1	22,156	34.076	14.833	8.020	31.923	75.779

4.3 Benchmark Model Setting

This empirical study focuses on examining the impact of financial mismatch on corporate green innovation performance. After conducting a Hausman test on the panel data, the results indicate that the P-value rejects the null hypothesis, confirming that the fixed-effects model is more appropriate than the random-effects model for this research. Moreover, compared to the random-effects model, the core advantage of the fixed-effects model lies in its assumption that individual effects are correlated with the explanatory variables in the model. This effectively controls for individual heterogeneity that does not change over time in panel data, addressing estimation bias caused by omitting such unobservable variables. Moreover, this model does not require imposing the stringent assumption that "individual effects are independent of explanatory variables", which is difficult to satisfy in most empirical settings. Consequently, its estimation results exhibit greater robustness and reliability.

Therefore, this paper specifies the following two-way fixed effects model:

$$gin_{it} = \beta_0 + \beta_1 fm_{it} + \Sigma\eta_j X_{it} + \mu_i + \delta_t + \varepsilon_{it} \quad (1)$$

$$ginq_{it} = \varphi_0 + \varphi_1 fm_{it} + \Sigma\eta_j X_{it} + \mu_i + \delta_t + \varepsilon_{it} \quad (2)$$

In the model, gin_{it} and ginq_{it} represent the quantity and quality of firms' green innovation, where I and t denote the firm and the year, respectively. gm_{it} the core explanatory variable, financial misallocation. X_{it} represents the control variables that affect the dependent variables. $\mu_i$and $\delta_t$represent the individual and time fixed effects, respectively. The inclusion of both individual and time fixed effects helps mitigate endogeneity issues inherent in traditional regression models. $\varepsilon_{it}$is the random disturbance term.

4.4 Mediation Effect Model

In addition to directly impacting firms' green innovation performance, financial misallocation also exerts an indirect effect through intermediate mechanisms. Therefore, following the approach of Jiang Ting (2022), this study constructs a mediation analysis model to explore these effects in detail. The model is specified as follows:

$$Y_{it} = \alpha_0 + \alpha_1 D_{it} + \Sigma\eta_j X_{it} + \mu_i + \delta_t + \varepsilon_{it} \quad (3)$$

$$mediator_{it} = \theta_0 + \theta_1 D_{it} + \Sigma\eta_j X_{it} + \mu_i + \delta_t + \varepsilon_{it} \quad (4)$$

In the formula, mediator is the mediator variable, and the other variables are the same as above.

5.0 Experiments

5.1 Benchmark Regression Results

The benchmark regression results are shown in Table 3. As indicated in columns (2) and (4), after controlling for time and firm fixed effects and including control variables, the coefficients of fm_{it} are-0.003 and-0.002, respectively, and are statistically significant at the 1% level. The economic interpretation of these findings is that, after accounting for other influencing factors, financial misallocation negatively impacts both the quantity and quality of firms' green innovation. This suggests that financial misallocation inhibits the development of green innovation in firms. In theory, financial mismatch can inhibit corporate green innovation performance by affecting capital access, resource allocation efficiency, risk management, and triggering rent-seeking behavior. Therefore, Hypothesis 1 is validated.

Table 3: Benchmark Regression

	(1)	(2)	(3)	(4)
Variable Name	gin	gin	ginq	ginq
fm	-0.001**	-0.003***	-0.001**	-0.002***
	(2.27)	(-26.31)	(0.71)	(-26.53)
Constant	0.239***	-1.338***	0.144***	-1.119***
	(21.83)	(-3.61)	(15.80)	(-3.91)
Observations	22,156	22,156	22,156	22,156
R-squared	0.014	0.019	0.013	0.018
Number of Firms	2,911	2,911	2,911	2,911
Control Variables	NO	YES	NO	YES
Individual Effects	YES	YES	YES	YES
Time Effects	YES	YES	YES	YES

Note: *** p<0.01, ** p<0.05, * p<0.1. Z-statistic values are shown in parentheses. The same applies to the table below.

5.2 Robustness Test

5.2.1 Replace The Explained Variable

This study conducts a robustness check by replacing the dependent variables. Specifically, the ratio of firms' green patent applications to total patent applications in a given year (Ratio gin) and the ratio of firms' green invention patents to total patent applications in the same year (Ratio ginq) are used as proxies for the quantity and quality of green innovation, respectively. The results are presented in Table 4. As shown in columns (1) and (2), the regression results are significantly negative at the 1% level. Therefore, even when the dependent variables are substituted, the inhibitory effect of financial misallocation on firms' innovation performance remains significant, confirming that the baseline regression results are robust.

5.2.2 Tail Trimming

The regression results after applying 1% double trimming to the data are presented in columns (3) and (4) of Table 4. The findings indicate that financial mismatch continues to suppress corporate green innovation performance even after trimming, confirming the robustness of the benchmark regression results.

Table 4: Robustness Test

	(1)	(2)	(3)	(4)
Variable Name	Ratio gin	Ratio ginq	Ratio gin	Ratio ginq
fm	-0.001***	-0.001***	-0.001***	-0.001***
	(-33.30)	(-35.40)	(-41.67)	(-35.00)
Constant	0.008	-0.022	-0.015	-0.011**
	(0.13)	(-0.52)	(-0.93)	(-2.16)
Observations	22,156	22,156	20,223	20,126
R-squared	0.002	0.002	0.004	0.004
Number of Firms	2,911	2,911	2,850	2,860
Control Variables	YES	YES	YES	YES
Individual Effects	YES	YES	YES	YES
Time Effects	YES	YES	YES	YES

5.3 Mediating Effect of Financing Constraints

As shown in Table 5(1), the regression coefficient for financial mismatch on the "quantity" of corporate green innovation is -0.003, significant at the 1% level, consistent with previous findings. This indicates that financial mismatch inhibits the "quantity" of corporate green innovation. Next, we regress financial mismatch as the explanatory variable on financing constraints (SA) as the dependent variable. The results are presented in Column (2) of Table 5. Here, the regression coefficient for financial mismatch on financing constraints is 0.001, significant at the 1% level, indicating that financial mismatch promotes financing constraints. Thus, financing constraints mediate the effect of financial mismatch on the "quantity" of corporate green innovation. Similarly, Tables 5(3) and (4) show that financing constraints also mediate the effect of financial mismatch on the "quality" of corporate green innovation.

The impact of financial misallocation on firms' green innovation "quantity" and "quality" through financing constraints manifests in the following ways: On the one hand, financial misallocation prevents firms from obtaining financing that aligns with their needs, particularly long-term capital. This shortage of funds results in insufficient investment in green innovation projects, hindering RD and technological innovation activities, which directly affects

the firms' innovation capacity and project scale, thereby limiting both the quantity and quality of green innovation projects. On the other hand, due to financial misallocation, firms may face higher financing costs. Financial institutions, in an attempt to mitigate risks, may demand higher interest rates or impose stricter financing conditions. The increased financing costs place additional financial pressure on firms, causing them to be more cautious in their investment in green innovation projects. Consequently, firms may reduce their RD budgets and opt for lower-risk, less innovative projects, ultimately leading to a decline in green innovation performance. Therefore, Hypothesis 2 is supported.

Table 5: The Mediating Effect of Financing Constraints

	(1)	(2)	(3)	(4)
Variable Name	gin	SA	ginq	SA
fm	-0.003***	0.001***	-0.002***	0.001***
	(-27.39)	(15.22)	(-26.53)	(15.22)
Intercept Term	-0.057	-4.084***	-1.119***	-4.084***
	(-0.11)	(-34.39)	(-3.91)	(-34.39)
Observations	22,148	22,148	22,156	22,148
R-squared	0.020	0.843	0.018	0.843
Number of Firms	2,911	2,911	2,911	2,911
Control Variables	YES	YES	YES	YES
Individual Effects	YES	YES	YES	YES
Time Effects	YES	YES	YES	YES
Variable Name	YES	YES	YES	YES

5.4 Heterogeneity Analysis

5.4.1 Regional Heterogeneity Analysis

Currently, China still faces significant regional development imbalances, with noticeable disparities in human, material, and financial resources between the eastern, central, and western regions. Moreover, the green innovation performance of firms varies across these regions, which may influence the impact of financial misallocation. To explore the differential effect of financial misallocation on firms' green innovation performance across regions, this study divides the total sample data into three sub-samples: Eastern, Central, and Western regions, and performs separate regressions for each sub-sample. The results are shown in Table 6 below. As seen in columns (1) to (6) of Table 6, financial misallocation suppresses the development of firms' green innovation "quantity" and "quality" in both the Eastern and Western regions, with a more pronounced suppression effect in the Western region. However, the coefficient for financial misallocation in the Central region is not significant, indicating that its effect on suppressing firms' green innovation "quantity" and "quality" is not significant in the Central region. This may be because, although the eastern region possesses abundant financial resources

overall, these resources tend to be concentrated among a few large enterprises and specific industries. This concentration makes it difficult for small and medium-sized enterprises (SMEs) and emerging industries to secure sufficient financial support. Such uneven resource allocation exacerbates financial mismatches, limiting many enterprises' investments in green innovation. Simultaneously, despite the eastern region's economic advancement, enterprises still face relatively high financing costs. Financial institutions like banks tend to channel funds into low-risk projects, while green innovation initiatives—characterized by higher risks and longer return cycles—often struggle to secure low-cost financing, thereby dampening corporate enthusiasm for green innovation. In contrast, the western region suffers from relatively underdeveloped financial markets, with a limited number and variety of financial institutions, making it difficult to provide diversified financing channels. When pursuing green innovation, enterprises face limited financing options, leading to insufficient capital and consequently stifling green innovation efforts. Although the Western Development Strategy has brought some policy support to the region, targeted support policies and incentive measures for green innovation remain inadequate. Without robust policy backing, enterprises encounter heightened uncertainty and financial pressure during green innovation. Central China, however, may experience negligible impact from financial mismatch on green innovation due to a reasonable allocation of financial resources across enterprises of varying sizes and a relatively mature financial market. Therefore, Hypothesis 3 holds.

Table 6: Regional Heterogeneity Analysis

	(1) East	(2) West	(3) Middle	(4) East	(5) West	(6) Middle
Variable Name	gin	gin	gin	ginq	ginq	ginq
fm	-0.003***	-10.089**	3.281	-0.002***	-8.818**	-0.354
	(-20.13)	(-2.39)	(0.74)	(-19.86)	(-2.45)	(-0.11)
Intercept Term	-1.349***	-1.407*	-1.477	-1.132***	-1.796***	-0.538
	(-2.99)	(-1.68)	(-1.35)	(-3.19)	(-2.92)	(-0.65)
Observations	15,807	3,479	2,867	15,807	3,479	2,867
R-squared	0.022	0.022	0.018	0.021	0.029	0.012
Number of Firms	2,086	462	395	2,086	462	395
Control Variables	YES	YES	YES	YES	YES	YES
ID Effects	YES	YES	YES	YES	YES	YES
Time Effects	YES	YES	YES	YES	YES	YES

5.4.2 Analysis of Enterprise Heterogeneity

As shown in columns (1) to (3) of Table 7 below, the financial mismatch coefficient for technology-intensive enterprises is -0.002 and significant at the 1% level. while the coefficients for labor-intensive and asset-intensive enterprises are not significant. This indicates that financial mismatch in technology-intensive enterprises inhibits the "quantity" of green innovation, whereas the lack of significance in labor-intensive and asset-intensive enterprises suggests its suppression effect on green innovation quantity is negligible. The reasons may be as follows: Technology-intensive enterprises face high risks and uncertainties, capital-intensive demands, information asymmetry, limited financing channels, insufficient policy support, and high technological barriers and patent barriers. These factors make it difficult for enterprises to obtain sufficient and well-matched financial resources. Addressing these challenges requires collaborative efforts from financial institutions, governments, and enterprises. By optimizing financial support policies, improving financing channels, enhancing information communication, and providing targeted incentives, we can promote green innovation in technology-intensive enterprises and advance sustainable development.

As shown in columns (4) to (6) of Table 7 below, the financial mismatch coefficient for technology-intensive enterprises is -0.002 and significant at the 1% level, while the coefficient for asset-intensive enterprises is 0.007 and significant at the 1% level. The coefficient for labor-intensive enterprises is not significant. This indicates that financial mismatch in technology-intensive enterprises inhibits the development of green innovation "quality", while financial mismatch in asset-intensive enterprises promotes the development of green innovation "quality." For labor-intensive enterprises, the impact is insignificant. The reasons may be as follows: Technology-intensive enterprises often pursue high-quality outcomes in green innovation, but financial mismatch severely impacts the quality of their green innovation. This is because financial mismatch in technology-intensive enterprises creates conflicts between short-term financing and long-term projects, high financing costs, and insufficient capital scale, thereby limiting the "quality" development of their green innovation. In asset-intensive enterprises, companies possess substantial fixed assets and long-term investments that require effective management and utilization. When facing financial mismatch, companies may need to allocate and utilize existing resources more cautiously to ensure the smooth progress of their green innovation projects. This optimized resource allocation encourages enterprises to focus on high-quality green innovation projects, avoiding resource wastage and enhancing the quality of innovation outcomes. Moreover, asset-intensive enterprises' propensity for long-term investments, effective utilization of internal financing and equity capital, along with technological integration and innovation, enable them to enhance the quality of green innovation projects through multiple avenues when

confronting financial mismatch, thereby achieving sustainable development goals. In conclusion, Hypothesis 4 holds.

Table 7: Analysis of Heterogeneity in Enterprise Types

	(1) Labor	(2) Technology	(3) Asset-	(4) Labor-	(5) Technology	(6) Asset
Variable Name	gin	gin	gin	ginq	ginq	ginq
fm	-0.169	-0.002***	0.006	-0.221	-0.002***	0.007**
	(-1.39)	(-12.17)	(1.33)	(-1.31)	(-11.52)	(2.00)
Intercept Term	-0.760*	-3.267***	-1.280	-0.246	-2.708***	-1.108
	(-1.75)	(-3.90)	(-1.58)	(-0.99)	(-4.11)	(-1.45)
Observations	7,784	10,030	3,976	7,784	10,030	3,976
R-squared	0.018	0.034	0.012	0.012	0.036	0.010
Number of Firms	1,158	1,470	590	1,158	1,470	590
Control Variables	YES	YES	YES	YES	YES	YES
ID Effects	YES	YES	YES	YES	YES	YES
Time Effects	YES	YES	YES	YES	YES	YES

6.0 Conclusion and Policy Implication

6.1 Conclusion

This study, grounded in relevant theoretical frame works, utilizes panel data from listed companies over the period 2011 to 2022 to construct a two-way fixed effects econometric model, analyzing the mechanism by which financial misallocation impacts corporate green innovation performance. The key findings are as follows:

Full sample regression analysis: The analysis of the entire sample reveals that financial misallocation suppresses both the “quantity” and “quality” of corporate green innovation. This conclusion remains robust after conducting various robustness checks.

Geographic heterogeneity: When analyzing regional heterogeneity, the results show that financial misallocation negatively affects the “quantity” and “quality” of green innovation in both the eastern and western regions, with the effect being more pronounced in the western region. In contrast, the effect in the central region is not statistically significant.

Firm-TypeHeterogeneity: In terms of firm-type heterogeneity, financial misallocation significantly suppresses the “quantity” and “quality” of green innovation in technology-intensive firms. However, the impact on

labor-intensive firms' green innovation "quantity" and "quality" is insignificant. For asset-intensive firms, financial misallocation does not significantly affect the "quantity" of green innovation but has appositive impact on its "quality" .

Role of Financing Constraints: Financing constraints play an intermediary role in the relationship between financial misallocation and corporate green innovation performance. Specifically, financial misallocation exacerbates financing constraints, which in turn suppresses the development of corporate green innovation.

6.2 Policy Implication

Based on the findings of this study, the following recommendations and insights are provided:

Establish an Institutional Safeguard System to Enhance Targeted Guidance Effectiveness. Regulatory authorities should build a standardized green finance institutional framework centered on resolving information asymmetry. This includes establishing a quantitative credit rating system covering green innovation achievements and environmental compliance records, while standardizing information disclosure requirements. Implement differentiated regulation based on regional and corporate heterogeneity to channel eastern financial resources toward green innovation in SMEs, strengthen financial infrastructure and policy support in central and western regions, improve risk compensation mechanisms for technology-intensive enterprises, and optimize financing systems for green assets in asset-intensive enterprises. Conduct regular assessments of financial resource allocation efficiency, using differentiated tools to guide resources toward green innovation clusters, expand carbon market coverage, and facilitate the conversion pathways between carbon assets and financial resources.

Innovate service delivery models to enhance resource allocation efficiency. Financial institutions should focus on green innovation financing needs, develop tailored instruments such as medium-to-long-term loans and equity-debt combinations, promote financing methods integrating intellectual property pledges with green credit, and optimize repayment and collateral arrangements; Establish dedicated green innovation credit lines, assemble specialized teams, and strengthen targeted support for key regions and enterprises. Create a credit cooperation mechanism among eastern, central, and western regions to promote balanced resource allocation. Develop multidimensional risk assessment models, utilize big data to monitor capital flows, and mitigate risks through diversified lending and syndicated loans to achieve a balance between returns and security.

Strengthen endogenous development capabilities and proactively connect with

external resources. Enterprises should optimize internal management based on their specific type: technology-intensive enterprises should standardize capital accounting and accumulate collateral assets; asset-intensive enterprises should revitalize existing green assets and focus on innovation quality; labor-intensive enterprises should reduce R&D risks through industry-academia-research collaboration. Proactively engage with policy and financial resources by establishing policy tracking mechanisms, participating in green credit ratings, disclosing project information truthfully, and building long-term partnerships with financial institutions. Focus on enhancing core quality in green innovation while balancing quantity and quality to strengthen core competitiveness.

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Valuation of Interest Rate Swaps Under a Discrete-Time No-Arbitrage Framework: Theory, Derivations, and Numerical Applications

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Abstract

This paper presents a rigorous treatment of interest rate swap valuation within a discrete-time no-arbitrage framework. We derive closed-form expressions for the par swap rate under both general (time-varying notional) and level-notional conditions, establishing the equivalence between the two approaches through the telescoping property of forward rates and discount factors. We extend the standard framework to deferred-start swaps and derive a corresponding simplified formula. All theoretical results are accompanied by detailed numerical examples that demonstrate practical implementation. A sensitivity analysis illustrates how the term structure of interest rates affects swap pricing, providing both pedagogical and practical insights for risk management. Our unified treatment bridges the gap between introductory textbook presentations and the measure-theoretic continuous-time models used in advanced quantitative finance.

Keywords: Interest rate swaps; no-arbitrage theory; discrete-time models; forward rates; financial mathematics.

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1.0 Introduction

Interest rate swaps are among the most widely traded financial derivatives in global markets. According to the Bank for International Settlements (BIS), the notional outstanding amount of interest rate swaps exceeded $400 trillion as of 2023 Bank for International Settlements (2023). An interest rate swap is a contractual agreement between two counterparties to exchange a stream of interest payments: one party pays a fixed rate while the other pays a floating (variable) rate, both applied to a specified notional principal over a predetermined period.

The economic motivation for interest rate swaps is multifaceted. Borrowers with variable-rate liabilities may seek to hedge against rising interest rates by entering into a swap to effectively convert their exposure to a fixed rate. Conversely, institutions with fixed-rate obligations may prefer variable exposure to better match floating-rate asset income. In either case, the swap provides a mechanism for transferring interest rate risk between parties with different preferences or comparative advantages in different markets—an observation first formalized by Bicksler et al. (1986).

The theoretical foundations of swap pricing rest on the principle of no-arbitrage, which requires that the present value of fixed-leg payments equal the present value of floating-leg payments at inception. This fundamental condition, combined with the term structure of interest rates, yields deterministic closed-form expressions for the par swap rate. While the continuous-time measure-theoretic treatment of swap valuation using the LIBOR market model Brace et al. (1997) and Miltersen et al. (1997) and the Heath–Jarrow–Morton (HJM) framework Heath et al. (1992) provides the standard for advanced quantitative applications, the discrete-time deterministic framework remains indispensable for actuarial practice, pedagogical purposes, and situations where the term structure is directly observable through zero-coupon bond prices.

The contribution of this paper is threefold. First, we provide a rigorous and self-contained derivation of the par swap rate formula under a general framework allowing time-varying notional amounts, and show how it simplifies under the common assumption of a level notional. Second, we extend the framework to deferred-start swaps and derive the corresponding closed-form expression, which is often omitted in introductory treatments. Third, we complement the theory with detailed numerical examples and a sensitivity analysis that illustrates the relationship between the shape of the yield curve and the resulting swap rate.

The remainder of this paper is organized as follows. Section 2 establishes the mathematical preliminaries, including precise definitions of spot rates,

discount factors, and forward rates. Section 3 derives the general par swap rate formula. Section 4 presents the simplified formula for level notional amounts and proves its equivalence to the general formula. Section 5 extends the framework to deferred-start swaps. Section 6 provides comprehensive numerical examples. Section 7 presents a sensitivity analysis. Section 8 concludes and discusses extensions to continuous-time models.

2.0 Mathematical Preliminaries

We work in a discrete-time setting with a finite horizon $T \in \mathbb{N}$. Let $t_0 = 0 < t_1 < t_2 < \cdots < t_n = T$ denote the payment dates of the swap, where for simplicity we assume annual spacing so that $t_i = i$ for $i = 0,1, \ldots, n$.

Definition 1 (Spot Interest Rate). The spot interest rate r_t is the annual effective yield on a zero-coupon bond maturing at time t. Equivalently, r_t is the rate such that the price at time 0 of a zero-coupon bond paying \$1 at time t is $P_t = (1 + r_t)^{-t}$.

Remark 2. The collection $\{r_t\}_{t=1}^{n}$ constitutes the term structure of interest rates (or yield curve) observed at time 0. The corresponding discount factors $\{P_t\}_{t=1}^{n}$ are the prices of zero-coupon bonds and form an equivalent representation of the term structure.

Definition 3 (Forward Interest Rate). The periodic effective forward interest rate between times t_1 and t_2 (with $0 \le t_1 < t_2$), denoted $f^*_{[t_1,t_2]}$, is defined by $f^*_{[t_1,t_2]} = \frac{(1+r_{t_2})^{t_2}}{(1+r_{t_1})^{t_1}} - 1 = \frac{P_{t_1}}{P_{t_2}} - 1$. For consecutive annual periods, the one-period forward rate between t and $t+1$ is $f_{[t,t+1]} = \frac{(1+r_{t+1})^{t+1}}{(1+r_t)^t} - 1$.

The forward rate $f^*_{[t_1,t_2]}$ can be interpreted as the "break-even" rate for the period $[t_1, t_2]$: it is the rate that makes an investor indifferent between (i) investing for t_2 years at rate r_{t_2} and (ii) investing for t_1 years at rate r_{t_1} and then reinvesting at the forward rate for the remaining $t_2 - t_1$ years.

Lemma 4 (Telescoping Property). For any $t \in \{1,2, \ldots, n\}$, $f^*_{[t-1,t]} \cdot P_t = P_{t-1} - P_t$.

Proof. By Definition Definition 2.2,

$$f^*_{[t-1,t]} = \frac{P_{t-1}}{P_t} - 1,$$

so that

$$f^*_{[t-1,t]} \cdot P_t = \left(\frac{P_{t-1}}{P_t} - 1\right) P_t = P_{t-1} - P_t.$$

This identity is crucial for deriving the simplified swap rate formula in Section 4.

3.0 The General Par Swap Rate

Consider an interest rate swap with n settlement periods, where the notional amount at time t_i is Q_{t_i} (which may vary across periods). At each settlement date t_i, the floating-leg payer pays interest at the realized forward rate $f^*_{[t_{i-1},t_i]}$ on the notional Q_{t_i}, while the fixed-leg payer pays interest at a constant rate R on the same notional.

Definition 5 (Par Swap Rate). The par swap rate R is the fixed rate such that the market value of the swap is zero at inception. Equivalently, R is determined by the condition that the present value of the floating leg equals the present value of the fixed leg: $\sum_{i=1}^{n} Q_{t_i} f^*_{[t_{i-1},t_i]} P_{t_i} = \sum_{i=1}^{n} Q_{t_i} R P_{t_i}$.

PV of floating leg PV of fixed leg

Theorem 6 (General Swap Rate Formula). Under the no-arbitrage condition (3.1), the par swap rate is given by $\boxed{R = \frac{\sum_{i=1}^{n} Q_{t_i} f^*_{[t_{i-1},t_i]} P_{t_i}}{\sum_{i=1}^{n} Q_{t_i} P_{t_i}}}$.

Proof. Since is constant across all settlement periods, we factor it out of the right-hand side of (3.1):R

$$\sum_{i=1}^{n} Q_{t_i} f^*_{[t_{i-1},t_i]} P_{t_i} = R \sum_{i=1}^{n} Q_{t_i} P_{t_i}.$$

The denominator since all discount factors and notional amounts are strictly positive. Dividing both sides yields (3.2). □$\sum_{i=1}^{n} Q_{t_i} P_{t_i} > 0$

Remark 7. Formula (3.2) expresses as a weighted average of the forward rates , where the weights are proportional to . Intuitively, the par swap rate is the "average" forward rate, weighted by the present value of each notional exposure.(3.2)$R f^*_{[t_{i-1},t_i]} Q_{t_i} P_{t_i}$

4.0 Level Notional: Simplified Formula

In practice, most plain-vanilla interest rate swaps have a constant (level)

notional amount. This common special case admits a remarkably elegant closed-form expression.

Theorem 8 (Level-Notional Swap Rate). If the notional amount is constant, i.e., $Q_{t_i} = Q$ for all $i = 1, ..., n$, then the par swap rate simplifies to $\boxed{R = \frac{1-P_{t_n}}{\sum_{i=1}^{n} P_{t_i}}}$.

Proof. When for all , the general formula (3.2) becomes$Q_{t_i} = Qi$(3.2)

$$R = \frac{\sum_{i=1}^{n} Q\ f^*_{[t_{i-1},t_i]}\, P_{t_i}}{\sum_{i=1}^{n} Q\ P_{t_i}} = \frac{\sum_{i=1}^{n} f^*_{[t_{i-1},t_i]}\ P_{t_i}}{\sum_{i=1}^{n} P_{t_i}}.$$

Applying Lemma 2.3 to the numerator:

$$\sum_{i=1}^{n} f^*_{[t_{i-1},t_i]}\ P_{t_i} = \sum_{i=1}^{n} \left(P_{t_{i-1}} - P_{t_i}\right).$$

This is a telescoping sum:

$$\begin{aligned}\sum_{i=1}^{n} \left(P_{t_{i-1}} - P_{t_i}\right) &= \left(P_{t_0} - P_{t_1}\right) + \left(P_{t_1} - P_{t_2}\right) + \cdots + \left(P_{t_{n-1}} - P_{t_n}\right) \\ &= P_{t_0} - P_{t_n} = 1 - P_{t_n},\end{aligned}$$

where we used . Substituting into the expression for yields (4.1). □ $P_{t_0} = P_0 = (1 + r_0)^0 = 1R$

Remark 9. Formula (4.1) has a natural economic interpretation. The numerator is the difference between \$1 today and the present value of \$1 at maturity. The denominator is the present value of an annuity paying \$1 per period. Thus, is the coupon rate of a par bond, which connects swap rates directly to bond pricing.(4.1)$1 - P_{t_n} \sum_{i=1}^{n} P_{t_i} R$

Corollary 10 (Par Bond Equivalence). The level-notional par swap rate R equals the coupon rate of a par-valued fixed-rate bond with the same payment dates and term structure.

Proof. A par bond with face value F and coupon rate c satisfies

$$F = \sum_{i=1}^{n} c\ F\, P_{t_i} + F\, P_{t_n},$$

which gives $1 = c \sum_{i=1}^{n} P_{t_i} + P_{t_n}$, hence $c = \left(1 - P_{t_n}\right) / \sum_{i=1}^{n} P_{t_i} = R$. □

5.0 Deferred-Start Swaps

A deferred-start swap (or forward-starting swap) is a swap that begins at some future date t_k $(k \geq 1)$ rather than at inception. Such instruments are useful for hedging anticipated future borrowing or for speculating on future interest rate movements.

Definition 11 (Deferred Par Swap Rate). Consider a swap with settlement dates $t_{k+1}, t_{k+2}, \ldots, t_n$ (i.e., the swap starts at time t_k and has its first payment at t_{k+1}). The deferred par swap rate R_d is the fixed rate satisfying $\sum_{i=k+1}^{n} Q_{t_i} f^*_{[t_{i-1},t_i]} P_{t_i} = R_d \sum_{i=k+1}^{n} Q_{t_i} P_{t_i}$.

Theorem 12 (Deferred Swap Rate — General Notional). The deferred par swap rate under general notional amounts is $R_d = \frac{\sum_{i=k+1}^{n} Q_{t_i} f^*_{[t_{i-1},t_i]} P_{t_i}}{\sum_{i=k+1}^{n} Q_{t_i} P_{t_i}}$.

Theorem 13 (Deferred Swap Rate — Level Notional). If $Q_{t_i} = Q$ for all $i = k+1, \ldots, n$, then $\boxed{R_d = \frac{P_{t_k} - P_{t_n}}{\sum_{i=k+1}^{n} P_{t_i}}}$.

Proof. Following the same telescoping argument as in the proof of Theorem 4.1:

$$\sum_{i=k+1}^{n} f^*_{[t_{i-1},t_i]} P_{t_i} = \sum_{i=k+1}^{n} \left(P_{t_{i-1}} - P_{t_i}\right) = P_{t_k} - P_{t_n}.$$

Dividing by yields (5.3). □$\sum_{i=k+1}^{n} P_{t_i}$

Remark 14. Theorem 4.1 is the special case of Theorem 5.3 with $k = 0$ (no deferral), since $P_{t_0} = P_0 = 1$.

6.0 Numerical Examples

In this section, we present a series of numerical examples that progressively illustrate the application of the formulas derived above.

6.1 Basic Application: Two-Year General Formula

Example 1. A bank borrows \$1,000,000 for two years at a variable interest rate. The current term structure consists of a one-year spot rate of $r_1 = 6\%$ and a two-year spot rate of $r_2 = 10\%$. Determine the par swap rate.

Solution. We compute the required quantities:

$$\begin{aligned} P_1 &= (1.06)^{-1} = 0.943396, \\ P_2 &= (1.10)^{-2} = 0.826446, \\ f^*_{[0,1]} &= r_1 = 0.06, \\ f^*_{[1,2]} &= \frac{(1.10)^2}{(1.06)^1} - 1 = \frac{1.21}{1.06} - 1 = 0.141509. \end{aligned}$$

Since the notional amount $Q = 1{,}000{,}000$ is constant, we apply the general formula (Theorem 3.1):

$$\begin{aligned} R &= \frac{(0.06)(0.943396) + (0.141509)(0.826446)}{0.943396 + 0.826446} \\ &= \frac{0.056604 + 0.116950}{1.769843} = \frac{0.173554}{1.769843} = 0.09806. \end{aligned}$$

Verification using the level-notional formula (Theorem 4.1):

$$R = \frac{1 - P_2}{P_1 + P_2} = \frac{1 - 0.826446}{0.943396 + 0.826446} = \frac{0.173554}{1.769843} = 0.09806.$$

The par swap rate is $R = \mathbf{9.806}\%$.

6.2 Application with Zero-Coupon Bond Prices

Example 2. Peter borrows $200,000 to be repaid at the end of five years at a floating rate, and wishes to convert to a fixed rate via a swap. Zero-coupon bond prices (face value $1) are given in Table 1.

Table 1: Prices of Zero-Coupon Bonds (Face Value $1)

Maturity (years)	Price P_t
1	0.8500
2	0.8400
3	0.7900
4	0.7700
5	0.7200

Solution. Since the notional is level, we apply Theorem 4.1:

$$\begin{aligned} R = \frac{1 - P_5}{\sum_{i=1}^{5} P_i} &= \frac{1 - 0.72}{0.85 + 0.84 + 0.79 + 0.77 + 0.72} = \frac{0.28}{3.97} = 0.07053 \\ &= \mathbf{7.053}\%. \end{aligned}$$

6.3 Comparison of General and Level-Notional Formulas

For Examples Example 6.3–Example 6.6, we use the term structure in Table 2 and the derived quantities in Table 3.

Table 2: Term Structure of Spot Interest Rates

Time t (years)	Spot Rate r_t
1	4.00%
2	5.00%
3	5.75%
4	6.25%
5	6.50%

Table 3: Derived Discount Factors and One-Period Forward Rates

t	r_t	P_t = (1+r_t)^(-t)	f*[t-1,t]	f*[t-1,t] · P_t
1	4.00%	0.961538	0.040000	0.038462
2	5.00%	0.907029	0.060096	0.054509
3	5.75%	0.845588	0.072661	0.061441
4	6.25%	0.784665	0.077642	0.060923
5	6.50%	0.729881	0.075059	0.054784
Σ	—	**4.228702**	—	**0.270119**

Example 3 (Two-Year Level-Notional Swap). Jacque has a variable-rate loan of $5,000 for two years with annual resets. Determine the fixed swap rate using both formulas.

Solution.

General formula (Theorem 3.1):

$$R = \frac{(5000)(0.04)(0.961538) + (5000)(0.060096)(0.907029)}{(5000)(0.961538) + (5000)(0.907029)} = \frac{192.308 + 272.545}{9{,}338.84} = 0.049755.$$

Level-notional formula (Theorem 4.1):

$$R = \frac{1 - P_2}{P_1 + P_2} = \frac{1 - 0.907029}{0.961538 + 0.907029} = \frac{0.092971}{1.868568} = 0.049755.$$

Both formulas yield $R = \mathbf{4.976}\%$, confirming the equivalence established in Section 4.

Example 4 (Five-Year Level-Notional Swap). Miles Manufacturing Corporation enters into a five-year swap with a constant notional of \$300,000 and annual settlement periods. Determine the par swap rate.

Solution. Applying Theorem 4.1 with data from Table 3:

$$R = \frac{1 - P_5}{\sum_{i=1}^{5} P_i} = \frac{1 - 0.729881}{4.228702} = \frac{0.270119}{4.228702} = \mathbf{6.388}\%.$$

Example 5 (Variable Notional Swap). James and Associates has a line of credit: \$400,000 in year 1, \$600,000 in year 2, and \$1,000,000 in year 3 (cumulative). James enters into a three-year swap matching these notional amounts. Determine the par swap rate.

Solution. Since the notional amounts vary, the general formula (Theorem 3.1) must be used:

$$\begin{aligned} \text{Numerator} &= (400{,}000)(0.04)(0.961538) + (600{,}000)(0.060096)(0.907029) \\ &\quad + (1{,}000{,}000)(0.072661)(0.845588) \\ &= 15{,}384.62 + 32{,}705.44 + 61{,}441.32 = 109{,}531.37, \\ \text{Denominator} &= (400{,}000)(0.961538) + (600{,}000)(0.907029) + (1{,}000{,}000)(0.845588) \\ &= 384{,}615.38 + 544{,}217.69 + 845{,}588.12 = 1{,}774{,}421.19. \end{aligned}$$

Thus, $R = 109{,}531.37 \,/\, 1{,}774{,}421.19 = \mathbf{6.173}\%$.

Example 6 (Deferred-Start Swap). Shyu & Salisbury Actuarial Consultants enter into a deferred interest rate swap with a level notional of \$125,000. The swap covers years 3–5 of a five-year term (no settlement in years 1–2). Determine the deferred par swap rate.

Solution. This is a deferred swap with $k = 2$, so we apply Theorem 5.3:

$$R_d = \frac{P_2 - P_5}{\sum_{i=3}^{5} P_i} = \frac{0.907029 - 0.729881}{0.845588 + 0.784665 + 0.729881} = \frac{0.177148}{2.360134} = \mathbf{7.506}\%.$$

Verification via Theorem 5.2:

$$R_d = \frac{(0.072661)(0.845588) + (0.077642)(0.784665) + (0.075059)(0.729881)}{0.845588 + 0.784665 + 0.729881}$$
$$= \frac{0.061441 + 0.060923 + 0.054784}{2.360134} = \frac{0.177148}{2.360134} = 7.506\%.$$

Both formulas agree, confirming the result.

7.0 Sensitivity Analysis

To illustrate the economic content of the swap rate formulas, we analyze the sensitivity of the par swap rate to changes in the term structure.

7.1 Parallel Shifts in the Yield Curve

We consider the baseline upward-sloping term structure of Table 2 and examine the effect of parallel shifts of $\Delta \in \{-200, -100, 0, +100, +200\}$ basis points on the five-year level-notional swap rate.

Table 4: Five-Year Par Swap Rate Under Parallel Yield Curve Shifts

Shift (bps)	r_1	r_2	r_3	r_4	r_5	Swap Rate R
-200	2.00%	3.00%	3.75%	4.25%	4.50%	4.422%
-100	3.00%	4.00%	4.75%	5.25%	5.50%	5.405%
0	4.00%	5.00%	5.75%	6.25%	6.50%	6.388%
$+100$	5.00%	6.00%	6.75%	7.25%	7.50%	7.371%
$+200$	6.00%	7.00%	7.75%	8.25%	8.50%	8.354%

The swap rate increases approximately linearly with parallel shifts, though a slight convexity effect is present due to the nonlinear discount factor function $(1 + r)^{-t}$.

7.2 Yield Curve Shape Effects

Table 5 compares swap rates across three distinct yield curve shapes. Under a flat yield curve, the swap rate equals the common spot rate, as expected from (4.1) and Corollary 10. An upward-sloping curve produces a swap rate above the short end but below the long end, reflecting the weighted-average structure of the formula. An inverted curve produces a lower swap rate, capturing declining expected future rates.

Table 5: Five-Year Par Swap Rate Under Different Yield Curve Shapes

Yield Curve Shape	**r_1**	**r_2**	**r_3**	**r_4**	**r_5**	**Swap Rate R**
Flat	5.00%	5.00%	5.00%	5.00%	5.00%	5.000%
Upward-sloping	4.00%	5.00%	5.75%	6.25%	6.50%	6.388%
Inverted	6.50%	6.25%	5.75%	5.00%	4.00%	4.127%

8.0 Conclusion

This paper has presented a rigorous discrete-time framework for the valuation of interest rate swaps. Our main contributions are:

1.A self-contained derivation of the general par swap rate formula (Theorem 3.1) under time-varying notional amounts, grounded in the no-arbitrage principle.

2.A proof that the level-notional formula (Theorem 4.1) follows from the general formula via the telescoping property (Lemma 2.3), with the further equivalence to par bond coupon rates established in Corollary 4.3.

3.Extension to deferred-start swaps with both general (Theorem 5.2) and level-notional (Theorem 5.3) closed-form formulas.

4.Comprehensive numerical illustrations and a sensitivity analysis demonstrating the relationship between yield curve shape and par swap rates.

Several natural extensions merit further investigation:

Net swap payments. In practice, counterparties exchange only the net difference. At each settlement date t_i, the net payment from the fixed-rate payer to the floating-rate payer is $Q_{t_i}\left(R - f^*_{[t_{i-1},t_i]}\right)$, which may be positive or negative depending on the realized forward rate.

Market value of swaps post-inception. At inception, the swap's market value is zero by construction. As time passes and the yield curve evolves, the swap acquires a non-zero market value. Denoting the updated yield curve at time $s > 0$ by $\{\tilde{r}_t\}$, the market value to the fixed-rate payer is

$$V_s = \sum_{i:\, t_i > s} Q_{t_i} \left(\tilde{f}^*_{[t_{i-1},t_i]} - R\right)\tilde{P}_{t_i - s},$$

where $\tilde{P}$ and $\tilde{f}^*$ are computed from the updated term structure.

Continuous-time extensions. The discrete-time framework naturally extends to continuous-time models. In the Heath–Jarrow–Morton framework Heath et al. (1992), the instantaneous forward rate $f(t,T)$ satisfies a stochastic differential equation, and swap rates are computed as expectations under the appropriate forward measure. The LIBOR market model Brace et al. (1997) and Miltersen et al. (1997) provides an alternative approach that directly models discrete forward rates and is particularly suited for pricing interest rate derivatives.

Credit risk and CVA. The framework presented here assumes no counterparty default risk. In practice, credit valuation adjustment (CVA) is added to account for the possibility that one counterparty may default before the swap matures Hull (2012).

Multi-curve framework. Since the 2007–2008 financial crisis, the market has adopted a multi-curve framework where discounting uses overnight index swap (OIS) rates while forward rates are derived from the relevant IBOR curve Henrard (2014). This introduces basis spreads and additional complexity into swap valuation that the single-curve framework does not capture.

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Low-Carbon Transformation and Enterprise Digitalization: Evidence from China's Manufacturing Industry

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Abstract

With the swift growth of the digital economy and rising concerns about the environment, the digital transformation of businesses and the shift toward low-carbon practices have become essential for economic vitality and growth potential. Existing research has mainly focused on how digitalization influences low-carbon development. However, the impact of low-carbon transformation on business digitalization has not been thoroughly explored. This paper introduces a theoretical model to examine the internal dynamics of how low-carbon city pilot programs affect digitalization. Using data from manufacturing companies listed on the Shanghai and Shenzhen A-shares from 2007 to 2022, a multi-period double difference model is developed. This model treats the low-carbon city pilot policy as a quasi-natural experiment to analyze the effects of low-carbon transformation on business digital transformation and its mechanisms. The findings indicate that low-carbon transformation significantly promotes enterprise digitalization. Additionally, easing financing constraints and boosting R&D investments are effective strategies for enhancing digital transformation. The low-carbon transformation of state-owned enterprises, less polluting industries, and businesses in central China shows a more substantial impact on digitalization. These results support the hypothesis that low-carbon transformation can provide a dual benefit of environmental protection and economic development from a digital perspective. Furthermore, this research offers insights for policy development aimed at promoting the synergistic growth of low-carbon transformation and digitalization.

Keywords: Low-carbon transformation, digitalization, development

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1.0 Introduction

As the world's largest carbon emitter, China faces the dual imperative of mitigating environmental degradation and fostering high-quality economic transformation. In response, the Chinese government has enacted ambitious policies, including the "Dual Carbon" goals (peaking emissions by 2030 and achieving neutrality by 2060) and multiple batches of low-carbon city pilot programs (Zheng, 2023; Hou et al., 2023). Concurrently, the digital economy, characterized by technologies such as big data, cloud computing, and the Internet of Things, has emerged as a pivotal force for enhancing resource allocation efficiency and driving innovation (Lyu et al., 2023; Sun & Chen, 2023). This confluence raises a critical yet underexplored question: does the policy-driven low-carbon transition actively spur corporate digital transformation, and if so, through what mechanisms?

The existing literature provides robust but largely parallel insights into these two domains. On one hand, studies confirm that low-carbon policies, like the city pilots, significantly reshape corporate decision-making, prompting strategic realignment, green technology adoption, and adjustments in resource allocation to comply with environmental regulations (He, 2016; Chen et al., 2016; Xu et al., 2023). Some view this transition as a potential cost burden (Chen et al., 2023), while others, aligning with the spirit of the Porter Hypothesis (Porter & van der Linde, 1995), suggest it can stimulate innovation that improves competitiveness (Li et al., 2021). On the other hand, a separate stream of research highlights digitalization as a key enabler for low-carbon goals, demonstrating how digital technologies optimize production processes, reduce waste, and enhance supply chain transparency (Mondejar et al., 2021; Zhang & Li, 2020; Ebinger & Omondi, 2020). Numerous studies have empirically examined the impact of the digital economy on reducing urban carbon emissions (Zhu et al., 2022; Liu et al., 2022; Yu et al., 2022).

However, a significant theoretical and empirical gap persists. First, the causal direction has been predominantly examined in one direction—from digitalization to low-carbon outcomes. The reverse causality, i.e., whether and how low-carbon transition policies act as an institutional driver for enterprise digitalization, remains insufficiently theorized and empirically tested (Yang et al., 2023; Liu et al., 2023). Second, while the synergy is often asserted, the specific internal mechanisms bridging this causal link are unclear. Preliminary evidence suggests low-carbon policies may alleviate financing constraints or incentivize R&D (Yu et al., 2023; Chernenko et al., 2022), but these pathways lack comprehensive examination within a unified framework linking policy shock to digital outcomes. Third, existing research often overlooks the heterogeneous effects across firms with differing ownership structures, pollution intensities, and regional contexts, which is crucial for understanding the boundary conditions of this relationship (Wang & Li, 2023).

This study aims to fill these gaps by investigating the causal effect of low-carbon city pilot policies on the digital transformation of manufacturing enterprises and elucidating the underlying mechanisms. Grounding our analysis in institutional theory (DiMaggio & Powell, 1983) and the resource-based view (Barney, 1991), we posit that low-carbon policies create coercive pressure and alter resource environments, thereby fostering digital capability building. Specifically, we treat the phased rollout of low-carbon city pilots as a quasi-natural experiment and employ a multi-period difference-in-differences (DID) model on a panel of Chinese A-share listed manufacturing firms from 2007 to 2022 (Hou et al., 2023; Zhang et al., 2023).

Our contributions are threefold. Theoretically, we extend the application of institutional theory by examining how environmental regulation, as a coercive force, drives a specific form of organizational change—digital transformation. We also contribute to the resource-based view by testing how policy-induced changes in resource access (financing) and allocation (R&D) mediate this process. Empirically, we provide robust causal evidence on a previously underexplored relationship and unpack the "black box" through mechanism tests on financing constraints and R&D investment. Practically, our heterogeneity analysis offers nuanced insights for policymakers to design targeted strategies that promote the synergistic development of low-carbon and digital transitions across different types of enterprises and regions (Zhang et al., 2022).

The remainder of this paper is structured as follows: Section 2 develops the theoretical framework and research hypotheses. Section 3 details the research design, model, and data. Section 4 presents the empirical results, including baseline estimates, robustness checks, mechanism, and heterogeneity analyses. Section 5 concludes with a discussion of findings, implications, and limitations.

2.0 Theoretical Analysis and Research Hypothesis

2.1. Institutional Context and Identification Strategy

To empirically test the theoretical linkage between low-carbon transition and enterprise digitalization, this study leverages the phased implementation of China's Low-Carbon City (LCC) pilot policy as a quasi-natural experiment. Initiated in three batches (2010, 2012, and 2017), this policy designated selected cities as pilots, requiring them to establish concrete low-carbon development plans and emission reduction targets (Wang et al., 2015; Li et al., 2018). The progressive expansion from the first batch (5 provinces and 8 cities) to subsequent batches reflects a deepening national commitment to low-carbon transformation, creating a staggered "treatment" across time and space (Li et al., 2018).

This policy context provides a critical identification advantage. For individual

manufacturing firms, the timing and location of this regulatory shock are largely exogenous, as the selection of pilot cities was based on city-level administrative characteristics and development readiness rather than the specific attributes or initiatives of individual firms within them. This spatial-temporal variation allows us to isolate the impact of low-carbon transition pressure from other confounding factors. Concurrently, the national strategic emphasis on the digital economy, as reiterated in key policy documents (Zhang et al., 2023), sets a broader backdrop where digital solutions are both available and incentivized. The LCC pilot policy, therefore, does not operate in a vacuum but within a policy ecosystem that simultaneously pushes firms toward low-carbon practices and pulls them toward digital means. This unique intersection offers a robust setting to examine whether and how the coercive pressure of low-carbon transition (the push) catalyzes digital transformation within firms, amidst the enabling environment for digitalization (the pull).

2.2. Theoretical Mechanisms and Research Hypotheses

Scholarly inquiry into the relationship between low-carbon transition and digitalization has converged along two primary, yet often parallel, trajectories: one examining the impact of low-carbon transition on corporate behavior, and another investigating the role of digitalization in enabling low-carbon goals (He, 2016; Chen et al., 2016; Mondejar et al., 2021). A critical synthesis of these streams reveals a significant gap concerning the causal mechanisms through which policy-driven low-carbon transition proactively stimulates enterprise digitalization.

2.2.1. Low-Carbon Transition as an Impetus for Strategic and Operational Change

Confronted with stringent carbon emission policies and the national "Dual Carbon" targets, firms are compelled to fundamentally reassess their business strategies and resource utilization models (He, 2016). This transition imposes significant pressure, potentially increasing short-term production costs and creating financial burdens as firms may need to curtail polluting activities and invest in environmentally friendly technologies (Chen et al., 2023; Xu et al., 2023). However, this pressure also acts as a catalyst for strategic innovation. To achieve emission reduction and efficiency gains, firms are driven to seek transformative solutions, with digital technologies emerging as a pivotal tool. The adoption of technologies such as the Internet of Things and big data analytics facilitates real-time production monitoring and precise energy management, directly enhancing resource efficiency and reducing waste (Chen et al., 2016; Tyfield et al., 2015). Consequently, the regulatory pressure of low-carbon transition creates a compelling context for firms to explore and integrate digital tools into their operations, not merely for compliance but as a

means to rebuild competitive advantage (Xu et al., 2023; Li et al., 2021). Furthermore, rising societal expectations for environmental transparency and governance increase the necessity for firms to demonstrate sustainable performance, potentially accelerating the adoption of digital systems for data management and reporting.

2.2.2. Digitalization as a Facilitator for Low-Carbon Objectives

Conversely, a robust body of literature establishes digitalization as a powerful enabler of low-carbon development. Digital technologies optimize resource allocation, enhance production process control, and improve supply chain transparency, thereby contributing significantly to energy conservation and emission reduction (Mondejar et al., 2021; Zhang & Li, 2020; Chen, 2022). For instance, intelligent systems powered by real-time data can minimize resource input and reduce overproduction, lowering the carbon footprint across the value chain (Mondejar et al., 2021). Digitalization also fosters innovative business models, allowing firms to launch green products and services that meet evolving market demands for sustainability (Parida et al., 2019; Yu et al., 2023). This synergy suggests a mutually reinforcing relationship where digital and green transformations can advance together (Yu et al., 2023; Rogetzer et al., 2018).

2.2.3. Integrating the Pathways: From Policy Shock to Digital Response

Despite these insights, the extant literature exhibits a notable asymmetry. While the facilitating role of digitalization in achieving low-carbon goals is well-documented, the reverse causal pathway—whether and how the exogenous shock of a low-carbon transition policy actively drives enterprise digitalization—remains underexplored and theoretically underdeveloped (Yang et al., 2023; Liu et al., 2023). There is no consensus on the precise mechanisms through which environmental policy impacts digital investment at the firm level (Chernenko et al., 2022; Wang et al., 2022). Some preliminary evidence suggests that low-carbon city pilots may ease financing constraints for firms (Yu et al., 2023), yet a comprehensive framework detailing the transmission channels from policy pressure to digital outcomes is lacking. Most studies focus on supply-side effects, neglecting how policy alters internal firm conditions and investment incentives on the demand side.

To address this gap, this paper proposes an integrated mechanism centered on resource reallocation. We argue that the low-carbon city pilot policy, as a salient regulatory shock, can promote enterprise digitalization primarily by reshaping two critical internal resource conditions: alleviating financing constraints and stimulating R&D investment. First, the policy and its associated supportive measures (e.g., green credit, fiscal subsidies) can improve firms' access to capital, providing the necessary financial resources

for costly digital investments. Second, the imperative for low-carbon innovation inherently boosts R&D expenditures, which often encompass digital technology development and adoption, thereby enhancing the firm's absorptive capacity for digital transformation. Moreover, the strength of these effects is likely to be heterogeneous, varying with firm ownership, industry pollution intensity, and regional development context due to differences in resource endowments, regulatory sensitivity, and market pressures (Wang & Li, 2023).

Based on the foregoing analysis, we posit the following hypotheses:

H1: The low-carbon transition has a significant promoting effect on enterprise digitalization.

H2: The low-carbon transition promotes enterprise digitalization by alleviating financing constraints and increasing R&D investment.

H3: The promoting effect of the low-carbon transition on enterprise digitalization is more pronounced in state-owned enterprises, non-polluting industries, and enterprises located in China's central region.

3.0 Study Design and Model Construction

This research examines the effects of low-carbon transformation on enterprise digitalization within publicly listed manufacturing firms in the Shanghai and Shenzhen A-share markets from 2007 to 2022. The study utilizes a combination of low-carbon city pilot programs established in three phases to investigate this relationship. The processing of company data is conducted as follows: (1) firms classified as ST and *ST are excluded from the analysis; (2) to mitigate the influence of extreme values and outliers on the regression results, all continuous variables are trimmed by 1% both before and after the analysis. This study utilizes data obtained from the China Securities Market and Research Database (CSMAR) along with the China Research Data Service Platform (CNRDS).

3.1 Model Setting

An artificial experiment is used to construct an inter-period double-difference model to examine the impact of low-carbon transformation on the digitisation of firms. A low-carbon city pilot project established in three phases is used as the basis for the model. The model has the following structure:

$$DCG_{it} = \alpha_0 + \alpha_1 LC_{it} + \alpha_2 X_{it} + IdFE + YearFE + \varepsilon_{it} \quad (1)$$

In this context, DCG_{it} represents the variable of digital transformation of enterprises, while LC_{it} signifies low-carbon transformation. X_{it} is the control variable, $IdFE$ are the individual fixed effects ,$YearFE$ are the time fixed

effects. ε_{it} is the random disturbance term.

3.2 Sample Selection

3.2.1. Dependent Variable

To measure enterprise digitalization (*DCG*), we employ a text-analysis-based proxy validated in prior literature as an effective indicator of strategic focus on digital transformation (Wu et al., 2021). Building upon the findings of that study, keywords were identified from five distinct domains: artificial intelligence technology, big data technology, cloud computing technology, blockchain technology, and digital technology applications. Subsequently, we computed the frequency of each keyword's occurrence. To assess the degree of digital transformation within organizations, we incremented the frequency of the term “digital transformation” by one.

3.2.2. Core Explanatory Variable

The phased low-carbon city pilot policy serves as a quasi-natural experiment to capture the exogenous shock of low-carbon transition pressure on firms (Ma & Sun, 2024). According to their research, the low-carbon city pilot programs initiated in three distinct phases in 2010, 2012, and 2017 are utilized as quasi-natural experiments to analyze the process of low-carbon transformation. In instances where a firm is situated in a city designated as a pilot city during a specific year, that year and all subsequent years are assigned a value of 1; otherwise, a value of 0 is assigned. The second cohort of low-carbon city pilots was announced in December 2012, making 2013 the designated year of policy shock for this particular group of pilots.

3.2.3. Control Variables

Firm Size-It is measured by the natural logarithm of total assets. Leverage: the ratio of total liabilities to total equity and liabilities. ROA-It is computed as the net profit as a ratio to total assets. Growth of Company- Growth rate in operating profit in the current year compared to last year, % change. The Enterprise Cash Flow is calculated by the cash flows from operations divided by total assets. It can be considered that the size of the board of directors by the natural logarithm of number of directors. The proportion of shares owned by the largest shareholder measures the stake of the largest shareholder. Last of all, the age of the firm is measured by the natural logarithm of the difference between the current year and the year in which the firm was established, offset by adding one.

3.2.4. Measurement Validity and Discussion

The construction of our core variables follows established practices in the

literature to ensure conceptual validity. For the dependent variable, the text-based measure of digital transformation (*DCG*) is justified as it directly captures a firm's strategic emphasis and disclosed commitments to digital technologies, which is a valid proxy for its digitalization orientation and has been widely adopted in recent studies on corporate digitalization (Wu et al., 2021). While alternative proxies exist, such as IT investment intensity or the count of digital patents, they often capture only one input or output facet of digitalization. The text-based measure offers a more holistic view of the firm's overall strategic engagement with the digital paradigm, aligning with our research objective.

For the core explanatory variable, the use of the low-carbon city pilot policy dummy (*LC*) as a proxy for low-carbon transition pressure is well-grounded. This policy represents a clear, exogenous regulatory shock that mandates a systemic shift towards low-carbon development at the city level, thereby creating a strong and measurable treatment effect on firms located within pilot areas. This operationalization is standard in policy evaluation studies utilizing quasi-natural experiments (Ma & Sun, 2024). The staggered implementation across three batches provides the temporal variation required for a robust multi-period DID design.

3.3. Descriptive Statistics

Summary statistics for the variables analyzed in this study are shown in Table 1 below. The degree of enterprise digitalization varies between the maximum value of 6.140 and the minimum value of 0.000, indicating that the level of digitalization among enterprises in the manufacturing sector differs significantly. In general, it is relatively low, as represented by the mean of 1.196. Also, about 54.2% of the enterprises in the sample are influenced by the low-carbon city pilot policy, as reflected by the mean value of 0.542 for low-carbon transition. The existing literature also predominantly supports the rest of the tested control variables.

Table 1: Presents the Descriptive Statistics

Variable	Mean	SD	Max	Min
DCG	1.196	1.272	6.140	0.000
LC	0.542	0.498	1.000	0.000
size	22.035	1.164	26.452	19.317
lev	0.398	0.190	0.908	0.027
roa	0.045	0.065	0.257	-0.373
growth	0.171	0.374	4.024	-0.658
cashflow	0.050	0.067	0.283	-0.223
board	2.116	0.192	2.708	1.609
top1	0.338	0.140	0.758	0.080
firmage	2.867	0.348	3.611	0.693

4.0 Empirical Results Analysis
4.1 Correlation Analysis

To test the correlation between variables before regression and avoid the impact of multicollinearity on the estimation results, this study uses the Pearson correlation coefficient. As shown in the correlation analysis results in Table 2, a correlation coefficient of 0.256 is found between low-carbon transformation and enterprise digitalisation, which passes the 1% significance test. This result suggests a significant positive correlation between low-carbon transformation and enterprise digitalisation, providing preliminary evidence that low-carbon transformation can promote enterprise digitalisation. Additionally, since the correlation coefficients between the selected explanatory variables are all below the empirical threshold of 0.8, there is no serious multicollinearity, meaning the regression results are not significantly affected by multicollinearity.

Table 2: Correlation Analysis

Variable	DCG	LC	size	lev	roa1	growth	cashflow
DCG	1.000						
LC	0.256***	1.000					
size	0.131***	0.050***	1.000				
lev	-0.017**	-0.036***	0.459***	1.000			
roa	-0.011	-0.020***	0.032***	-0.368***	1.000		
growth	0.017***	0.016***	0.065***	0.044***	0.291***	1.000	
cashflow	-0.010	-0.021***	0.089***	-0.167***	0.450***	0.034**	1.000
board	-0.109***	-0.101***	0.229***	0.151***	0.010	-0.006	0.013**
top1	-0.061***	-0.014**	0.099***	-0.003	0.140***	0.013*	0.090***
firmage	0.145***	0.143***	0.227***	0.101***	-0.071**	-0.075***	0.057***
	board	top1	firmage				
board	1.000						
top1	-0.013*	1.000					
firmage	-0.002	-0.118***	1.000				

Note: *, **, and * indicate a significance level of 10%, 5%, and 1%, respectively.**

4.2 Baseline Regression Analyses

Regression estimation for multi-period double-difference model is conducted to explore the effect of low-carbon transformation on enterprise digitalization. It can be seen from the benchmark regression results in Table 3 that, prior to the addition of control variables in column, the low-carbon transition coefficient regarding enterprise digitalization is 0.068, statistically significant at a significance level of 1%. In column, by adding control variables, including firm size in attempting to control for potential firm-specific characteristics, the regression coefficient of low-carbon transformation and firm digitalization was reduced to -0.070, yet still statistically significant at 1%. The above results show that the low-carbon transformation significantly promotes the digital transformation of enterprises, whether or not adding the control variables.

Table 3: Results of the Baseline regression

	(1)	(2)
Variable	DCG	DCG
LC	0.068***	0.070***
	(0.024)	(0.023)
size		0.218***
		(0.015)
lev		0.027
		(0.059)
roa		-0.179
		(0.118)
growth		0.022
		(0.016)
cashflow		-0.033
		(0.096)
board		0.201***
		(0.049)
top1		-0.471***
		(0.094)
firmage		0.022
		(0.091)
Constant	1.159***	-3.986***
	(0.014)	(0.404)
Individual fixed	Yes	Yes
Time fixed	Yes	Yes
Observations	22,603	22,603
R-squared	0.760	0.765

Note: *, **, and * indicate a significance level of 10%, 5%, and 1%, respectively. The values in parentheses are robust standard errors, as in the table below.**

4.3. Robustness Test

4.3.1. Parallel Trend Test

To ensure that the level of digitization between firms in the treatment group and the control group does not differ significantly before the implementation of the carbon city pilot, the difference-in-differences (DID) model is used to test the impact of the carbon transition on firms' digitization. The event study method conducts the parallel trends test.The model is specified as follows:

$$DCG_{it} = \lambda_0 + \sum_{k=2}^{3} \beta_{-k} Before_{kt} + \lambda_1 Current_{it} + \sum_{k=1}^{7} \beta_k After_{kt} + \lambda_2 X_{it} + IdFE + YearFE + \varepsilon_{it} \quad (2)$$

The above result of the parallel trend test illustrates the insignificance of coefficients for the period before the low-carbon city pilot. That means no huge discrepancies in the level of digitalization had existed among firms beforehand. Hence, the DID model is appropriate to use in finding the causal relationship for the researchers (Colombo & Garrone, 1996; Gómez-Plana & Latorre, 2019). Obviously positive coefficients in the three post-pilot periods suggest that the low-carbon city pilot policy has significantly facilitated the digital transformation of firms.

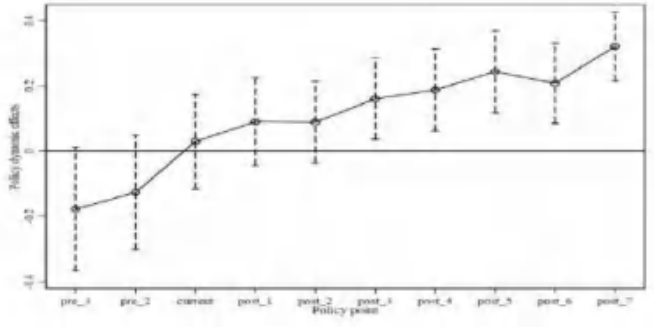

Figure 1: Parallel trend test

4.3.2. Plac

This paper can control for how the estimated effects of a given factor-or some alternative policy-change by randomly selecting 800 companies to be in the treatment group, while all other companies serve as the control group. The author create and analyze such a dummy policy interaction term using a baseline regression model. From Figure 2, most of the coefficients of the political dummy variables lie around zero, while the corresponding p-values are all above 0.1. This leads to the result that the estimates of the baseline regression are significant at 10% level. Hence, this leads to the result that the potential confounding factors have not affected the results of the earlier baseline regression, which justifies the robustness of those conclusions.

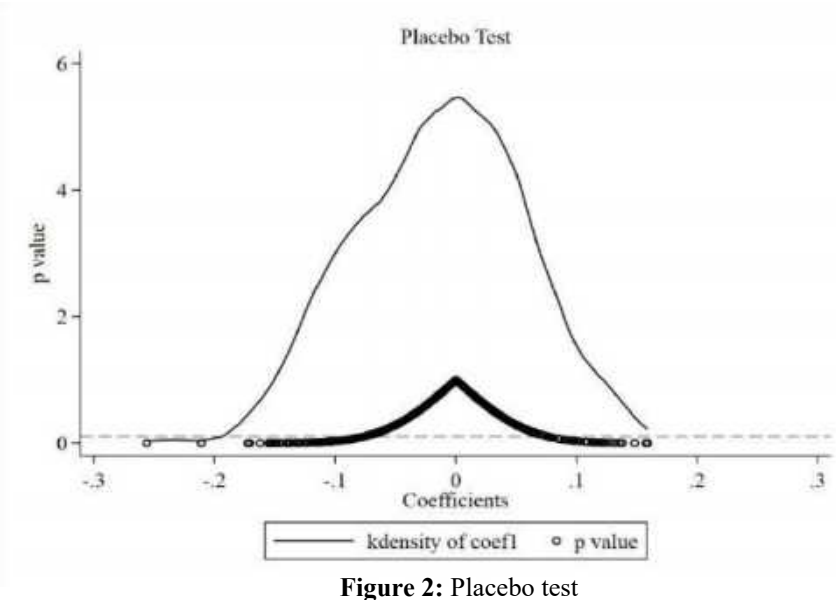

Figure 2: Placebo test

4.3.3. Propensity Score Matching

In order to limit sample self-selection bias, researchers usually use sample matching to reduce these biases in estimation. Particularly, sample matching relies on the PSM method (King & Nielsen, 2019). To this end, one first estimates a logistic regression model to conduct 1:1 nearest neighbor matching of samples. Then, one analyzes the matched samples using a benchmark regression model. Column (1) of Table 4 presents the regression coefficient of the low-carbon transition to firm digitalization, which is 0.110 at the 1% significance level. This result therefore reinforces the conclusion that the low-carbon transition promotes firm digitization, as suggested by the regression results using the approach of PSM-DID (Peduzzi et al., 1996; King & Nielsen, 2019).

4.3.4. Heckman Two-Step Method

The author applied the Heckman two-step approach in order to take into consideration the problem of sample selection bias. To be more specific, in this case, the first step was estimating the IMR by using a probit model; at the second stage, the estimated IMR was introduced into the basic regression model. As was shown in column (2) of the following Table 4, the regression coefficient of the low-carbon transition to firm digitalization is 0.070, statistically significant at 1%. According to the Heckman two-step method, firm digitalization is still positively influenced by the transition to the low-carbon position, which further enhances the robustness of the above conclusions.

4.3.5 Excluding the Municipal Sample

To assess the strength of the results, it took out samples from the four municipalities of Beijing, Shanghai, Tianjin, and Chongqing. As can be seen from column in Table 4 below, the regression coefficient of low-carbon transition to enterprise digitalization is 0.085, and it passes the 1% significance level test. It means that excluding municipal samples, the low-carbon transition still promotes enterprise digitalization, hence enhancing the robustness of previous conclusions.

4.3.6 Control for Regional Characteristics

Given the regional influence, the researcher carried out a robustness check by adding a regional fixed effect in order to catch the regional characteristics. From the results shown in Table 4 below, column (4) provides the regression coefficient of low-carbon transition with enterprise digitalization as 0.058, statistically significant at the 5 percent significance level. The findings above tend to indicate that even considering regional features, low-carbon transition contributes significantly to enterprise digitization, hence reinforcement in the robustness of the previous conclusion.

Table 4: Robustness Test

	(1)	(2)	(3)	(4)
Variable	DCG	DCG	DCG	DCG
LC	0.110***	0.070***	0.085***	0.058**
	(0.038)	(0.023)	(0.026)	(0.023)
IMR		2.648		
		(3.456)		
size	0.212***	0.245***	0.220***	0.217***
	(0.023)	(0.038)	(0.016)	(0.015)
lev	0.002	-0.187	-0.026	0.024
	(0.088)	(0.287)	(0.064)	(0.059)
roa	-0.266	-0.580	-0.347***	-0.171
	(0.177)	(0.537)	(0.125)	(0.118)
growth	0.004	0.125	0.034*	0.022
	(0.025)	(0.137)	(0.018)	(0.016)
cashflow	0.080	-1.275	0.006	-0.032
	(0.148)	(1.624)	(0.102)	(0.096)
board	0.256***	-0.221	0.229***	0.204***
	(0.074)	(0.554)	(0.053)	(0.049)
top1	-0.275*	-0.039	-0.521***	-0.471***
	(0.142)	(0.572)	(0.098)	(0.094)
firmage	0.055	0.059	-0.018	0.019
	(0.137)	(0.104)	(0.097)	(0.091)
Constant	-4.212***	-5.315***	-3.948***	-3.952***
	(0.608)	(1.783)	(0.428)	(0.405)

	(1)	(2)	(3)	(4)
Individual fixed	Yes	Yes	Yes	Yes
Time fixed	Yes	Yes	Yes	Yes
area fixed	No	No	No	Yes
Observations	11,017	22,603	19,375	22,603
R-squared	0.772	0.765	0.762	0.766

4.4. Mechanism Test

To examine the theoretical mechanisms proposed in Hypothesis 2, we test whether low-carbon transformation promotes digitalisation by alleviating resource constraints and stimulating innovation efforts. Specifically, we focus on two mediating channels: enterprise financing constraints and enterprise R&D investment. The SA index measures the firms' financing constraints (SA), and the amount of firms' R&D expenditure measures their R&D investment. Researchers constructed an empirical model, with reference to existing research (Jiang, 2022), to test the impact of low-carbon transformation on financing constraints and R&D investment.. The model is set as follows:

$$M_{it} = \alpha_0 + \alpha_1 LC_{it} + \alpha_2 X_{it} + IdFE + YearFE + \varepsilon_{it} \quad (3)$$

M_{it} is corporate financing constraints and R&D investment.

As shown in the following results of Table 5, the regression value of business financing bottlenecks on the low-carbon transition in column (1) is -0.006 and passes the 1% significance test. This indicates that business financing bottlenecks are significantly reduced by the low-carbon transition. The regression value of business R&D investment on the low-carbon transition in column (2) is 0.749, passing the 1% significance test, indicating that business R&D investment is significantly increased by the low-carbon transition. These results demonstrate that the low-carbon transition promotes firm digitalization effectively through reducing financing constraints and increasing R&D investment.

Table 5: Mechanism Test

	(1)	(2)
Variable	SA	RD
LC	-0.006***	0.749***
	(0.002)	(0.162)
size	0.004**	2.222***
	(0.002)	(0.108)
lev	0.050***	-2.103***
	(0.005)	(0.264)
roa	0.012	0.935*

	(0.009)	(0.540)
growth	0.008***	-0.399***
	(0.001)	(0.113)

4.5 Analysis of the Heterogeneity

4.5.1. Heterogeneity of Enterprise Nature

In the meantime, the digital transformation among different types of enterprises has a quite different distribution, especially in response to the Low Carbon City Pilot. During the heterogeneity analysis, the enterprises were divided into two groups according to ownership structure: state-owned and non-state-owned enterprises. As can be seen from Table 6, enterprise digitalization is positively correlated with low-carbon transformation; the regression coefficient is 0.095 in column (1) and statistically significant at the 1% significance level. In the same way, low-carbon transformation also promotes enterprise digitalization; the regression coefficient is 0.069 in column (2), which is significant at the 5% level. These findings suggest that LCT positively impacts enterprise digitalization, regardless of ownership type. More importantly, the coefficients from regression can be compared: the coefficient in column (1) is larger than that in column (2). This implies that their empirical P-value in the Fisher combination test was 0.066, significant at a 10% level. That implies that the low-carbon transformation provides the state-owned enterprises with a greater impact than the non-state-owned ones on digitalization.

4.5.2. Heterogeneity of Different Industries

Heavily polluting industries and industries that are not heavily polluting are affected differently by the policies of the Low Carbon City pilot project. Therefore, for the heterogeneity analysis, the sample is divided into heavy polluting and non-heavy polluting industries based on the industry to which the enterprise belongs (Wang & Li, 2023). As shown in the results of heterogeneity analysis in Table 6 below, the regression factor of low-carbon transformation on enterprise digitization in column (3) is .011, which does not pass the significance test; the regression factor of low-carbon transformation on enterprise digitization in column (4) is .087, which passes the significance test at the 1% level, and the empirical p-value is .000, which means that there is a difference in the factor between the groups at the 1% level. This suggests that low-carbon transformation has a greater impact on the digitisation of companies in non-polluting industries than in highly polluting industries.

Table 6: Heterogeneity Analysis (1)

	(1)	(2)	(3)	(4)
	state-owned	non-state-owned	Heavy pollution	non-heavy pollution
Variable	DCG	DCG	DCG	DCG
LC	0.095***	0.069**	0.011	0.087***
	(0.033)	(0.032)	(0.037)	(0.029)
size	0.159***	0.231***	0.215***	0.199***
	(0.024)	(0.020)	(0.025)	(0.019)
lev	0.108	-0.121*	-0.299***	0.049
	(0.102)	(0.074)	(0.103)	(0.072)
roa	0.050	-0.325**	-0.364*	-0.002
	(0.222)	(0.139)	(0.219)	(0.139)
growth	-0.010	0.034*	0.063*	0.013
	(0.025)	(0.020)	(0.032)	(0.019)
cashflow	-0.032	-0.036	-0.199	0.075
	(0.155)	(0.120)	(0.154)	(0.119)
board	0.144*	0.176***	0.132	0.191***
	(0.081)	(0.063)	(0.083)	(0.060)
top1	-0.308**	-0.438***	-0.400**	-0.533***
	(0.145)	(0.130)	(0.161)	(0.118)
firmage	-0.875***	0.114	-0.123	0.105
	(0.153)	(0.108)	(0.142)	(0.114)
Constant	-0.380	-4.255***	-3.741***	-3.582***
	(0.677)	(0.513)	(0.616)	(0.521)
Individual fixed	Yes	Yes	Yes	Yes
Time fixed	Yes	Yes	Yes	Yes
Observations	6,680	15,923	6,298	16,305
R-squared	0.755	0.776	0.654	0.777
p-value	0.066*		0.000***	

4.5.3. Regional Heterogeneity

The levels of digital economy development and external conditions for digital transformation vary across different regions (Guo & Jiang, 2023). Therefore, this paper conducts a heterogeneity analysis by dividing the sample into eastern, central, and western regions based on the enterprise's location. In Table 7, enterprise digitalization is not significantly affected by low-carbon transformation in column (1), with a regression coefficient of 0.037. In column (2), low-carbon transformation significantly affects enterprise digitalization, showing a regression coefficient of 0.174, which passes the 1% significance test. In column (3), enterprise digitalization is impacted by low-carbon transformation with a regression coefficient of -0.119, passing the 5% significance test. These regression results demonstrate that enterprises in the central region experience a more significant driving effect from low-carbon transformation on digitalization than those in the eastern and western regions.

Table 7: Heterogeneity Analysis (2)

	(1)	(2)	(3)
	East	Central	West
Variable	DCG	DCG	DCG
LC	0.037	0.174***	-0.119**
	(0.030)	(0.052)	(0.056)
size	0.234***	0.200***	0.142***
	(0.019)	(0.033)	(0.037)
lev	0.041	-0.116	0.208
	(0.072)	(0.143)	(0.139)
roa	-0.056	-0.646**	-0.185
	(0.146)	(0.265)	(0.284)
growth	0.015	0.070*	0.013
	(0.021)	(0.038)	(0.035)
cashflow	-0.008	0.181	-0.427*
	(0.119)	(0.205)	(0.248)
board	0.126**	0.306***	0.329***
	(0.064)	(0.093)	(0.127)
top1	-0.504***	-0.249	-0.145
	(0.123)	(0.181)	(0.218)
firmage	0.064	0.286	-1.272***
	(0.109)	(0.188)	(0.269)
Constant	-4.157***	-4.849***	0.757
	(0.502)	(0.831)	(1.001)
Individual fixed	Yes	Yes	Yes
Time fixed	Yes	Yes	Yes
Observations	15,886	3,882	2,835
R-squared	0.773	0.754	0.707

5.0 Conclusions and Implication

5.1 Summary and Academic Interpretation of Findings

This study employs a multi-period difference-in-differences design to identify the causal effect of low-carbon city pilot policies on the digital transformation of Chinese manufacturing enterprises. The results robustly support the central hypothesis that policy-induced low-carbon transition serves as a significant driver for enterprise digitalization. This primary finding contributes to the ongoing debate on the Porter Hypothesis by presenting evidence that environmental regulation can spur innovation beyond immediate, end-of-pipe green technologies, extending to foundational digital capabilities that reshape operational processes (He, 2016; Xu et al., 2023). The identified positive effect aligns with the perspective that regulatory pressure can catalyze strategic renewal and long-term competency building.

The mechanism analysis reveals that alleviating financing constraints and

increasing R&D investment are two critical transmission channels. This insight bridges macro-level policy and micro-firm behavior through the lens of resource allocation. It suggests that the policy's impact is not merely coercive but also enabling, as it helps mitigate a key barrier (financing) and stimulates a core activity (innovation) essential for digital adoption (Chernenko et al., 2022; Yu et al., 2023). This finding refines our understanding of how environmental governance instruments operate, highlighting their role in reshaping the resource environment and incentive structures within firms.

Furthermore, the observed heterogeneity—stronger effects in state-owned enterprises, less polluting industries, and the central region—underscores the contingent nature of this relationship. It indicates that the policy's efficacy in promoting digitalization is moderated by firm-specific resources, historical burdens, and regional institutional landscapes. This complexity echoes the nuanced findings in the literature regarding differentiated corporate responses to regulatory shocks (Wang & Li, 2023; Yang et al., 2023).

5.2 Theoretical and Practical Implications

5.2.1. Theoretical Implications

This study offers several theoretical contributions. First, it extends institutional theory by empirically demonstrating how a specific coercive isomorphism—low-carbon city policy—drives the adoption of isomorphic practices in the digital realm. Second, it enriches the resource-based view by showing how external policy shocks can reconfigure internal resource conditions (easing financial constraints, boosting R&D), thereby facilitating strategic change towards digitalization. Third, it provides a nuanced test of the Porter Hypothesis in a developing economy context, suggesting that the "innovation offset" can manifest as digital transformation, which may indirectly support environmental goals through efficiency gains.

5.2.2. Practical Implications

For policymakers, the results argue for an integrated approach to climate and industrial policy. Designing low-carbon policies with explicit channels for financial and innovation support can unlock their co-benefits for digital advancement. For business managers, the findings highlight the strategic imperative to leverage policy-driven opportunities, such as green financing, to fund digital upgrades that enhance both sustainability and competitiveness.

5.3 Limitations and Avenues for Future Research

This study is subject to several limitations that offer directions for future inquiry. First, while the text-based measure of digitalization is widely used, it

captures strategic emphasis rather than the depth or effectiveness of implementation. Future research could employ alternative metrics, such as investment in digital assets or patents. Second, although the DID design addresses many endogeneity concerns, the possibility of omitted time-varying variables cannot be entirely ruled out. Third, the focus on listed manufacturing firms limits the generalizability of findings to small and medium-sized enterprises or the service sector. Future studies could explore these domains. Fourth, the mechanisms tested, though significant, may not be exhaustive; other channels, such as human capital adaptation or supply chain coercion, warrant investigation. Finally, the long-term dynamics and performance consequences of this policy-induced digital transition remain an open and vital question for subsequent research.

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Developing Business Strategy for A Smart Pillow Start-Up in the Malaysian Bedding Industry: A Case Study of Urspillow Inc.

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Abstract

The rising prevalence of sleep disorders in Malaysia creates a market opportunity for innovative sleep technology. This study develops a business strategy for UrsPillow Inc., a smart water pillow startup in Kuala Lumpur, using PESTEL, Porter's Five Forces, SWOT, and a survey (n=78). Key findings: 70.5% experience insomnia, 75.6% have morning neck/back pain, 91.0% struggle waking up, 92.3% are willing to use a water pillow, and 79.5% consider the pillow very important. Financial projections show first-year sales of MYR 1.85 million and a payback period of 1.06 years. A differentiated strategy targeting middle-income earners and insomnia patients is proposed.

Keywords: business strategy; smart pillow; sleep technology; insomnia; marketing strategy; new venture; Malaysia; SWOT analysis; Porter's Five Forces

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1.0 Introduction

1.1 Background and Motivation

Sleep disorders constitute a growing global public health concern, with insomnia representing one of the most prevalent and debilitating conditions affecting quality of life, workplace productivity, and long-term physical and mental well-being (Morin & Benca, 2012; Riemann et al., 2017). In the Malaysian context, Zailinawati, Mazza, and Teng (2012) documented a 33.8% prevalence rate of insomnia among primary care patients, with chronic insomnia—defined by the American Academy of Sleep Medicine (AASM, 2014) as persistent difficulty initiating or maintaining sleep occurring at least three nights per week for at least three months—affecting approximately 12.2% of the general population. The economic and social burden associated with these conditions, including impaired cognitive performance, increased absenteeism, and elevated healthcare utilization, has stimulated demand for technological solutions capable of addressing both the physiological and environmental determinants of sleep quality.

Globally, the sleep technology market has experienced substantial growth, driven by advances in the Internet of Things (IoT), miniaturized biometric sensors, and mobile health applications. The digital economy already contributed 18.3% of Malaysia's GDP in 2017, with projections of reaching 20% by 2020 (Malaysia Digital Economy Blueprint), underscoring the country's readiness for IoT-enabled consumer health products (Wok & Mohamed, 2017). Within this broader context, smart bedding products—including instrumented mattresses, sleep trackers, and intelligent pillow systems—have emerged as a nascent product category attracting considerable commercial and academic attention. Despite this global momentum, the Malaysian bedding industry remains largely characterized by conventional, undifferentiated products, with established players such as Getha Corporation, Dreamland, and Sweet Dream offering limited integration of digital health technology (Inn, 2017).

This market gap—the absence of a pillow product comprehensively addressing insomnia, uncomfortable waking, and musculoskeletal discomfort—constitutes the primary entrepreneurial opportunity motivating this study. Abrupt acoustic alarms have been associated with elevated cardiovascular stress responses upon waking (Kalb, 2013), suggesting that conventional alarm mechanisms may compound, rather than ameliorate, sleep-related health burdens. An integrated smart pillow combining temperature modulation with a progressive, vibration-based waking system could address this unmet need while simultaneously differentiating itself within the competitive landscape.

1.2 Research Objectives

The objectives of this study are threefold:

(1)To analyze the external macro-environment, competitive landscape, and internal capabilities relevant to the establishment of UrsPillow Inc. in the Malaysian smart pillow market.

(2)To assess consumer needs, willingness-to-adopt, and preferences regarding sleep quality, pillow products, and alarm functionality through primary market research.

(3)To formulate a comprehensive, evidence-based marketing strategy, encompassing target market identification, marketing mix, branding, competitive positioning, and financial projections—for the market entry of UrsPillow Inc.

1.3 Significance and Contribution

This study makes several contributions to the extant literature. First, it extends the entrepreneurial strategy literature by providing an empirically grounded case study of new venture strategy development in the emerging Malaysian wellness technology sector. Second, it demonstrates the applicability of classical strategic frameworks in the context of technology-embedded consumer health products. Third, the primary consumer data provide novel empirical insights into sleep disorder prevalence and smart product adoption intentions among urban Malaysian consumers. Fourth, the inclusion of financial viability projections bridges the gap between academic strategy formulation and practical entrepreneurial decision-making.

2.0 Literature Review

2.1 Sleep Disorders and the Economics of Insomnia

Insomnia is operationally defined as persistent difficulty initiating or maintaining sleep, or early morning awakening with inability to return to sleep, accompanied by significant daytime impairment despite adequate sleep opportunity (AASM, 2014; Morin & Benca, 2012). The condition is highly prevalent globally, with epidemiological estimates ranging from 10% to 30% of adult populations experiencing chronic insomnia symptoms (Riemann et al., 2017). In Malaysia, Zailinawati et al. (2012) documented a 33.8% point prevalence among primary care patients, with insomnia disproportionately affecting urban, middle-aged, and female populations. The economic burden of insomnia is substantial: beyond direct healthcare costs, indirect costs arising from reduced workplace productivity, increased absenteeism, and elevated accident risk impose significant societal costs (Daley et al., 2009). Research by

Synovate further reveals that 55% of Malaysian young adults aged 25–34 are willing to pay a premium for high-quality goods and services, indicating strong market receptiveness to a well-positioned sleep health product.

The rising prevalence of sleep disorders, combined with growing consumer health literacy and the proliferation of wearable technology, has catalyzed demand for non-pharmacological sleep improvement solutions. Smart bedding products have achieved commercial traction in Western markets; however, academic research on consumer adoption of such products in the Southeast Asian context remains nascent.

2.2 The Malaysian Bedding Industry and Competitive Dynamics

The Malaysian bedding industry is characterized by moderate market concentration, with several established domestic firms—most notably Getha Corporation Sdn. Bhd., Dreamland, and Sweet Dream—competing on dimensions of brand recognition, product quality, and distribution breadth (Inn, 2017). These incumbents have historically focused on conventional latex and memory foam products, with limited integration of digital health technology. The bedding segment operates within the broader home furnishing sector, which has benefited from Malaysia's sustained economic growth and rising middle-class expenditure on home improvement (Yusof, 2018).

Despite the strength of incumbent competitors, the absence of a commercially available smart pillow product combining temperature regulation with integrated alarm functionality represents a structural market gap—a 'blue ocean' opportunity in Kim and Mauborgne's (2005) terminology. The theoretical proposition underlying UrsPillow's strategy is that incumbents' strategic focus on conventional product attributes creates a viable entry point for a technology-differentiated challenger targeting underserved consumer segments.

2.3 Strategic Frameworks for Technology-Based New Ventures

The strategic management literature provides a well-developed toolkit for new venture strategy formulation. PESTEL analysis offers a structured approach to macro-environmental scanning (Ferrell & Hartline, 2014). Porter's (1985) Five Forces model provides a framework for assessing industry attractiveness and competitive intensity. Internally, the SWOT matrix facilitates the alignment of organizational strengths and weaknesses with external opportunities and threats (Kotler & Keller, 2016). At the operational level, the marketing mix (4Ps) framework—product, price, place, and promotion—remains a foundational tool for market entry strategy formulation. The integration of financial projections into the strategic planning framework further enables

assessment of venture viability, a dimension often underrepresented in academic business strategy studies.

2.4 Technology Adoption and Consumer Behavior in Malaysia

Consumer adoption of smart health products is theoretically grounded in the Technology Acceptance Model (TAM), which posits that perceived usefulness and perceived ease of use are the primary determinants of behavioral intention to adopt a technology (Davis, 1989). In the Malaysian context, Wok and Mohamed (2017) document internet penetration exceeding 85.7% as of 2018 and growing smartphone adoption, creating a conducive digital infrastructure for IoT-enabled health products. The country's expanding middle class—characterized by rising health consciousness and increasing disposable income—is theorized to constitute a particularly receptive market for premium wellness technology products (Yusof, 2018).

3.0 Methodology

3.1 Research Design

This study employs a mixed-methods sequential explanatory research design (Creswell & Plano Clark, 2017), integrating secondary data analysis for macro-environmental and competitive assessment with primary quantitative data collection for consumer preference analysis. The secondary analysis drew on peer-reviewed academic literature, official government and institutional reports, and credible industry publications to evaluate the macro-environment, competitive landscape, and technology adoption context.

3.2 Survey Instrument and Data Collection

A structured, self-administered questionnaire was designed comprising closed-ended items organized into six thematic sections: (1) sociodemographic and income characteristics; (2) sleep quality and insomnia prevalence; (3) physical discomfort upon waking; (4) pillow usage, purchasing criteria, and satisfaction; (5) alarm clock usage and associated challenges; and (6) awareness of and willingness to adopt a smart water pillow. The complete questionnaire instrument is provided in Appendix A.

The questionnaire was administered to a convenience sample of 78 respondents (from approximately 100 distributed) in the Kuala Lumpur metropolitan area. Respondents were recruited at public locations and via referral networks, targeting adult consumers aged 18 years and above. Descriptive statistics (frequencies and percentages) were computed using IBM SPSS Statistics Version 25 to summarize the findings.

3.3 Analytical Framework

The strategic analysis integrated five complementary analytical tools: (1) PESTEL analysis for macro-environmental scanning; (2) Porter's (1985) Five Forces model for industry-level competitive analysis; (3) SWOT matrix for internal-external strategic alignment; (4) the 4Ps marketing mix framework for market entry strategy formulation; and (5) financial projection modeling for viability assessment. The integration of these frameworks follows the triangulation principle, whereby convergent findings across multiple analytical lenses enhance the validity and robustness of strategic conclusions (Patton, 2002).

3.4 Limitations

Several limitations circumscribe the scope and generalizability of the findings. First, the sample size (n = 78) obtained via non-probability convenience sampling limits statistical power and representativeness. Second, the cross-sectional design captures consumer preferences at a single point in time, precluding assessment of preference dynamics over time. Third, the absence of inferential statistical testing constrains the ability to identify statistically significant relationships among variables. Fourth, financial projections are based on assumptions that require empirical validation post-launch. Future research should address these limitations through longitudinal, probability-based survey designs incorporating advanced quantitative methods.

4.0 Results and Analysis

4.1 External Environment: Pestel Analysis

4.1.1 Economic Environment

Malaysia's macroeconomic environment presents favorable conditions for new consumer health product ventures. The unemployment rate stood at 3.3% as of August 2019—near its structural minimum—while consumer price inflation has remained at approximately 2% since April 2016, preserving household purchasing power (World Bank, 2019). Despite the 2008–2009 global crisis, Malaysian consumer expenditure has risen on an annual basis, and real GDP growth has averaged approximately 5% per annum over the preceding decade. The ongoing expansion of Malaysia's middle class—projected to represent over 45% of households by 2020—has driven increasing consumer expenditure on health, wellness, and home furnishing products (Yusof, 2018). Notably, Synovate research indicates that 55% of Malaysian young adults aged 25–34 are willing to pay a premium for high-quality goods and services, directly supporting the premium pricing rationale for the Water Pillow.

4.1.2 Political and Regulatory Environment

Malaysia's political environment is characterized by institutional stability, and the regulatory framework is broadly business-friendly (Xinhua, 2018). The Index of Economic Freedom (2019) rates Malaysia favorably on dimensions of business freedom, property rights, and regulatory efficiency. Notably, no minimum capital requirement applies to company formation, minimum wage regulations are flexible, and restrictions on working hours are accommodating, collectively reducing barriers to entry for start-up ventures. Compliance with the Consumer Protection Act 1999, the Sale of Goods Act 1957, and relevant product safety standards administered by SIRIM QAS International constitutes a necessary prerequisite for market entry.

4.1.3 Social and Demographic Environment

A structural shift toward health consciousness among urban Malaysian consumers has increased demand for products that improve sleep quality, manage stress, and enhance overall wellness. Urbanization rates exceeding 75% concentrate this health-conscious demographic in major metropolitan areas, facilitating cost-effective retail and marketing strategies. The multicultural composition of Malaysia's population—comprising diverse communities with varying buying power and cultural preferences—necessitates culturally sensitive product packaging and communication strategies. Growing online shopping adoption further supports the dual-channel (physical retail and e-commerce) distribution strategy proposed for UrsPillow.

4.1.4 Technological Environment

Malaysia's high internet penetration (85.7% as of 2018) and widespread smartphone adoption provide a supportive digital infrastructure for IoT-enabled health products and e-commerce distribution strategies (Wok & Mohamed, 2017). The digital economy's contribution to Malaysia's GDP—18.3% in 2017, projected to reach 20% by 2020—signals continued government investment in digital infrastructure. The rising demand for wearable health devices and smart home technology creates favorable conditions for consumer-facing IoT products, including smart pillows integrating mobile application connectivity. UrsPillow's existing presence on Etsy—an international online marketplace for handmade and artisan products—provides an early proof-of-concept for digital market reach.

4.1.5 Environmental and Legal Environment

Growing environmental consciousness among Malaysian consumers has increased demand for eco-friendly and sustainably produced goods, creating an opportunity for UrsPillow to position water-based pillow technology as a sustainable alternative to petroleum-derived synthetic foam. From a legal perspective, compliance with Malaysia's Employment Act 1955, Occupational Safety and Health Act 1994, and relevant consumer protection and product liability legislation is requisite. The political issue of cotton sourcing from India—where low prices for cotton coupled with high prices for chemicals have created supplier instability (Gutierrez et al., 2015)—warrants proactive supply chain diversification to mitigate raw material cost volatility.

4.2 Competitive Analysis: Porter's Five Forces

Table 1 summarizes the competitive intensity assessment across Porte's (1985) Five Forces dimensions

Table 1: Porter's Five Forces Analysis for the Malaysian Smart Pillow Market

Competitive Force	Intensity	Rationale
Threat of New Entrants	Moderate	Low capital barriers for conventional pillow entry; smart pillow technology requires specialized IoT expertise and R&D investment, raising effective barriers for technologically differentiated entry.
Bargaining Power of Suppliers	Low–Moderate	Multiple suppliers available for raw materials; Indian cotton supply chain instability (Gutierrez et al., 2015) warrants diversification. Electronic components may face moderate supplier concentration.
Bargaining Power of Buyers	Moderate	Individual consumers have low individual bargaining power; however, availability of conventional substitutes creates moderate collective buyer power. Quality dominance over price in purchasing criteria (53.8% vs 42.3%) moderates this force.
Threat of Substitute Products	Moderate–High	Conventional pillows, sleep aid medications, wearable sleep trackers, and noise machines constitute substitutes. Differentiation through integrated multi-functional features reduces substitutability.

Rivalry Among Existing Competitors	Low (direct) High (indirect)	No current competitor offers a combined temperature-regulation and smart alarm pillow; however, broader competition from Getha, Dreamland, and Sweet Dream for consumer wallet share is intense.

4.3 Primary Market Research Findings

The descriptive results of the questionnaire survey (n = 78) are presented in Table 2. The survey findings reveal several strategically significant patterns. First, the 70.5% insomnia prevalence rate substantially exceeds the 33.8% rate documented in Zailinawati et al.'s (2012) broader primary care sample, potentially reflecting the heightened occupational stress characteristic of the urban, middle-income demographic surveyed. Second, the near-universal acknowledgement of pillow importance (79.5% rating it 'very important') combined with widespread pillow-switching due to musculoskeletal discomfort (75.6% citing migraine pain or shoulder stiffness) underscores a pervasive gap between current product offerings and consumer needs. Third, the dominance of quality (53.8%) over price (42.3%) as the primary purchasing criterion validates the premium pricing rationale. Fourth, the high willingness to adopt (92.3%) juxtaposed with low prior water pillow experience (33.3%) indicates a large addressable market of consumers receptive to innovation but requiring product education. Finally, the near-total dissatisfaction with acoustic alarm clocks (93.6% reporting some form of discomfort) directly validates the vibration-based alarm value proposition.

4.4 SWOT Analysis

The SWOT analysis (Table 3) reveals that UrsPillow’s primary strategic asset is its first-mover position in a product category simultaneously addressing multiple prevalent consumer pain points. The alignment of the company's technological differentiation with macro-level opportunities — particularly the high insomnia prevalence, expanding wellness technology market, and Malaysia's favorable digital infrastructure — creates a structurally favorable competitive position. The central strategic imperatives are: (1) to build brand awareness and consumer trust rapidly, before technologically capable incumbents can replicate the core innovation; (2) to overcome consumer apprehension through evidence-based communication and accessible trial mechanisms;

and (3) to diversify the supply chain to mitigate raw material cost volatility.

Table 2: Comprehensive Summary of Primary Survey Findings (n = 78)

Variable / Indicator	Frequency (n)	Percentage (%)
A. Monthly Household Income (MYR)		
RM2,000–RM2,999	5	6.4
RM3,000–RM3,999	13	16.7
RM4,000–RM4,999 (largest group)	53	67.9
Above RM5,000	7	9.0
B. Sleep Quality, Insomnia, and Physical Discomfort		
Experience insomnia (Yes)	55	70.5
Experience neck/back pain upon waking (Yes)	59	75.6
C. Pillow Importance, Preferences, and Prior Experience		
Right pillow is 'very important' to sleep routine	62	79.5
Primary purchasing criterion: Quality	42	53.8
Primary purchasing criterion: Price	33	42.3
Primary purchasing criterion: Availability	3	3.8
Previously tried non-traditional pillow: Memory foam (most common)	38	48.7
Reason for pillow switch: Migraine pain / shoulder stiffness	59	75.6
Reason for pillow switch: Pillow too high / too low	10	12.8
Reason for pillow switch: Head sinking too deep	9	11.5
Pillow quality 'very important' (standalone rating)	50	64.1
D. Smart Water Pillow Adoption Intentions		
Prior experience with water pillow (Yes)	26	33.3
Believe correct pillow resolves sleep problems (Yes)	72	92.3
Willing to adopt a water pillow (Yes)	72	92.3
E. Alarm Clock Usage and Waking Behavior		
Difficulty waking up (Yes)	71	91.0
Use alarm clock daily (Yes)	75	96.2
Primary alarm challenge: Jolting noise	39	50.0
Primary alarm challenge: Partner's alarm	20	25.6

Primary alarm challenge: Loud noise dislike	14	17.9
Satisfied with alarm clock	5	6.4

Table 3: SWOT Matrix for UrsPillow Inc.

STRENGTHS	**WEAKNESSES**
• First-mover advantage: no direct competitor offering integrated temperature regulation + smart alarm pillow • Product addresses multiple concurrent unmet needs simultaneously (insomnia, musculoskeletal discomfort, waking difficulties) • Proprietary temperature regulation and vibration-based alarm technology • High customization capability: material, size, firmness, fragrance, app or remote control • Quality-focused consumer base (53.8% prioritize quality) supports premium positioning • Established Etsy online presence provides early proof-of-concept for digital sales	• No brand recognition or consumer awareness as a new entrant • Limited financial resources (RM 400,000 startup capital) relative to established competitors • Higher unit production costs (RM 150–200) than conventional pillow manufacturers • Immature supply chain; components sourced at consumer-level costs • Competing for market share against well-established firms (Getha, Dreamland, Sweet Dream)
OPPORTUNITIES	**THREATS**
• High and growing insomnia prevalence (33.8%–70.5%) in urban Malaysian population • Expanding wellness technology and wearable device market • Rising middle-class health consciousness and disposable income; 55% of young adults willing to pay premium • Government MyDIGITAL initiatives enhancing IoT infrastructure • Mid Valley Megamall: ~30 million annual visitors provides captive retail audience • No clear market leader addressing both insomnia and alarm-related challenges	• Potential technology imitation by resource-rich incumbent brands • Consumer technology apprehension and unfamiliarity with water pillows (only 33.3% prior experience) • Indian cotton supply chain instability may increase raw material costs (Gutierrez et al., 2015) • Entry of international smart sleep technology brands into Malaysian market • Macroeconomic volatility affecting discretionary consumer spending • Consumer fear of health risks associated with technology-embedded health products

4.5 Internal Environment and Financial Viability

UrsPillow employs a flat organizational structure comprising a general manager, financial manager, operations manager, and sales and marketing director. This decentralized structure facilitates rapid decision-making and direct customer engagement—critical capabilities during the market entry phase. The general manager oversees strategic planning; the sales and marketing director monitors market trends; the operations manager manages daily production processes; and the financial manager handles accounts, revenue, budgeting, and human resources.

The company has established four core operational objectives: (1) to achieve ISO-standard product quality and maintain consistent quality control across all production batches; (2) to build brand awareness and public image recognition; (3) to implement rigorous quality control mechanisms that generate satisfied customers and positive word-of-mouth referrals; and (4) to cultivate robust, long-term relationships with both customers and suppliers.

Financial projections, derived from cost-plus pricing analysis and market sizing estimates, indicate strong commercial viability. Total startup capital of MYR 400,000 (contributed equally by shareholders at MYR 100,000 each) will fund retail store establishment, manufacturing facility setup, and equipment procurement. First-year projected sales revenue of approximately MYR 1,854,720 with a net profit of MYR 356,873 implies a payback period of approximately 1.06 years—a highly favorable return profile for a consumer health technology start-up. Second-year projections of MYR 2,040,430 in sales and MYR 542,177 in net profit reflect anticipated brand equity accumulation and operational efficiency gains. These projections are summarized in Table 4.

Table 4: Financial Projections for UrsPillow Inc. (Years 1–2)

Financial Metric	Year 1	Year 2
Total Startup Capital	MYR 400,000	—
Projected Sales Revenue	MYR 1,854,720	MYR 2,040,430
Projected Net Profit	MYR 356,873	MYR 542,177
Payback Period	≈ 1.06 years	—
Unit Manufacturing Cost	MYR 150–200	MYR 150–200
Retail Price per Unit	MYR 300	MYR 300

5.0 PROPOSED MARKETING STRATEGY

5.1 Strategic Goals

Building on the situational analysis, four strategic goals are advanced for UrsPillow's market entry phase: (1) Brand Recognition and

Awareness—establishing visibility and positive brand associations among the target consumer segment through leveraging the novelty of the Water Pillow concept; (2) Preferred Provider Status—developing customer loyalty and preference through demonstrated product superiority and responsive customer service; (3) Trial Stimulation—overcoming the adoption barrier represented by consumers' unfamiliarity with water pillow technology through strategically designed trial and sampling programs; and (4) Trust Building—establishing consumer confidence through medical expert endorsements, transparent product disclosure, and consistent quality delivery.

5.2 Target Market Segmentation

Based on the survey findings and environmental analysis, two primary target segments are identified:

Primary Segment: Middle-income urban earners (MYR 4,000–4,999/month) experiencing one or more sleep-related problems (insomnia, neck/back pain upon waking, or waking difficulty). This segment represents the largest demographic group in the survey sample (67.9%) and exhibits the convergence of health awareness, sufficient disposable income for premium pillow products, and documented unmet need. Malaysia's steadily expanding middle class provides a growing addressable population within this segment (Yusof, 2018).

Secondary Segment: Adults with clinically diagnosed insomnia or other sleep disorders, representing the highest-need sub-population with the greatest potential to perceive and value the specific health benefits of the Water Pillow. The AASM (2014) estimates that one in five Kuala Lumpur residents experiences clinically significant sleep problems, with prevalence rates of 30–50% in the broader population. Engagement with this segment through healthcare provider channels and sleep clinic partnerships could generate high-credibility endorsements while serving a medically underserved need.

5.3 Marketing Mix Strategy

5.3.1 Product Strategy

The Water Pillow is designed as a multi-functional health product addressing three primary consumer pain points: sleep initiation difficulty, uncomfortable waking, and musculoskeletal discomfort. The product's physical architecture comprises a thick, quilted memory foam pad positioned beneath a water-based support layer. The pad contains tubes filled with water, connected via a thin cord to a small bedside tank. This water-heat system performs temperature regulation functions, controlled via a companion mobile application or a wireless remote control—providing dual-control flexibility for varying consumer preferences.

Core product features include: (a) a water-based support system with user-adjustable firmness via a fill-valve mechanism; (b) an integrated thermoelectric temperature regulation system that actively cools the pillow surface to promote sleep onset and progressively warms it to facilitate natural waking; (c) a smartphone-connected vibration-based alarm system—described as 'vibrating pants' that gently rouse the individual through haptic stimulation without acoustic disturbance to bed partners; and (d) extensive customization options encompassing material composition, dimensions, firmness gradient, design, and optional aromatherapy integration. A comprehensive user guide is included as an augmented product element, addressing potential concerns about operational complexity.

5.3.2 Pricing Strategy

A value-based pricing strategy—anchored by cost-plus calculation—is recommended, with a retail price of MYR 300 per standard unit against a manufacturing cost of MYR 150–200 (depending on size and customization specifications). This pricing reflects the product's premium positioning while remaining accessible to the target middle-income demographic. The implied gross margin of approximately 33–50% supports the marketing investment required for brand building and market education. Introductory promotional pricing—offering bundle deals, special discounts during the launch period, and sales promotion during mega sales periods—is recommended to stimulate trial during the critical brand-building phase.

5.3.3 Place (Distribution) Strategy

A dual-channel distribution strategy is proposed. The flagship retail store at Mid Valley Megamall, Kuala Lumpur—attracting approximately 30 million visitors annually (Inn, 2017)—provides high-visibility brand exposure and serves as an experiential brand touchpoint where consumers can trial the product's temperature and vibration features. The complementary e-commerce platform (including the existing Etsy presence) enables national and international market reach. For customized products, a made-to-order production and fulfillment model—with a delivery commitment of 3–4 business days via contracted third-party logistics providers—balances production efficiency with customer service expectations. As market traction develops, selective expansion into hospital gift shops, wellness centers, and specialty health retailers is recommended to access the secondary (clinically diagnosed) target segment.

5.3.4 Promotion and Communication Strategy

An integrated marketing communications strategy combines digital and

traditional channels. Digital channels include: a content-rich company website (incorporating e-commerce, sleep health resources, and a product configurator); professionally managed social media profiles across multiple platforms with a dedicated social media engagement expert; influencer partnerships with health and lifestyle content creators; blog outreach with review units sent to targeted sleep and wellness bloggers; and targeted search and display advertising. Traditional channels include: participation in the Malaysian Furniture Fair and Malaysian Furniture and Furnishing Fair; radio and television advertising; out-of-home advertising (including bus-side advertisements) in proximity to target retail locations; and promotional gifts (free pillow distribution during launch periods). The communications strategy prioritizes educational content addressing consumer unfamiliarity with water pillow technology and evidence-based sleep health messaging supported by medical expert endorsements.

5.4 Branding and Competitive Positioning

UrsPillow is positioned in the high-uniqueness, high-customization quadrant of the competitive positioning landscape, differentiating itself from established competitors that offer conventionally designed products with broader distribution but limited technology differentiation. The brand identity is anchored in the 'preciousness of life' conceptual platform—health is precious, hence there is a need to protect it—symbolized by the company logo (Figure 1) depicting a pillow cradled by two hands, rendered in navy blue to convey trust, serenity, and sophistication. The logo will be consistently deployed across all products, packaging, store environments, business cards, and promotional materials to build unified brand recognition.

Figure 1. UrsPillow Inc. Company Logo and Brand Concept Map

This positioning strategy operationalizes Kim and Mauborgne's (2005) 'blue ocean' strategic logic by creating an uncontested market space—the smart wellness pillow category—rather than competing directly with incumbents on price or distribution scale. The risk inherent in this strategy—that incumbents may enter the smart pillow segment upon observing UrsPillow's market success—necessitates continuous investment in technological innovation and brand equity to establish durable competitive differentiation.

6.0 Implementation Plan

The marketing implementation follows a phased, twelve-month launch timeline designed to build brand awareness progressively while managing initial resource constraints. Table 5 summarizes the implementation schedule.

Table 5: Phased Implementation Timeline and Responsibilities

Phase	Timeline	Key Activities and Responsibilities
1	Feb (Month 1)	Appoint implementation monitoring team under general manager. Assign KPIs to each functional manager. Finalize organizational structure and supplier agreements.
2	Mar (Month 2)	Launch corporate website with e-commerce pre-order functionality (financial manager responsibility). Consolidate brand identity (logo, color palette, messaging). Prepare retail store setup.
3	Apr (Month 3)	Activate social media profiles across multiple platforms. Onboard social media engagement expert. Commence paid digital and traditional advertising. Open flagship retail store at Mid Valley Megamall.
4	Jun (Month 5)	Set aside production samples for additional quality testing (R&D team responsibility). Distribute review units to targeted sleep and wellness blogs. Collect and analyze initial consumer feedback.
5	Oct (Month 9)	Engage sleep medicine specialists to validate and enhance product's sleep analytics capabilities. Integrate expert endorsements into marketing collateral. Explore hospital and wellness center distribution partnerships.
6	Dec (Month 12)	Comprehensive Year 1 performance evaluation (sales and marketing director): pre-order volume, referral rates, social media reach, website traffic, customer satisfaction scores, net profit vs. projection. Strategic review and Year 2 planning.

The total estimated budget for first-year marketing implementation is approximately MYR 50,000, representing 12.5% of startup capital. Budget allocation: website development and hosting (20%), product quality testing (20%), consumer trial program (10%), medical expert consultancy (10%), customer satisfaction research (10%), and digital and traditional advertising (30%). This 70% concentration on core marketing activities reflects the critical importance of brand awareness investment during the launch phase.

7.0 Evaluation and Control

7.1 Performance Measurement Framework

Strategy effectiveness will be evaluated through a balanced scorecard incorporating four performance dimensions: (1) Financial performance—ROI, gross margin, and revenue against quarterly targets; (2) Customer performance—customer acquisition rate, net promoter score (NPS), repeat purchase rate, and online review sentiment; (3) Market performance—brand awareness recall, social media reach and engagement, and referral rates; and (4) Operational performance—on-time delivery rate, product defect rate, and customer service response times. Monthly performance reporting against established KPI targets will enable agile identification of underperforming channels or activities.

7.2 Financial and Operational Controls

The financial control framework designates 70% of the annual marketing budget to direct marketing activities, broken down as: website creation and hosting (20%), further product testing (20%), customer trials (10%), medical expert consultancy (10%), and customer satisfaction analysis (10%). The remaining 30% covers advertising across digital and traditional channels. The sales and marketing director provides weekly expenditure reports to the general manager, ensuring budget observance. Product profitability reviews conducted quarterly will assess whether pricing, cost management, and sales volume are collectively generating the targeted gross margin. Contingency provisions of 10% of total budget are recommended to address unforeseen expenditures during the launch phase.

8.0 Discussion

The integrated analysis presented in this study affirms the strategic viability of UrsPillow Inc.'s market entry proposition while simultaneously identifying the critical strategic challenges that will determine venture success. The confluence of high and growing insomnia prevalence, widespread dissatisfaction with conventional waking mechanisms, near-universal consumer receptiveness to innovative health products (92.3% willingness to

adopt), and the absence of a direct technological competitor in the Malaysian market collectively constitute a compelling entrepreneurial opportunity. The financial projections—demonstrating a payback period of approximately 1.06 years on a MYR 400,000 startup investment—further support the commercial viability of the venture.

The most significant strategic risk facing UrsPillow is the potential for technology imitation by resource-rich incumbents. Getha Corporation and Dreamland, with their established manufacturing capabilities and distribution networks, could potentially develop competing smart pillow products if market demand signals prove sufficiently strong. This threat underscores the importance of rapid market penetration and brand establishment as durable competitive barriers. Kim and Mauborgne (2005) note that blue ocean strategies are temporally bounded; their advantage accrues disproportionately to early movers who build switching costs and brand loyalty before competitors converge.

A secondary strategic risk relates to the consumer education requirement inherent in a product category with only 33.3% prior awareness. The adoption S-curve for novel health technologies in emerging markets typically exhibits a protracted diffusion lag before reaching the early majority (Rogers, 2003). UrsPillow's marketing investment must accordingly be heavily weighted toward consumer education—explaining both the problem (the health consequences of abrupt acoustic waking and suboptimal sleep temperature) and the solution—rather than assuming that product superiority will be self-evident to uninformed consumers.

The quality-dominant purchasing criterion (53.8% vs. 42.3% for price) and the Synovate finding that 55% of Malaysian young adults willingly pay a premium for quality goods collectively validate the premium pricing rationale. However, this finding should be interpreted cautiously given the potential for stated preference-revealed preference gaps, particularly for novel product categories where consumers lack direct experience to anchor their quality evaluations. From a theoretical perspective, this study illustrates the utility of integrating TAM-derived insights into new venture strategy formulation: Davis's (1989) emphasis on perceived usefulness as the primary adoption driver suggests that UrsPillow's marketing communication should foreground specific, tangible health outcomes—improved sleep onset latency, reduced musculoskeletal discomfort, and more natural waking experiences—rather than focusing primarily on technological features.

The supply chain dimension also warrants strategic attention. As a start-up with an immature supply chain sourcing components at consumer-level costs, UrsPillow faces higher unit production costs than established competitors. Proactive development of supplier relationships, bulk purchasing agreements, and potential vertical integration as volume grows will be essential to

improving unit economics over time. The identified political risk of Indian cotton supply instability (Gutierrez et al., 2015) further reinforces the need for supply chain diversification strategies from the outset.

9.0 Conclusion

This study has developed a comprehensive, empirically grounded business strategy for UrsPillow Inc., a technology-embedded new venture entering the Malaysian smart pillow market. Through systematic macro-environmental analysis, competitive assessment, primary market research, financial projection modeling, and strategic framework integration, the study confirms the existence of a substantial, underserved market opportunity for an innovative pillow product combining temperature regulation, vibration-based alarm functionality, and extensive customization.

The primary empirical contributions include: documentation of widespread unmet consumer needs (70.5% insomnia prevalence, 75.6% musculoskeletal discomfort, 91.0% waking difficulty) alongside remarkably high adoption willingness (92.3%); demonstration that quality dominates price as the primary purchasing criterion; confirmation that the vast majority of alarm clock users (93.6%) experience dissatisfaction with acoustic waking; and financial projections indicating a viable 1.06-year payback period on startup investment.

Key strategic recommendations include: (1) prioritizing rapid brand awareness investment through integrated digital and traditional media channels targeting the identified middle-income demographic; (2) leveraging sleep medicine expert endorsements to build trust and overcome technology adoption barriers; (3) implementing a phased market entry strategy anchored by a flagship retail location and e-commerce platform; (4) diversifying the supply chain to mitigate raw material cost volatility; (5) continuously monitoring competitive developments, particularly potential technology imitation by incumbent brands; and (6) investing systematically in research and development to sustain technological differentiation across the product lifecycle.

Future research should employ larger, probability-based samples and longitudinal designs to validate consumer preference patterns and track post-launch market dynamics. Conjoint analysis or discrete choice experiments would provide more granular insights for product development prioritization. Cross-cultural comparative research examining smart pillow adoption dynamics across Southeast Asian markets would further contextualize the Malaysian findings within the regional wellness technology landscape.

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SOCIAL SCIENCE

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Strategies for Enhancing Subjective Well-Being in Art and Design Students: Evidence from Three Higher Vocational Colleges in Quanzhou, Fujian Province, China

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Abstract

This study examined factors influencing subjective well-being among 306 art and design students from three higher vocational colleges in Quanzhou, China, using hierarchical regression analysis. Results indicated that social support and psychological resilience were the strongest positive predictors, jointly explaining 46% of the variance in well-being. In contrast, academic stress showed a significant negative effect, with over 60% of students reporting moderate to high stress related to creative workload and career uncertainty. Professional satisfaction displayed a differentiated pattern: although students reported relatively high satisfaction with social recognition of their majors, lower self-assessed competency weakened career identity and indirectly reduced well-being. Guided by Self-Determination Theory, this study conceptualizes how autonomy, competence, and relatedness needs are differentially satisfied or frustrated through social support, resilience, stress, and professional satisfaction, thereby shaping subjective well-being. Findings underscore the importance of creative interpersonal networks, particularly faculty mentorship and peer collaboration, in art education. The study further highlights the negative impact of mismatches between initial major selection motivations and subsequent career identity development, suggesting the need for targeted career counseling, resilience training, and practice-oriented transition programs.

Keywords: Art and design education; subjective well-being; psychological resilience; academic stressors; major-career identity alignment

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1.0 Introduction

Happiness, transcending temporal boundaries and cultural differences, has emerged as a globally prominent concern. Within psychology, happiness is defined as subjective well-being an individual's subjective evaluation of their life circumstances based on personal standards, acting as the ultimate arbiter of their own existence (Diener, 1984). This concept underscores the profoundly personal nature of happiness.

As academic research on happiness deepens, early studies primarily focused on the impact of external factors such as age, gender, income level, and residential density on happiness. However, given that happiness is fundamentally an individual's subjective experience of life, these sociodemographic variables prove insufficient for comprehensively explaining personal well-being. Consequently, research on the internal psychological factors influencing happiness has gained increasing prominence in recent years, becoming a major research focus (Yang & Yu, 2024). Moreover, happiness does not exist in isolation but is closely intertwined with major life events experienced during different developmental stages. Consequently, examining the events encountered by individuals at various life phases holds particular significance (Lucas, 2007). College students, navigating the transitional phase from adolescence to adulthood, face numerous adaptation challenges (Wu & Kong, 2024).

1.1 Theoretical Framework

This study is theoretically grounded in Self-Determination Theory (SDT), which posits that human well-being and optimal functioning depend on the satisfaction of three basic psychological needs: autonomy, competence, and relatedness (Tang et al., 2020). According to SDT, environments that support these needs enhance intrinsic motivation and well-being, whereas environments that frustrate these needs increase stress and maladjustment.

Within the context of art and design education, social support reflects the fulfillment of relatedness needs through faculty mentorship, peer collaboration, and professional networks; psychological resilience reflects competence by enabling students to cope with creative challenges and evaluative pressures; and professional satisfaction particularly alignment between personal interest and field of study reflects autonomy. Conversely, excessive academic stress and career uncertainty may frustrate these needs, thereby undermining subjective well-being.

Based on SDT, this study proposes an integrated conceptual framework in which social support, psychological resilience, academic stress, and professional satisfaction jointly influence subjective well-being through the satisfaction or frustration of autonomy, competence, and relatedness needs.

This framework This study aims to fill these gaps by investigating the causal effect of low-carbon moves beyond descriptive associations and provides an analytical structure for interpreting well-being mechanisms among art and design students.

Art and design students often select their majors under the combined influence of employment prospects, social reputation of the discipline, parental expectations, and institutional guidance, rather than purely intrinsic interest (Sudhana et al., 2020). During their academic training, these students face intensive creative workloads, portfolio evaluations, exhibition requirements, and internships, alongside pressure related to subjective assessment standards and uncertain career trajectories (Li et al., 2024). These stressors may reduce professional satisfaction and negatively affect subjective well-being, potentially impairing long-term social adaptation and professional identity development (Toubassi et al., 2023).

If stress is viewed as an internal factor negatively impacting the subjective well-being of art and design students, then social support can be regarded as an external positive resource that promotes well-being. Furthermore, individuals' ability to recognize their strengths and fully realize their potential in daily life also contributes to positive experiences of well-being (Carruthers & Hood, 2004). A key psychological trait closely related to this potential is psychological resilience. Psychological resilience refers to an individual's capacity to actively cope with adversity, overcome challenges, and achieve effective adaptation through self-regulation and cognitive restructuring in high-pressure environments or situations with significant change (Mumtazah, 2024).

Although prior studies have examined college students' well-being in relation to stress, personality traits, self-esteem, interpersonal relationships, and academic satisfaction (Song et al., 2021; Wilcox & Nordstokke, 2019; Cui et al., 2024), research focusing specifically on art and design students remains limited, despite the distinctive creative, evaluative, and emotional characteristics of this population (Spendlove, 2007).

1.2 Research Gap and Uniqueness of Art and Design Students

Art and design students represent a unique and distinct subgroup within higher education, characterized by the inherently creative, subjective, and evaluative nature of their academic training. Unlike students in more standardized disciplines, they are required to continuously express personal creativity while simultaneously meeting rigorous academic, aesthetic, and industry-based standards. This dual demand often results in heightened performance anxiety, identity tension, and emotional labor, as they navigate the pressures of originality and excellence (Sawyer, 2018).

The creative process itself functions as a double-edged sword for these students. On one hand, it fosters self-expression, emotional fulfilment, and a sense of accomplishment; on the other, it intensifies self-doubt, peer comparison, and stress related to subjective evaluation. The transition from student ti professional designer further complicates this landscape, as it demands early career identity formation and practical competency demonstration. Consequently, professional satisfaction and perceived competence emerge as particularly salient factors influencing their well-being.

Given these discipline-specific stressors and well-being mechanisms, treating art and design students as a homogeneous subset of general university students risks overlooking critical nuances. Their unique academic environment marked by subjective evaluation, creative blocks, and career uncertainty necessitates a dedicated theoretical and empirical framework for investigating subjective well-being.

Based on these objectives, the specific aims are as follows:

1. To understand the levels of social support, psychological resilience, stress, professional satisfaction, and subjective well-being among art and design majors.

2. To examine how general characteristics of art and design majors contribute to variations in their subjective well-being.

3. To examine the relationships among social support, psychological resilience, stress, professional satisfaction, and subjective well-being among art and design majors.

4. To examine the influence of social support, psychological resilience, stress, professional satisfaction, and subjective well-being on family subjective well-being among art and design majors.

By adopting this approach, the study provides context-sensitive empirical evidence and theoretical insights into the well-being of art and design students. It underscores the importance of targeted interventions, such as faculty-student mentoring, resilience training for creative blocks, and career alignment counseling, to address their unique challenges. Ultimately, this research advocates for a discipline-specific understanding of well-being to foster healthier, more fulfilled creative professionals.

2.0 Research Methods

2.1 Research Participants

This study employed a descriptive research design. Participants comprised 306 art and design students from three higher vocational colleges in Quanzhou City, Fujian Province, China, all of whom had completed at least one internship and voluntarily participated in the study. Participants were drawn from four major

fields within art and design programs (e.g., visual communication design, environmental design, digital media design, and product design), reflecting the typical disciplinary structure of vocational art education in China. The inclusion criteria were: (1) enrollment in an art or design major, (2) completion of at least one internship, and (3) voluntary consent to participate. Students without internship experience or with incomplete questionnaire responses were excluded.

Ethical considerations were strictly observed. Participants were informed of the study's purpose, procedures, confidentiality assurances, and their right to withdraw at any time without penalty. Written informed consent was obtained from all participants, and no personally identifiable information was collected. The study adhered to established ethical standards for social science research.

2.2 Research Tools

2.2.1 General Characteristics

General characteristics were measured using a self-administered questionnaire consisting of seven items, including five demographic variables (gender, grade, interpersonal relationship quality, perceived health status, and academic achievement level) and two major-related variables (motivation for choosing the major and internship experience). These variables were included as control factors based on prior well-being research among university students.

2.2.2 Social Support

The social support measurement tool used in this study was developed by Zimet et al. (1988) to assess social support among university students. This tool comprises 12 items: 4 items on family support, 4 items on friend support, and 4 items on support from significant others or meaningful people. Each item uses a 7-point Likert scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree), with higher scores indicating greater perceived social support. The MSPSS has been widely validated across cultural contexts, supporting its suitability for assessing social support among Chinese college students. In this study, Cronbach's α was .92.

2.2.3 Psychological Resilience

The psychological resilience measurement tool used in this study is a modified and refined version of the Resilience Scale developed by Oshio et al. (2002) for university students. This tool comprises 16 items: 5 items assessing positive future orientation, 6 items for emotional regulation, and 5 items for interest and interest diversity. Negative items are reverse-scored. Each item uses a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), with higher scores indicating greater psychological resilience. This

scale captures both emotional and cognitive-adaptive aspects of resilience, aligning with the competence dimension of Self-Determination Theory. Cronbach's α in this study was .80.

2.2.4 Stress

Academic stress was measured using the Chinese Perceived Stress Scale (CPSS) developed by Yang et al. (2003). The CPSS consists of 14 items rated on a 5-point Likert scale, with higher scores indicating higher perceived stress levels. This instrument has been widely applied in stress research among Chinese university populations and demonstrates stable psychometric properties. In the present study, Cronbach's α was .89.

2.2.5 Professional Satisfaction

Professional satisfaction was measured using the scale developed by Kim (2000), consisting of 13 items divided into two dimensions: personal-level satisfaction (6 items) and social-level satisfaction (7 items). Responses were rated on a 5-point Likert scale ranging from 1 (very dissatisfied) to 5 (very satisfied), with higher scores indicating higher levels of satisfaction. In this study, Cronbach's α was .89.

2.2.6 Subjective Well-Being

The subjective well-being measurement tool employed in this study utilizes the Subjective Well-Being Scale developed by Suh et al. (2011). This instrument comprises 9 items: 3 items assessing life satisfaction, 3 items measuring positive emotions, and 3 items evaluating negative emotions. Scores are calculated by reverse-scoring negative statements. Each item uses a 7-point Likert scale ranging from 1 (very low) to 7 (very high), with higher scores indicating greater subjective well-being. This multidimensional structure allows for a comprehensive assessment of both cognitive and affective components of well-being. Cronbach's α for this study was .82.

2.3 Data Collection and Procedures

To ensure methodological rigor and ethical compliance, data collection followed standardized procedures. Prior to survey administration, the research plan was reported to and approved by the relevant administrative departments of the participating institutions. Participants were informed of the study objectives, data usage, confidentiality measures, and voluntary nature of participation.

Data were collected from December 5 to December 12, 2025, targeting third- and fourth-year art and design majors from the three selected vocational

colleges. A total of 329 questionnaires were distributed during scheduled after-class sessions using structured classroom administration. To protect participant privacy and minimize response bias, completed questionnaires were immediately sealed in individual envelopes upon submission. All participants received small tokens of appreciation as compensation for their time.

After excluding 23 incomplete or invalid questionnaires, 306 valid responses were retained for final analysis, yielding an effective response rate of 92.7%.

2.4 Data Analysis

Data were analyzed using SPSS version 18.0. First, descriptive statistical analyses were conducted to summarize participants' general characteristics and the levels of social support, psychological resilience, academic stress, professional satisfaction, and subjective well-being. Means and standard deviations were calculated to examine overall distribution patterns.

Second, independent samples t-tests and one-way ANOVA were performed to identify differences in subjective well-being across demographic and academic characteristics. Pearson correlation analysis was then used to examine relationships among the main study variables.

Finally, hierarchical multiple regression analysis was conducted to identify key predictors of subjective well-being among art and design students. Control variables were entered in the first step, followed sequentially by stress, professional satisfaction, social support, and psychological resilience, consistent with the proposed theoretical framework.

3.0 Research Findings

3.1 Differences in Subjective Well-Being Levels Based on General Characteristics

The sample consisted of 306 art and design students, including 185 third-year students (60.5%) and 121 fourth-year students (39.5%). Among the participants, 187 students (61.1%) reported good interpersonal relationships, while 119 students (38.9%) reported fair or poor interpersonal relationships. Regarding perceived health status, 212 students (69.3%) reported good health, and 94 students (30.7%) reported average health.

Motivations for choosing an art and design major were categorized as follows: personal interest (107 students, 35.0%), job opportunities (102 students, 33.3%), parental advice (60 students, 19.6%), and college entrance examination scores (37 students, 12.1%). Academic achievement levels were distributed as excellent (67 students, 21.9%), moderate (190 students, 62.1%), and low (49 students, 16.0%).

Statistical analyses revealed significant differences in subjective well-being

across several general characteristics, including interpersonal relationships, perceived health status, and major selection motivation. Specifically, students reporting good interpersonal relationships demonstrated significantly higher subjective well-being scores than those reporting fair or poor relationships ($t=6.10$, $p<.001$). Similarly, students with good perceived health reported higher well-being than those with average health ($t=2.75$, $p=.007$).

Regarding motivation for major selection, a significant difference was observed among groups ($F=2.90$, $p=.024$). Students who chose their major based on personal interest exhibited higher subjective well-being than those influenced primarily by external factors such as employment prospects or parental advice. No statistically significant differences were found with respect to gender, grade level, or academic achievement.

These findings suggest that interpersonal relationships and intrinsic motivation

for major choice play a critical role in shaping subjective well-being among art and design students. Detailed analysis of these relationships is presented in Table 1.

Table 1: Analysis of Subjective Well-Being by General Characteristics

	Category	n (%)	M±SD	t or F	p
Gender	Male	19 (6.2%)	46.0±10.0	.36	.72
	Female	287 (93.8%)	44.0±7.0		
Grade	Grade 3	185 (60.5%)	44.2±7.1	-1.99	0.055
	Grade 4	121 (39.5%)	45.4±6.9		
Interpersonal Relationships	Good	187 (61.1%)	46.5±6.1	6.1	<.001
	Fair or poor	119 (38.9%)	41.7±7.0		
Health Status	Good	212 (69.3%)	45.8±7.1	2.75	.007
	Average	94 (30.7%)	42.4±6.6		
Motivations for Choosing to Study Art and Design	Interest	107 (35.0%)	46.0±6.5	2.9	.024
	College Entrance Examination Score	37 (12.1%)	45.7±6.1		
	Job Opportunities	102 (33.3%)	42.9±7.3		
	Parental Advice	60 (19.6%)	44.7±7.4		
Academic Achievement Level	Excellent	67 (21.9%)	46.2±6.7	1.8	.16
	Moderate	190 (62.1%)	44.5±6.9		
	Low	49 (16.0%)	42.5±7.5		

3.2 Participants' Social Support, Psychological Resilience, Stress, Job Satisfaction, and Subjective Well-Being Levels

Descriptive statistics for the main study variables are presented in Table 2. The mean score for social support was 5.99±0.90 on a 7-point scale, indicating a relatively high level of perceived social support among participants. Among the subdimensions, support from significant others (M=6.01±0.75) was the highest, followed by family support (M=5.89±1.05) and friend support (M=5.82±0.87).

The mean score for psychological resilience was 3.82±0.62 on a 5-point scale, reflecting a moderate-to-high level of resilience. Among its subdimensions, positive future orientation scored the highest (M=4.10±0.64), followed by interest diversity (M=3.92±0.61), while emotional regulation scored relatively lower (M=3.05±0.65).

The mean stress score was 3.56±0.59 on a 5-point scale, indicating a moderately

high level of perceived academic stress among art and design students. Professional satisfaction averaged 4.19±0.52 on a 5-point scale. Notably, social-level satisfaction (M=4.36±0.59) was higher than personal-level satisfaction (M=3.87±0.67), suggesting a discrepancy between external recognition and self-perceived competence.

The mean subjective well-being score was 4.88±0.72 on a 7-point scale, indicating an above-average level of well-being. Taken together, these descriptive results illustrate a pattern in which relatively strong social support coexists with elevated stress and uneven perceptions of professional competence.

Table 2: Levels of Social Support, Psychological Resilience, Stress, Professional Satisfaction, and Subjective Well-Being

Variable	Possible Range	Range	M±SD	Item Mean
Social Support	12–84	39–82	71.8±9.45	5.99±0.90
Family Support	4–28	12–28	23.5±4.25	5.89±1.05
Friend Support	4–28	10–28	23.4±3.55	5.82±0.87
Other Support	4–28	13–28	24.1±3.15	6.01±0.75
Psychological Resilience	16–80	32–75	58.1±7.15	3.82±0.62
Positive Future Orientation	5–25	13–25	20.6±3.25	4.21±0.72
Emotional Control	6–30	5–20	13.3±2.70	3.17±0.73
Interest Diversity	5–25	12–25	19.7±3.05	3.89±0.76
Stress	14–70	39–70	46.9±6.75	3.56±0.61
Professional Satisfaction	13–65	34–65	53.6±7.25	4.19±0.52
Personal Level Satisfaction	6–30	16–30	23.3±4.05	3.92±0.71
Social Level Satisfaction	7–35	15–35	30.6±4.15	4.42±0.63
Subjective Well-Being	9–63	28–58	45.0±7.15	4.88±0.72
Life Satisfaction	3–21	10–21	16.7±2.95	5.53±0.95
Positive Emotions	3–21	9–21	5.7±1.10	5.50±1.05
Negative Emotions	3–21	7–20	11.7±3.55	3.87±1.16

3.3 Correlations Among Social Support, Psychological Resilience, Stress, Job Satisfaction, and Subjective Well-Being in the Sample

Pearson correlation analysis was conducted to examine relationships among the main study variables, and the results are presented in Table 3. Subjective well-being was positively correlated with social support ($r=.54$, $p<.001$), psychological resilience ($r=.56$, $p<.001$), and professional satisfaction ($r=.44$, across three batches provides the temporal variation required for a robust multi- $p<.001$). In contrast, subjective well-being was negatively correlated with stress ($r=-.40$, $p<.001$).

Among the independent variables, social support showed a moderate positive correlation with psychological resilience ($r=.38$, $p<.001$) and professional satisfaction ($r=.41$, $p<.001$), while stress was negatively correlated with psychological resilience ($r=-.50$, $p<.001$) and professional satisfaction ($r=-.15$, $p<.005$).

These results indicate that psychological resilience and social support are the variables most strongly associated with subjective well-being, whereas stress functions as a significant risk factor. The observed correlation pattern provides

empirical support for the hypothesized relationships derived from the Self-Determination Theory framework.

Table 3: Correlations Among Variables

Variable	Category	Social Support	Psycholo-gical Resilience	Stress	Professional Satisfaction	Subject-ive Well-Being
		r (p)	r (p)	r (p)	r (p)	r (p)
External Factors	Social Support	1				
Internal Factors	Psychological Resilience	.38 (p<.001)	1			
	Stress	-.20 (p<.005)	-.50 (p<.001)	1		
	Professional Satisfaction	.41 (p<.001)	.43 (p<.001)	-.15 (p<.005)	1	
	Subjective Well-Being	.54 (p<.001)	.56 (p<.001)	-.40 (p<.001)	.44 (p<.001)	1

3.4 Factors Influencing Subjective Well-Being

Hierarchical multiple regression analysis was conducted to identify key predictors of subjective well-being among art and design students. The results are summarized in Table 4. Interpersonal relationships and perceived health status were entered as control variables in Model 1. Interpersonal relationships significantly predicted subjective well-being (β=.43, p<.001), whereas health status was not a significant predictor (β=.02, p=.710). Model 1 explained 19% of the variance in subjective well-being (F= 47.50, p<.001).

In Model 2, stress was added and showed a significant negative effect on subjective well-being (β=−.28, p<.001), increasing the explained variance to 27%. Professional satisfaction was introduced in Model 3 and demonstrated a significant positive effect (β=.29, p<.001), with the explained variance rising to 36%.

In Model 4, social support was added and emerged as a significant positive predictor (β=.28, p<.001), increasing the explained variance to 43%. Finally, psychological resilience was entered in Model 5 and remained a significant predictor (β=.23, p<.001). The final model explained 46% of the total variance in subjective well-being, indicating substantial explanatory power.

Diagnostic tests confirmed the absence of multicollinearity and autocorrelation, supporting the robustness of the regression model. Overall, the findings

indicate that interpersonal relationships, social support, psychological resilience, professional satisfaction, and stress jointly shape subjective well-being, with social support and psychological resilience exerting the strongest positive effects.

Table 4: Stratified Multiple Regression Analysis

Variable	Model 1 (β)	Model 2 (β)	Model 3 (β)	Model 4 (β)	Model 5 (β)
Interpersonal Relationships	.42 (p<.001)	.36 (p<.001)	.32 (p<.001)	.24 (p<.001)	.21 (p<.001)
Health Status	.03 (.705)	.02 (.855)	.13 (.805)	.04 (.635)	.05 (.305)
Pressure	-	-.27 (p<.001)	-.24 (p<.001)	-.21 (p<.001)	-.11 (.035)
Professional Satisfaction	-	-	-.29 (p<.001)	.21 (p<.001)	.13 (.035)
Social Support	-	-	-	.28 (p<.001)	.26 (p<.001)
Psychological Resilience	-	-	-	-	.23 (p<.001)
F(p)	47.40 (p<.001)	43.90 (p<.001)	38.40 (p<.001)	38.30 (p<.001)	35.50 (p<.001)
R^2	0.17	0.25	0.35	0.42	0.45
Adjusted R^2	0.17	0.25	0.34	0.4	0.44

4.0 Discussion

This study examined the mechanisms influencing subjective well-being among art and design majors by integrating social support, psychological resilience, academic stress, and professional satisfaction within a Self-Determination Theory (SDT) framework. The findings extend existing well-being research by highlighting the unique psychological dynamics experienced by students engaged in creative and practice-oriented disciplines.

4.1 Theoretical Contributions

This study makes several theoretical contributions to the literature on student well-being. First, it extends Self-Determination Theory by contextualizing autonomy, competence, and relatedness needs within vocational art and design education. While prior SDT-based studies have largely focused on general university populations, this research demonstrates that the satisfaction and frustration of basic psychological needs manifest in discipline-specific ways among art and design students.

Social support emerged as the most influential predictor of subjective

well-being. Within the SDT framework, this finding underscores the centrality of relatedness need satisfaction. Art and design students frequently engage in collaborative learning, studio-based projects, and mentorship-driven instruction. Faculty guidance, peer critique, and senior-junior collaboration constitute essential relational resources that support emotional validation and creative confidence. When such relational support is strong, students are more likely to experience enhanced well-being.

Psychological resilience also exerted a significant positive effect on subjective well-being, supporting the role of competence satisfaction in SDT. Resilience enables students to reinterpret failure, manage evaluative stress, and persist through creative uncertainty key challenges inherent in artistic learning contexts. This finding aligns with international research indicating that resilience buffers the negative effects of stress and enhances adaptive functioning among university students.

In contrast, academic stress negatively predicted subjective well-being, reflecting need frustration. Art and design students often face ambiguous assessment criteria, time-intensive creative production, and pressure to translate abstract ideas into tangible outcomes. Such stressors may undermine students' perceived competence and autonomy, leading to reduced well-being when coping resources are insufficient.

Professional satisfaction demonstrated a differentiated influence on well-being. While students reported relatively high satisfaction with the social recognition of their major, personal-level satisfaction related to perceived professional competence was comparatively lower. This discrepancy between external validation and internal self-evaluation represents a distinctive psychological tension in art and design education, where societal appreciation does not always translate into personal confidence. This imbalance may weaken career identity formation and indirectly diminish subjective well-being.

4.2 Uniqueness of Art and Design Students in Well-Being Research

The findings reinforce the argument that art and design students constitute a psychologically distinct group within higher education. Unlike students in more structured disciplines, art and design majors operate in learning environments characterized by subjectivity, creativity, and evaluative ambiguity. Success is often defined through aesthetic judgment rather than standardized criteria, increasing emotional exposure and vulnerability.

Furthermore, art and design students are required to develop professional identities early, often during their undergraduate or vocational training. The pressure to establish a coherent career identity while still refining technical and creative competencies intensifies stress and heightens sensitivity to feedback. These characteristics help explain why social support and resilience play

particularly critical roles in shaping well-being within this population.

4.3 Practical Implications

From a practical perspective, the findings suggest several targeted intervention strategies. First, universities should prioritize the development of structured social support systems tailored to art and design students. Faculty mentorship programs, peer critique workshops, and collaborative studio activities can strengthen relational networks and enhance students' sense of belonging.

Second, resilience-building interventions should be incorporated into art and design curricula. Workshops focusing on emotional regulation, adaptive coping, and reframing creative failure can help students strengthen competence-related resources and mitigate stress. Given the inevitability of evaluative pressure in creative disciplines, resilience training represents a sustainable strategy for well-being promotion.

Third, the discrepancy observed between social-level and personal-level professional satisfaction highlights the need for competency-based career counseling. Programs that help students objectively assess and develop their professional skills such as portfolio coaching, industry-aligned projects, and structured internships may reduce self-doubt and support career identity development.

Finally, to address stress associated with the transition from education to employment, institutions should establish industry transition programs. University–industry collaboration, alumni mentoring, and realistic career expectation guidance may reduce uncertainty and facilitate smoother professional adjustment.

4.4 Limitations and Future Research Directions

Several limitations should be acknowledged. First, the study employed a cross-sectional design, which limits causal inference. Longitudinal studies are needed to examine how well-being trajectories evolve across different stages of art and design education. Second, the sample was drawn from three higher vocational colleges in a single region of China, which may constrain the generalizability of the findings.

Future research should expand the sample to include universities in different regions and educational systems, as well as conduct cross-cultural comparisons. Additionally, qualitative approaches such as interviews or portfolio-based reflections could provide deeper insight into the lived experiences underlying quantitative well-being indicators. Finally, future studies may explore mediating or moderating mechanisms such as career identity or intrinsic motivation to further refine the SDT-based explanatory model.

5.0 Conclusion

This study explored the effects of social support, psychological resilience, academic stress, and professional satisfaction on the subjective well-being of art and design majors enrolled in higher vocational colleges in Quanzhou, China. The findings demonstrate that social support and psychological resilience are the most influential positive predictors of subjective well-being, while academic stress exerts a significant negative effect. Interpersonal relationships and professional satisfaction further contribute to variations in well-being, and the integrated model explains 46% of the total variance.

By adopting Self-Determination Theory as an analytical framework, this study advances understanding of how autonomy, competence, and relatedness needs are differentially satisfied or frustrated within creative and practice-oriented educational contexts. The results highlight that, for art and design students, well-being is shaped not only by general academic stressors but also by discipline-specific factors such as subjective evaluation, creative uncertainty, and early career identity formation.

This research contributes to the literature by empirically demonstrating that art and design students constitute a distinct population whose well-being mechanisms differ from those of general university students. In particular, the discrepancy between high social-level professional satisfaction and relatively lower personal-level competence satisfaction reveals a unique psychological tension that may undermine career confidence and subjective well-being if left unaddressed.

From a practical standpoint, the findings suggest that enhancing the well-being of art and design students requires targeted and context-sensitive interventions. Universities should prioritize strengthening social support networks, fostering psychological resilience through curriculum-based interventions, and providing competency-oriented career guidance. Programs designed to bridge the gap between academic training and professional practice may be especially effective in reducing stress and supporting sustainable well-being.

Despite its contributions, this study has limitations related to its cross-sectional design and regional sample. Future research should employ longitudinal and cross-cultural designs to validate and extend the findings. Nonetheless, the present study provides a theoretically grounded and empirically supported foundation for developing well-being promotion strategies tailored to art and design students in vocational higher education.

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Understanding the Other in a Foreign Land：A Preliminary Case Study of Malay Language Learning Texts among Hakka and Cantonese Migrants in British Malaya

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Abstract

Since the Ming dynasty voyages of Zheng He, Chinese migration to Southeast Asia has extended over several centuries. While earlier migratory routes largely focused on port cities such as Makassar, Batavia, and Manila, a new wave of migration from the mid-nineteenth century onward increasingly shifted toward the Malay Peninsula and Borneo. Many of these migrants settled permanently, forming the historical foundations of contemporary Chinese communities in Malaysia. Despite their significance, the ways in which early migrants adapted to unfamiliar environments, linguistic barriers, and cultural differences remain insufficiently examined, particularly with regard to how language learning facilitated everyday life and economic activities.Among Chinese migrants in colonial British Malaya, Hakka and Cantonese communities constituted a substantial proportion. Owing to their relative phonological and lexical proximity, these groups provide a valuable lens for examining early Chinese linguistic practices in Malaya. This article analyzes two Malay language learning booklets published between the late nineteenth and early twentieth centuries—Zheng Ke Yin Yi Mu Lai You Hua (正客音译义木来由话) and Malayu Yue Yin Yi Yi (马拉语粤音译义). Through textual analysis, it explores how Hakka and Cantonese migrants learned and conceptualized the Malay language under colonial conditions, with particular attention to lexical selection and the organization of practical knowledge. By comparing these two texts, the study reconstructs aspects of everyday social contexts and examines how different Chinese speech communities formed understandings of the Malay language and local society. In doing so, it offers a preliminary perspective on migrant language learning and cross-cultural knowledge formation in colonial Malaya.

Keywords: Oversea Chinese , Hakka Communities, Cantonese Communities, Malay learning , Language Contact.

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1.0 Introduction

The history of Chinese migration to Southeast Asia extends far back in time; however, when considering large-scale and sustained transregional movements, a key turning point can be traced to the period following Zheng He's maritime expeditions during the Ming dynasty (1405–1433). Although the voyages of Zheng He's fleets did not themselves constitute popular or civilian migration, their historical significance lay in the effective facilitation of maritime transport networks and the circulation of information across regions, thereby reshaping patterns of regional maritime connectivity. As shipping routes and navigational knowledge accumulated, places such as Manila, Batavia (present-day Jakarta), Melaka, and Siam gradually emerged as important nodes for the movement, anchorage, and activities of Chinese merchants and sojourners, laying the groundwork for the subsequent formation of Chinese communities in Southeast Asia（Skinner, 1957）. However, the decisive shift that gradually made the Malay Peninsula a major center of Chinese settlement occurred in the second half of the eighteenth century. At that time, the financial position of the Dutch East India Company (VOC) was increasingly weakened, while Chinese merchants and laborers who had previously moved between Batavia and other regional ports began to redirect their networks—encompassing opium, mining, and labor mobilization—towards the Malay Peninsula, Makassar, and Borneo. This reorientation undermined the VOC's established port revenues and commercial monopolies, further exacerbating its already fragile finances, and simultaneously encouraged the dispersal of Chinese activities from Batavia to other ports and resource sites across the region (Blussé , 2011).

By the mid-nineteenth century, upheavals such as the Opium Wars and the Taiping Rebellion swept across China's coastal regions, dramatically intensifying the scale of southward Chinese migration. Migrants from Fujian, Guangdong, and Hakka-speaking areas successively entered Singapore, Perak, Johor, and Borneo, where they played pivotal roles within colonial tin-mining operations, rubber plantations, and port systems. Over time, these processes shaped the principal dialect-based communities of what is now Malaysian Chinese society and, through sustained interaction with Malay society, gave rise to hybrid social formations characterized by long-term negotiation and exchange.

As large numbers of Chinese migrants gradually settled across different parts of Malaysia in the second half of the nineteenth century, the primary challenges they encountered in everyday life, economic activities, and interethnic interactions were often not political institutions or religious differences, but the immediate and pressing problem of linguistic communication. Situated within unfamiliar linguistic and social environments, newly arrived migrants were required to learn, without delay, how to

communicate with local Malays, how to conduct transactions, and how to comprehend a range of local institutions, terms of address, and customary practices. Such knowledge not only had to be rapidly incorporated into migrants' cognitive and practical frameworks, but also profoundly shaped their daily modes of operation in spaces such as mines, ports, and marketplaces. From this perspective, language learning was not merely a form of acculturation, but a core condition that determined whether migrants could establish themselves locally and, indeed, sustain their livelihoods.

From the nineteenth century onwards, large numbers of Chinese migrants moved into Malaya, bringing about profound changes in demographic structures, economic activities, and local societies. With the rapid expansion of the tin-mining industry, the emergence of secret societies and lineage-based organizations, and the formation of transregional commercial networks, Chinese society under the colonial regime exhibited a high degree of mobility and organizational capacity. It was for this reason that such phenomena long attracted scholarly attention, and existing studies have produced a substantial body of analysis, primarily from macro-level perspectives focusing on social organization, labor systems, and ethnic relations.[1]

However, in comparison with these structural and institutional approaches, the role of language, as the most basic and frequently practised form of knowledge in migrants' everyday lives has long been relegated to a relatively secondary position. How Chinese migrants learned Malay, and how they understood and constructed the local social world through daily interactions, constitute a dimension of "daily knowledge production" that remains underexamined in existing scholarship and calls for further investigation.

2.0 Literature Review: Empire, Language, and Cross-Cultural Exchange

In the study of language exchange, Chinese-language scholarship has in fact accumulated a substantial body of research. The Hua Yi Yi Yu (华夷译语), compiled by the Ming dynasty' state, provides a representative example. As a linguistic reference work situated within an official knowledge system, it not only reflects the court's modes of classification and understanding of the languages of "Southeast Asian polities," but also reveals the political imagination and conceptions of order embedded in specific historical contexts. For these reasons, the Huayi Yiyu has in recent years become an important source for studies of Sino–foreign interactions, the production of linguistic knowledge, and practices of imperial governance, attracting scholarly attention

[1] See also Wong Yee Tuan, Penang Chinese Commerce in the Nineteenth Century*: The Rise and Fall of the Big Five* (Singapore: Institute of Southeast Asian Studies, 2015)*;* Carl A. Trocki, *Opium and Empire: Chinese Society in Colonial Singapore, 1800–1910* (Ithaca, NY: Cornell University Press, 1990).

from perspectives ranging from diplomatic institutions to language ideologies and knowledge production (Chiang,2010;Lin,2015). In examining language contact and the exchange of knowledge between China and the Malay world, Malay-related language knowledge circulating within the Chinese textual tradition , particularly Malay loanwords preserved in Chinese sources can serve as important evidence for understanding long-term cultural interactions and the transmission of knowledge between China and maritime Southeast Asia (Salmon, 2009).

In recent years, interactions between empires—and the attendant issues of linguistic and cultural exchange have increasingly become a major focus of scholarly inquiry in Europe and North America. Scholars such as Tonio Andrade and Henrietta Harrison adopt cross-imperial perspectives to examine how language, ritual, and knowledge circulated across different political systems, were translated, and were reinterpreted within specific historical contexts. Henrietta Harrison (2021) takes the British embassies to China during the Qianlong reign as the core of her analysis, approaching them through the Qing linguistic regime and practices of translation. By tracing the life trajectories and experiences of two key interpreters— Li Zi Biao (李自标) and Sir George Thomas Staunton, 2nd Baronet. She offers a nuanced account of the complexities involved in managing cross-cultural communication within multilingual and multi-dialectal imperial contexts in the eighteenth and nineteenth centuries. She argues that language was not merely a tool of communication, but a key constitutive element deeply embedded in political order, power relations, and the mechanisms of mutual understanding. By contrast, Tonio Andrade (2021) reconstructs the Dutch embassy to China of 1794–1795 to offer a nuanced account of the profound collision between the Qing tributary order and early modern European diplomatic ideals. He argues that the textual expectations upon which the envoys relied prior to departure often diverged sharply from their observations on the ground, and that it was within this gap that cultural superiority, linguistic differences, ritual protocols, and mutual misreadings intersected, shaping patterns of interaction and frameworks of understanding on both the Chinese and European sides. In comparison, Asian scholarship on linguistic exchange has tended to focus on translation practices between Chinese and English, particularly with the George Macartney mission to China as a central case. Such studies emphasize the crucial role of translation in diplomatic negotiations, seeking to reconstruct the linguistic contexts of diplomatic interaction at the time, as well as the ensuing challenges of understanding and the tensions inherent in processes of negotiation (Wang, 2022).

Beyond the aforementioned studies of linguistic contact involving Britain, the Netherlands, and China, Spain, as a major empire of the same period has likewise attracted growing scholarly attention. Drawing on previously

unpublished seventeenth-century manuscripts in which Spanish missionaries learned Hokkien, Fabio Yuchung Lee (2020) reconstructs the processes through which Spaniards acquired and used the language, while also illuminating the linguistic practices of Hokkien-speaking communities in the Philippines and their interactions with missionaries in the seventeenth century. These materials not only reveal the concrete settings of cross-linguistic interaction but also help to clarify how the Spanish Empire constructed knowledge of, and sought to understand, local societies within overseas colonial contexts, particularly in the Philippines.

More broadly, the process of language learning itself reflects patterns of cultural exchange and identity formation among different communities. In this context, Tom Hoogervorst's recent research on Chinese-language textbooks in the late colonial Dutch East Indies (2021) provides an important theoretical and methodological perspective for this study. Through an analysis of a range of textbooks written in Malay for Chinese learners of Chinese, he identifies their hybrid linguistic characteristics (Sino-Malay) and further demonstrates how these texts operated between discourses of Chinese nationalism and the structures of colonial social order. Hoogervorst treats such textbooks as a crucial window onto the cultural practices and social interactions of colonial Chinese communities, arguing that they were not merely instruments for language instruction, but also vehicles for transregional cultural exchange and the construction of ethnic consciousness. This perspective addresses a key limitation of earlier scholarship, which has tended to privilege phonological and lexical analysis while comparatively neglecting the broader socio-cultural contexts in which such materials were produced and used. As such, it offers particularly valuable insights for rethinking the functions and historical significance of these early language-learning texts.

3.0 Research Perspective and Sources: Language-Learning Texts of Overseas Chinese

Existing studies of language exchange and cultural contact have largely focused on diplomatic interactions between states or on missionary representations of local languages. By contrast, how overseas Chinese learned the languages of others, and how they re-positioned themselves through language in everyday life, has long lacked systematic examination. Earlier research has tended to privilege changes in phonology, grammar, or linguistic structure, while paying comparatively little attention to how language-learning texts themselves reflect concrete social contexts. Yet it is precisely at this level that a key point of entry for understanding the migrant experience of overseas Chinese can be found. Through such texts, it becomes possible not only to reconstruct processes of adaptation in unfamiliar environments, but also to trace, through patterns of lexical choice and semantic change, the modes of

interaction and knowledge systems that shaped relations between Chinese communities, local populations, and colonial authorities.

For this reason, a more comprehensive understanding of the lived world of nineteenth-century Chinese communities in Malaya requires a return to language-learning texts that were closest to everyday life, yet have often been overlooked. In the context of large-scale Chinese migration during this period, the Hakka and Cantonese dialect groups constituted a substantial proportion of the migrant population. Not only did their languages share a certain degree of similarity, but their occupational activities also partially overlapped, while their spheres of activity extended across the mining districts, ports, and markets of the Malay Peninsula, making them key forces in shaping local Chinese society. Consequently, the Malay–Chinese bilingual texts used by these dialect groups were not merely practical linguistic tools; they also serve as crucial windows through which to examine how migrants understood Malay society, constructed knowledge in unfamiliar environments, and interacted with local communities.

In terms of source materials, this article focuses on Malay language-learning texts dating from the late nineteenth to the early twentieth centuries. The Hakka materials are drawn primarily from Zheng Ke Yin Yi Mu Lai You Hua (Malay–Chinese transliteration and explanation in Hakka), a text now held in Singapore and reproduced in the Collection of Miscellaneous Character Texts from Lingnan, Qing to Republic Era (Qing zhi Minguo Lingnan Zazi Wenxian Jikan) (Wang, 2018). As for the Cantonese materials, this study adopts Malay Language with Cantonese Phonetic Transcription and Explanation (Malayu Yue Yin Yi Yi) , a text preserved at the University of Singapore, as a comparative source (Feng, 1913) .Through a close analysis of these two texts, this article seeks to examine how Hakka and Cantonese migrants learned and employed Malay in diasporic settings, thereby reconstructing the processes through which linguistic knowledge was formed. It further explores variations and diachronic changes in language contact across different dialect groups, with the aim of re- examining the historical experiences and patterns of ethnic interaction among overseas Chinese in the Malay Peninsula.

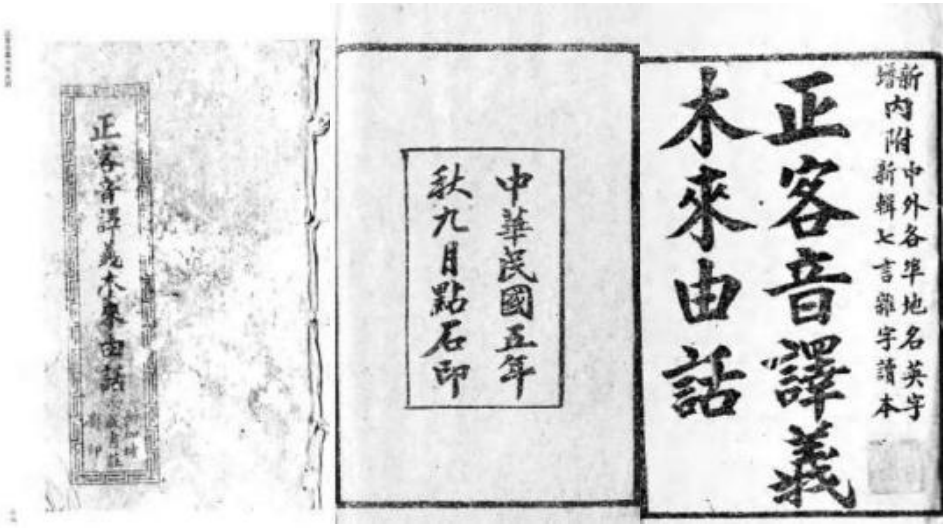

Figure 1： Photograph showing the contents of Zheng Ke Yin Yi Mu Lai You Hua, Scource:Wang,2018.

Figure 2： Photograph showing the contents of Malayu Yue Yin Yi Yi Scource:Feng,1913.

4.0 Linguistic Tools as Windows into Migrant Knowledge: The Hakka and Cantonese Malay-Learning Texts

This article examines Malay language learning booklets compiled by Cantonese- speaking and Hakka-speaking communities in the early twentieth century, with the aim of exploring how Chinese migrants learned and used Malay within the social context of colonial Malaya. Through an analysis of these teaching materials' content, organization, and practical contexts of use, the study investigates how language learning responded to the everyday and frequent demands of cross-ethnic interaction in colonial society, and how it functioned as an essential form of knowledge that enabled Chinese migrants to adapt to local conditions and to construct their daily social order.

The emergence of such Malay language learning books was closely related to the port-based social structure that developed in the Malay Peninsula from the late nineteenth to the early twentieth century. During this period, port cities such as Singapore attracted migrants from diverse linguistic and ethnic backgrounds, gradually shaping the Malay Peninsula into a highly multilingual social environment. Within this context, Malay became the most commonly used medium of interethnic communication, with Bazaar Malay in particular functioning as a crucial lingua franca. Bazaar Malay was a functionally oriented contact language based on Malay vocabulary, and it had been widely used since the establishment of British colonial rule in Singapore in. Although it had no native speakers, it long served as an important means of communication both among non-Malay groups and between Chinese communities and other ethnic populations (Khin, 2021).

It was precisely within this multilingual social environment that Chinese communities began to compile Malay language learning booklets designed for practical use. These booklets were typically small in format and easily portable, indicating that their primary purpose was to meet the immediate communicative needs of everyday trade, social interaction, and labor contexts. The textbook compiled by Hakka speakers was entitled Zheng Ke Yin Yi Yi Mu Lai You Hua, while the Cantonese counterpart was known as Malayu Yue Yin Yi Yi. Although the two texts were produced in different periods, both reflect how distinct dialect groups, operating within a multilingual colonial society, employed writing and translation practices to gradually construct practical knowledge of Malay and to navigate everyday life.

With regard to publication dates, Malayu Yue Yin Yi Yi was first printed in the sixteenth year of the Guangxu reign (1890). The edition used in this study is a reprint published in Singapore in the second year of the Republic of China (1913), indicating that both its compilation and circulation predate the Hakka bilingual glossary. By contrast, the extant Hakka version, Zheng Ke Yin Yi Yi Mu Lai You Hua, bears an imprint stating that it was printed in the ninth lunar month of the fifth year of the Republic of China (1916) printed by

lithography[2], suggesting a slightly later date of publication of Cantonese version. However, the compiler states in the preface that the text was written in Jiyou year. According to the sexagenary cycle, jiyou may correspond either to the twenty-ninth year of the Daoguang reign (1849) or to the first year of the Xuantong reign (1909), a dating that clearly does not align with the publication year of the extant edition, which is given as the fifth year of the Republic of China (1916). A closer examination of the physical features of the book reveals the imprint "lithographically printed at Shijing Hall, Shiba Fu, Guangzhou[3]" in the lower left corner of the page, indicating that the original place of printing was Guangzhou. Taken together, the chronological information provided in the preface and the imprint suggests that the first edition of Zheng Ke Yin Yi Yi Mu Lai You Hua was most likely completed in 1909, while the version dated 1916 should be understood as a later reprint produced in response to market demand in Southeast Asia.

It is also noteworthy that the Cantonese teaching manual examined in this study, Malayu Yue Yin Yi Yi, was likewise printed in Guangdong in its early editions. This indicates that from the late nineteenth to the early twentieth century, Guangdong was not only a major point of origin for Chinese migration but also an important center of publishing and knowledge production oriented toward overseas Chinese communities. Through lithographic printing and mechanisms of reprinting, language-learning materials compiled in Guangdong were able to transcend regional boundaries and circulate in Southeast Asian port cities such as Singapore. This phenomenon not only reflects the regional influence of Guangdong's publishing industry at the time but also underscores the growing practical demand for Malay language learning materials among Chinese communities in a multilingual colonial society, which in turn encouraged speakers of different dialect groups to engage increasingly with the learning and use of Bazaar Malay.

A closer examination of the table of contents of the Cantonese version shows that the text is organized into a total of twenty-eight categories, covering topics such as numbers, astronomy, commodities, medicinal materials, utensils, construction materials, the human body, and occupations, as well as lexical and syntactic units at different levels, including single-character, two-character, three-character items, and short and long sentences. Overall, the content focuses on practical vocabulary and basic sentence patterns, reflecting an arrangement clearly oriented toward the needs of everyday life. By contrast, the Hakka version is divided into thirty-one categories, noticeably exceeding the Cantonese version in terms of the number of classifications. However, a closer look at their classificatory approaches reveals several differences in the

[2] Original imprint reads: Zhonghua Minguo wu nian (1916) qiu jiuyue dianshi yin.
[3] Original imprint reads: Guangzhou Shiba Fu Shijing Tang shiyin.

emphasis aspects of daily life. The Cantonese version is in fact more detailed in certain everyday categories, for example by including additional sections on medicines, jewellery, bones and internal organs, and forms of address; at the same time, however, it lacks categories that had existed previously, such as those devoted to minerals and forms of address. The Hakka version, by contrast, introduces a greater number of categories related to sentence patterns and incorporates toponymic sections such as “Dutch administrative centers” and “Chinese provinces”. Although some of these geographical categories are no longer preserved in the extant copies, the overall classificatory design nonetheless demonstrates a clear editorial awareness of practical contexts of use and differentiated learning needs. These differences in the organization of the table of contents not only suggest that speakers of different dialect groups encountered distinct living conditions and linguistic demands within Malay society, but also provide important analytical clues for a comparative examination of the language-learning strategies and logics of knowledge organization adopted by Hakka and Cantonese migrants.

Examining the cultural networks in which the authors of the prefaces and the editors of these texts were embedded allows for a clearer understanding of the positions and symbolic meanings occupied by different dialect versions within the modern publishing field. The preface to Malayu Yue Yin Yi Yi was written by Pan Feisheng（潘飞声）, an intellectual active in southern China and overseas during the late Qing and early Republican periods. Pan spent an extended period residing in Europe, where he participated in teaching and scholarly exchanges related to Sinology. His transregional life experience afforded him first-hand exposure to issues of linguistic transmission and cultural contact, shaping a comparatively open intellectual outlook. After returning to China, Pan moved frequently between Guangzhou, Hong Kong, and Shanghai, engaging in newspaper editing and literary activities. He also became a member of the Nanshe (南社), indicating his active participation in the cultural and intellectual networks surrounding the 1911 Revolution. Particularly noteworthy is Pan’s close relationship with Qiu Shuyuan (邱菽园), a prominent newspaper figure in Singapore. When Qiu founded the Tian Nan Xin Bao (天南新报) in 1898, the paper widely published works by poets from various regions, including contributions by Pan Feisheng and other well-known figures. This publishing activity reflects the existence of a knowledge and print network that spanned southern China and the Nanyang region（Yao, 2013）. This evidence indicates that the publishing and cultural milieu in which Malayu Yue Yin Yi Yi was produced was closely connected to the newspaper networks and transregional literary circles of the Nanyang, rather than being that of an isolated language manual. functions not merely as a language-learning manual, but as a medium through which knowledge transmission and social cognition operated simultaneously, revealing its multiple roles in the lived experiences of migrants.

5.1 From Dietary Vocabulary to Processes of Localization among Hakka Migrants

In the Hakka version, food-related vocabulary is primarily concentrated in the "Food"category, offering a concrete illustration of how Hakka migrants understood the structure of everyday diet. As reflected in the textual content, the range of entries is notably broad, encompassing not only marine products such as salted fish and fresh fish, but also a wide variety of meats, including pork (isi babi), beef (isi lembu), mutton (isi kambing), and buffalo meat (isi kerbau), as well as poultry such as chicken (ayam), duck (itik), and goose (angsa). This breadth of coverage suggests that the compiler possessed a detailed awareness of local ecological conditions and patterns of animal husbandry.

With regard to staple foods, the text records a variety of grains and starchy food sources, including glutinous rice (beras pulut), white rice (beras putih), sago (sagu), and vermicelli (tepung halus). Among these, sago (sagu) was one of the most common staple foods in Southeast Asia and was widely distributed in regions such as the Moluccas (Maluku), the Philippines, particularly the Sulu Archipelago and Kalimantan. Derived primarily from the pith of the sago palm, sago belongs to a starch-based resource system developed in tropical environments, and stands in marked contrast to the rice-centered dietary structure traditionally associated with Chinese foodways(Charra, 2016). These lexical items indicate that, in the course of settling into local life, migrants gradually came to accept and make use of food resources distinctive to tropical environments. The presence of such food-related vocabulary suggests that Hakka migrants were not merely reproducing dietary patterns from their places of origin. Rather, through everyday living, they progressively adjusted their dietary structure in response to local ecological conditions and material resources. In addition, the text records a range of terms related to seasoning and cooking, including salt (garam), sugar (gula), ginger sugar (gula halia), white sugar (gula putih), vinegar (cuka), and soy sauce (kicap). These entries indicate that Hakka migrants were already able to employ a diverse array of seasonings in daily food preparation, gradually shaping a dietary profile attuned to local living conditions. Particularly noteworthy is the use of the term manisan. In Malay, this term broadly refers to various kinds of sweet foods or preserved fruits and does not correspond directly to the more narrowly defined concept of "candy" in modern Chinese. Its appearance thus reflects processes of semantic adjustment and reconfiguration in the course of linguistic translation. For newly arrived Hakka migrants in Southeast Asia, such sweet foods were likely not a common component of their original dietary repertoire. Consequently, in the processes of linguistic conversion and comprehension, these items were often understood and assimilated through the pre-existing concept of "sugar." This phenomenon indicates that linguistic adaptation is not a one-to-one correspondence, but rather a mediated process in

which familiar conceptual frameworks serve as intermediaries for extending and constructing understandings of new cultural objects.

Overall, the text includes a number of food items that did not originally belong to the South China dietary system, such as coconut-based products and sago, indicating that Hakka migrants gradually came into contact with and incorporated locally available natural resources in the course of their lives in Southeast Asia. The appearance of these terms reflects not only shifts in dietary structure but also reveals how migrant communities reinterpreted food and resources within a new environmental context. A closer examination of the food-related vocabulary further shows that the text simultaneously preserves dietary elements rooted in Chinese culinary traditions while incorporating a variety of local ingredients, thereby presenting a dietary pattern characterized by both continuity and adaptation. As Tan Chee Beng (2011) has pointed out, the formation of overseas Chinese food cultures in Southeast Asia is the result of continuous negotiation, adaptation, and integration between Chinese culinary traditions and local food practices. It also reflects the ways in which migrant communities reconstruct their lifestyles and cultural identities within new ecological and social environments.

Therefore, the dietary vocabulary presented in Zheng Ke Yin Yi Yi Mu Lai You Hua is not only significant at the linguistic level but may also be understood as a concrete illustration of how Hakka migrants engaged in processes of cultural adaptation and knowledge transformation within Southeast Asian societies. Through these terms, we are able to glimpse how Hakka migrants reinterpreted food, resources, and everyday life in an unfamiliar environment, and how they gradually shaped a form of dietary culture marked by local characteristics.

In addition, within the “Commodities” section, the text records a variety of seafood-related items, such as squid (ikan sotong), fish skin (kulit ikan), and fish maw (perut ikan). These entries indicate the significant influence of a port-centered trade economy on everyday dietary practices among Hakka communities in Malaya. At the same time, the text also includes several high-value commercial goods, including bird’s nest (sarang burung), shark fin (sisik ikan), and buffalo horn (tanduk kerbau), reflecting Hakka migrants’ awareness of trade commodities and market value. Furthermore, the text records a wide range of dried foods and preserved vegetables, such as glass noodles (laksa kering), preserved mustard greens (sayur kering), salted Chinese cabbage (sayur lobak masin), dried daylily buds (sayur bunga kering), and dried mushrooms (kulat kering). These entries point to the Hakka community’s strong reliance on preserved foods within a tropical environment. Taken together, such vocabulary not only depicts the dietary landscape of Hakka life in Southeast Asia but also illustrates how migrants absorbed and adjusted their inherited food practices in the course of localization, in order to adapt to the material conditions and everyday demands of a tropical

society.The text contains no vocabulary related to alcoholic beverages. By contrast, seventeenth-century language manuals produced in the Philippines frequently include terms such as arak, indicating the prevalence of alcohol consumption in everyday life in the Philippines (Lee, 2021).

In its question-and-answer format, the text includes a separate section entitled “Dialogues with the Cook” (Tong chufu wenda men), indicating that its content is not limited to one-to-one lexical correspondences but instead incorporates concrete interactional contexts. The dialogues collected in this section largely revolve around food and commercial transactions, such as “Prepare some food to eat tomorrow morning” (besok boleh bikin barang sikit makan), “The coffee has already sold out” (kopi sudah habis), and “Twenty cents” (dua puluh sen satu kati tuan). These examples reflect the practical linguistic demands generated by everyday activities surrounding food preparation and trade. Particularly noteworthy is the frequent appearance of the term Teuga (tuan) in these dialogues, as seen in expressions such as “What would you like to eat, sir?” (tuan mau makan barang apa) and “What kinds of fruit do you like, sir?” (tuan suka makan apa buah). This recurring form of address suggests that the speaker is often positioned in a role of inquiry or response, rather than command. Such linguistic situations not only illustrate patterns of language use within service relationships but also reflect the social positioning and division of roles within food-related settings in contemporary Chinese communities.

From this perspective, the pedagogical focus of the text lies not in abstract grammatical structures but in communicative scenarios that could be repeatedly deployed in everyday life—particularly those closely tied to food, commerce, and labor—thereby underscoring its function as a practical language-learning manual.

5.2 Daily Material Culture among Hakka Migrants as Reflected in Clothing-Related Vocabulary

In Zheng Ke Yin Yi Yi Mu Lai You Hua, references to clothing and dress do not constitute the largest portion of the text, yet they nevertheless offer valuable insight into how Chinese communities at the time understood and categorized everyday material culture. With regard to color, the text records only basic color terms—such as gray, red, blue, black, white, yellow, and green—suggesting that attention to color was primarily oriented toward practical considerations rather than decorative or symbolic meanings. In terms of clothing types, the items listed are largely those commonly encountered in daily life, including shirts (baju), trousers (seluar), skirts (sarung), hats (topi), belts (tali pinggang), undershirts (baju kemeja), and long robes (baju panjang). This selection reflects an editorial approach guided chiefly by practical usage

and daily needs. Notably, footwear occupies a relatively prominent position in the text, and its classification is comparatively detailed. In addition to general types of shoes, the text differentiates footwear according to materials and functions, such as slippers (kasut selipar) and cloth-patterned sandals (kain bunga kasut), indicating the influence of local living environments and mobility requirements on dress culture. Particularly illuminating is the treatment of the term ji (clogs), rendered as sepatu palem. Rather than directly mapping onto an established Chinese concept, this translation adopts a descriptive strategy, interpreting the item as footwear made from palm and other plant-based materials. Such a translation approach suggests that the compiler sought to explain objects originating from China through locally available natural resources, reflecting a strong reliance on local experience and everyday knowledge in the process of linguistic translation.

Overall, an analysis of clothing-related vocabulary shows that Zheng Ke Yin Yi Yi Mu Lai You Hua does not merely present simple lexical correspondences, but rather embodies a set of linguistic practices deeply embedded in lived experience. These practices reflect how migrants perceived their surrounding environment and engaged in concrete forms of cross-cultural interaction. Through such subtle yet tangible linguistic materials, we gain further insight into how Hakka migrants, within the everyday contexts of Nanyang society, gradually constructed their understanding of the material world through language.

5.3 Daily Consumption and daily Life under British Colonial Rule

Next, this article approaches the analysis from the perspective of "daily life" to examine how Zheng Ke Yin Yi Yi Mu Lai You Hua represents the daily living conditions of Chinese communities within Malay society at the time. More specifically, based on the lexical content reflected in the text, the discussion proceeds through the dimensions of "daily consumption," "production and labor," and "social structure," in order to elucidate how Hakka migrants responded to their living experiences and everyday needs in Malay society through linguistic practices. By examining these aspects, the study not only reveals how language functioned as a key medium for understanding everyday life, but also demonstrates its crucial role in shaping collective experience and social cognition.

From the nineteenth century onward, large numbers of Hakka migrants moved to the Malay Peninsula and gradually became involved in local economic activities centered on tin mining. Regions such as Selangor and Perak subsequently emerged as major tin-producing areas, and the Hakka community, in turn, became one of the principal labor forces in the mining industry (Khoo, 1991). This historical background is also clearly reflected in the content of the text. A number of terms related to mining activities appear throughout the

work, such as karang (“ore-bearing sand”), basuh karang (“washing ore sand”), lampan (“hill or surface ore sand”), and karang baik (“high-quality ore sand”). These terms indicate that the compiler possessed a considerable degree of knowledge regarding the properties of tin-bearing sand, methods of processing, and distinctions in quality. Together, they not only demonstrate a nuanced classification of different types of ore sand, but also reflect a familiarity with the mining process itself. The term lampan is particularly illustrative, as it refers to an open-air hydraulic mining method that was among the most commonly used techniques in tin mining during the period (King, 1940). The appearance of this term in the text indicates that the compiler possessed a concrete and clear understanding of actual mining operations.

This evidence indicates that Hakka migrants did not engage with Malay society solely at the level of language, but actively participated in mining production and, through the process of labor, gradually shaped their understanding of minerals, technologies, and the natural environment. The prominence of such terminology in the text reflects the role played by the Hakka community within the economic structure of Malay society at the time. Through the acquisition and use of this vocabulary, Hakka migrants were able to comprehend and adapt to their modes of labor and living conditions, with language thus serving as an important medium linking economic activity and social positioning.

As large numbers of Hakka migrants became engaged in labor-intensive industries such as tin mining, their ways of life increasingly became intertwined with the economic structures of the colonial Malay Peninsula. Under British colonial rule, the opium trade emerged as one of the officially tolerated and even institutionalized, economic activities, penetrating mining areas and labor communities alike. As a result, the circulation and consumption of opium constituted an integral component of both the labor system and the broader colonial economic structure of the period (Trocki, 1990). In this context, the text also contains a range of terms related to opium, such as “Luzon tobacco” (cerut), “prepared opium”, “opium smoke” (candu), and “raw opium”. The presence of these terms indicates that opium and related smoking products had already become clearly identifiable and nameable elements of everyday life. The inclusion of such vocabulary not only reflects the widespread presence of opium in contemporary society, but also suggests that it had long been incorporated into migrants’ lived experience as one of the commodities of daily consumption.

In addition to recording commodities and economic activities related to everyday needs, the text also includes a wide range of terms referring to social identities and occupational roles, thereby reflecting the concrete workings of society at the time. In the section titled “Human Occupations” , the book lists various identities and professions commonly encountered in Malay society, such

as “British” (orang Inggeris), “French” (orang Perancis), “Keling” (orang Keling), “missionary” (tuan paderi), and “datuk” (rendered as bosatu in the text), indicating the compiler’s awareness of the ethnic, religious, and cultural diversity characteristic of colonial society. The text further records a number of titles associated with administrative structures, including “Malay ruler” (raja), “King of Siam” (Raja Siam), “land surveyor” (tuan ukur tanah), “inspector” (inspektor), as well as the Chinese community leader known as the kapitan (甲必丹). Taken together, these terms relating to official positions and occupational roles complement the earlier vocabulary concerning food, material culture, and labor, collectively sketching a social landscape marked by the coexistence of multiple ethnic groups and hierarchical strata.

When Hakka migrants relocated to the unfamiliar environment of Nanyang, bodily health became an important concern alongside the adaptation to language and livelihood. As living conditions, labor regimes, and dietary structures changed, various illnesses and physical discomforts gradually became part of everyday experience. In addition to recording everyday objects and common expressions, Zheng Ke Yin Yi Yi Mu Lai You Hua also includes a number of terms related to ailments and bodily conditions. Prolonged labor, exposure to a hot and humid climate, and changes in diet and daily routines made illness an unavoidable aspect of migrant life.Terms found in the text—such as “bleeding” (keluar darah), “weak legs” (lembut kaki), “hot feet” (kaki panas), “heart illness” or emotional distress (sakit hati), “body heat” (badan hangat), “body coldness” (badan sejuk), and “toothache” (sakit gigi)—largely revolve around bodily discomfort caused by labor, physiological responses to climatic conditions, and the interplay between emotional states and physical well-being. This suggests that, for Hakka migrants of the period, illness was not an abstract medical concept but a form of practical knowledge closely embedded in everyday life.

Through the organization and analysis of such vocabulary, we may not only understand how Hakka migrants identified and described bodily conditions in the Nanyang environment, but also gain insight into how they gradually constructed a framework of knowledge about the body and illness through language under unfamiliar natural and social circumstances.

5.4 From “Mobility”-Related Vocabulary to the Migratory Experiences of Hakka Migrants

In the domain of “mobility”, the vocabulary recorded in Zheng Ke Yin Yi Yi Mu Lai You Hua provides a concrete depiction of the everyday practices of movement and transportation among Chinese migrants on the Malay Peninsula. The means of transport documented in the text include ox carts (kereta lembu), horse-drawn carts (kereta kuda), and the so-called “Eastern carriage” (kereta

angkong), referring to the rickshaw commonly used in the modern period. The designation of the latter may be etymologically related to Hokkien terms for certain implements or hand-pushed vehicles, indicating the circulation and transformation of transport-related vocabulary across different Sinitic dialects and Malay. This, in turn, reflects the hybrid character and processes of lexical formation associated with transportation in a multilingual contact environment (Lee, 1990).

This phenomenon indicates that the linguistic environment reflected in Zheng Ke Yin Yi Yi Mu Lai You Hua was situated in a historical phase of intensive interaction between Malay and various Chinese dialects, thereby highlighting the formation and practical use of Bazaar Malay as a lingua franca. As Hokkien often functioned as a key medium of communication among Chinese communities in major port cities of Southeast Asia at the time, traces of Hokkien influence can still be clearly identified in the lexical system of this text, even though it was primarily compiled for Hakka migrants. This, in turn, reflects the sharing, diffusion, and interweaving of linguistic resources within a multi-dialect contact environment (Khin, 2021).

6.0 Textual Analysis II：Cantonese Approaches to Learning Malay

The preceding section analyzed Malay–Hakka bilingual texts, using an examination of lexical organization and pragmatic usage to reconstruct the everyday life and cultural practices of Hakka migrants in Nanyang society. Building on this discussion, the following section shifts its focus to the Cantonese versions of comparable texts. Given the high degree of similarity between the two corpora in terms of overall lexical range and organizational structure, this study does not pursue a simple parallel comparison. Instead, it concentrates on the points of lexical divergence and differential emphasis found in the Cantonese materials relative to the Hakka texts, in order to explore how Cantonese migrants, operating within the same colonial social conditions, shaped distinctive life experiences and social positions through linguistic choice and lexical configuration.

Through a comparative analysis of domains such as food, clothing, dwelling, and mobility, this section aims to demonstrate how Cantonese migrants responded to the institutional structures and everyday demands of colonial society at the linguistic level. By attending to these subtle yet consequential differences, the analysis further seeks to construct a historically grounded understanding of Cantonese migrant society at the time, thereby deepening our comprehension of ethnic differentiation, interaction patterns, and mechanisms of cultural adaptation in a multilingual colonial context.

6.1 Culinary Knowledge in a Port Society: Food Choices and the Medicinal World of Cantonese Migrants

In Malayu Yue Yin Yi Yi, compiled by Cantonese speakers, entries related to food display a high degree of similarity to the Hakka version in terms of overall structure and lexical arrangement. This consistency is likely attributable to the continued use of an established editorial template during the processes of printing and compilation, such that most lexical items correspond closely between the Cantonese and Hakka versions, even to the extent that their ordering is largely identical. Nevertheless, despite this highly standardized framework, a number of noteworthy differences can still be discerned. These differences indicate that Cantonese compilers and users of such Malay learning texts did not merely replicate an existing model wholesale, but instead incorporated, to a certain extent, their own dietary experiences in the Nanyang context. At the same time, these variations reflect distinctions in everyday food practices and material orientations among different Chinese dialect groups.

With regard to the elements shared by both texts, the Cantonese and Hakka versions alike include preserved mustard greens (sayur kering), white rice (beras putih), glutinous rice (beras pulut), sago (sagu), pork (isi babi), chicken (ayam), and coconut oil (minyak kelapa). This common set of food items indicates that these dietary elements had become relatively stable and widely shared components of everyday food consumption among Chinese migrants in Southeast Asia at the time. Such convergence not only reflects the gradual formation of a shared dietary foundation within migrant communities in a new environment, but also suggests that certain aspects of food practices transcended dialect-group boundaries and were transformed into cross-communal lived experiences. Nevertheless, a closer examination of the texts reveals that Cantonese migrants placed different emphases in their choice of foods and ingredients. These distinctions constitute a dietary profile that sets them apart from their Hakka counterparts and provide important clues for understanding how different dialect groups articulated their everyday life experiences within Southeast Asian societies.

First, in terms of the range of ingredients presented, the Cantonese text clearly includes a wider variety of food items than the Hakka version. Entries such as ham and fermented shrimp (udang jeruk) appear in the text. Among these, ham occupies a particularly important place within the Cantonese culinary system and is used in a wide range of dishes. A representative example is the classic Cantonese superior stock, whose flavor base relies heavily on the salty and umami notes provided by ham, reflecting the Cantonese emphasis on techniques of curing and fermentation (Zhao, 2023). By contrast, Hakka cuisine tends to place greater emphasis on the practicality of ingredients and

their capacity to provide sustenance. The differences in dietary structure and culinary philosophy between the two thus form a clear contrast.

Within the category of fruits and vegetables, the Cantonese text also includes several items that differ from those found in the Hakka dietary repertoire, such as betel nut (pinang) and jambu. Among these, betel nut may be regarded as one of the earlier loanwords to have entered the Chinese lexicon from the Malay linguistic sphere, with a circulation history dating back at least to the Ming–Qing period, by which time it had already become widespread in Guangdong. Historical sources indicate that during this period the customs offices of Quanzhou and Guangzhou were able to derive substantial annual revenue from the betel nut trade, demonstrating that betel nut was not merely an item of everyday consumption but also an important commercial commodity linking Southeast Asia and Guangdong. This, in turn, reflects the distinctive position it occupied within the social and economic structures of Guangdong society (Salmon, 2009). As for jambu, now commonly known as guava, its name derives from the distinctive odor emitted by the fruit when ripe. Originally native to the Americas, the species was later introduced into Asia by the Spanish and, by the Qing period, had become widely cultivated and consumed in Guangdong. It was even at times mistakenly regarded as indigenous to China, indicating that jambu had by then become highly localized within Cantonese society (Peng, 2023).

From another perspective, the Cantonese text introduces a separate category of "medicinal materials," a classification that does not appear in the Hakka version. The terms listed under this category include rhinoceros horn, star anise, pepper, cardamom, and musk, indicating the distinctive position of Guangdong within networks of medicinal knowledge and the circulation of medical resources. Since the nineteenth century, Guangzhou, as one of China's most important treaty ports, has served not only as a hub of Sino-Western trade but also as a key site for the exchange of medical knowledge. Benjamin Hobson, a British missionary of the London Missionary Society, practiced medicine and published extensively in Guangzhou. In his Xiyi Luelun, he repeatedly referred to the practical use of Chinese medicinal materials, reflecting the high capacity of Guangzhou society at the time to absorb and transform medical knowledge (Liu, 2023). Among the various entries on medicinal materials, camphor is particularly representative. In addition to its use in Chinese medicine (Liu, 2023:57), by the mid-nineteenth century, camphor was also widely used in industrial and military contexts and gradually became one of the important export commodities, with its production and circulation largely concentrated in the Guangzhou region (Chu, 2014). This context may help explain why terms related to camphor appear only in Cantonese language-learning texts and are absent from the Hakka version.

Overall, as a long-standing treaty port, Guangzhou's social environment was consistently exposed to, and actively absorbed, material goods and knowledge systems from overseas. This historical condition meant that although the overall structure of the Cantonese version of the text largely resembles that of the Hakka version, it nonetheless exhibits several regionally specific differences in content. The inclusion of foreign fruits such as pinang (betel nut) and jambu (guava), for example, reflects Guangdong's earlier and deeper integration into Southeast Asian networks of commodity circulation. Moreover, with the arrival of missionaries and Western medical knowledge, related medicinal materials and commercial products gradually became part of everyday knowledge in Cantonese society, prompting the text to introduce a distinct category of "medicinal materials." This phenomenon demonstrates that geographical position and historical experience of trade not only shaped material culture but also influenced the classification and presentation of knowledge in language-learning texts, thereby enabling Cantonese communities in Southeast Asian societies to articulate cultural understandings and interpretive frameworks distinct from those of Hakka groups.

6.2 Dress and bodily adornment in the Cantonese text

In Malayu Yue Yin Yi Yi, terms related to dress and bodily adornment, although less extensive in overall coverage than those concerning food or everyday necessities, nonetheless provide an important entry point for understanding how Cantonese migrants shaped socially recognizable and intelligible positions through practices of clothing and bodily decoration in Malay societies. In comparison with the Hakka version, the Cantonese text presents a more fine-grained classification at the level of "clothing," most notably through the establishment of a separate category for "ornaments," revealing differences between the two traditions in both the degree of attention paid to dress and bodily adornment and their respective classificatory approaches.

Under the category of "clothing," the text primarily records practical garments such as skirts (sarung), shirts (baju), and cloth (kain), with a clear emphasis on items used in daily life. The category of "colors," by contrast, lists only basic color terms, such as red, black, blue, and white—indicating a functional focus on basic identification and practical needs, and thus reflecting the everyday requirements of Cantonese migrants. The most striking difference in the Cantonese text, however, lies in the establishment of a distinct category titled "ornaments." This category is absent from the Hakka version but is treated as an independent and substantial section in Malayu Yue Yin Yi Yi. Its contents are wide-ranging, encompassing pearls, silverware, crystal, gemstones, as well as bodily accessories such as earrings (subang) and necklaces (rantai). In addition, the text includes small, daily items such as toothpicks and needle tips, indicating that the scope of the "ornaments" category is not limited to

expensive or luxurious objects but instead encompasses a broad range of personal accessories and bodily adornments used in daily life.

The appearance of this category suggests that Cantonese compilers did not conceptualize "clothing" solely in terms of garments themselves, but rather incorporated a broader set of related objects associated with wearing and bodily presentation that were practically employed in everyday contexts. Such items were often closely tied to gender, social status, occasions of use, and interpersonal interaction, and were therefore more likely to be mentioned, requested, or discussed in daily encounters, making them objects that required clear naming and systematic learning. This phenomenon not only points to the relative complexity and diversity of material life in Cantonese society, but also reflects the visibility and practical significance of items associated with women in everyday practices, which in turn justified their inclusion in language-learning texts. By contrast, the absence of a comparable "ornaments" category in the Hakka text may be understood in light of a migratory experience and lifestyle more heavily oriented toward labor, subsistence, and basic living needs, rendering more decorative or symbolic objects less central to the linguistic concerns of Hakka communities at the time.

Overall, through categories such as "clothing," "colors," and "ornaments," the Cantonese Malay–Chinese bilingual text presents a mode of daily life understanding centered on the body and outward appearance. This demonstrates that language not only serves to denote objects, but also reflects the ways in which Cantonese migrants in Malay societies constructed material life and popular culture through everyday practices.

6.3 Daily circulation of Commodity Circulation, Material Use, and Social Roles

In the following discussion, this article approaches the issue from the level of everyday life, arguing that the vocabulary presented in the text is closely tied to the daily experiences of migrants at the time and can be read as an important set of clues for understanding the lived environments encountered by Cantonese migrants after entering Malay society. By examining these lexical items, it becomes possible to further illustrate how Cantonese migrants, through language learning, acquired the basic knowledge necessary to sustain everyday activities in Southeast Asian society and gradually constructed their understanding of the local lifeworld.

To begin with, within the category of "commodities," the text includes a range of terms related to trade, processing, and raw materials—such as dried oyster, fennel, rattan, and vine materials, reflecting a clear concern with commodity circulation and sources of material goods. Among these commodity-related terms, those most distinctive of the Cantonese context are canned tobacco and tortoiseshell (hawksbill turtle). Tobacco-related vocabulary is particularly

noteworthy, as the forms in which tobacco appears in the Cantonese text differ markedly from those found in the Hakka version. Tobacco has long maintained a close association with Chinese capital, a connection that was particularly pronounced in Southeast Asia. As early as the beginning of the twentieth century, Nanyang tobacco enterprises were already competing with British and American tobacco companies, and several of the most prominent Nanyang tobacco firms were themselves founded by Cantonese entrepreneurs. This underscores the deep and sustained ties between Cantonese communities and the tobacco industry. Prior to 1909, the development of Nanyang tobacco was primarily centered on Guangzhou, Hong Kong, and Shanghai; after 1909, however, its sales networks and marketing channels gradually expanded into Southeast Asia, with particular emphasis on Singapore and Siam (Chong, 2019). This trajectory of development indicates that tobacco had long been a highly familiar commodity for Cantonese communities, and this familiarity likewise extended to Cantonese migrants who later moved into the Malayan region.

If tobacco reflects the Cantonese community's long-term engagement with modern light industry and consumer markets, then hawksbill turtle shell (hawksbill turtle) points to a different commodity world—one closely tied to marine resources, artisanal production, and the circulation of luxury goods. According to historical records, as early as the Han dynasty, Chinese merchants from the Guangdong region were already involved in the trade of hawksbill turtle shell (Chu, 2015). By the Ming dynasty, within the tributary trade system, the term "hawksbill turtle shell" (daimao) was already included in both the Ryukyu Interpreter Vocabulary (Liuqiu guan yiyu) and the Japanese Interpreter Vocabulary (Riben guan yiyu). So-called yiyu ("interpreter vocabularies") were bilingual or multilingual glossaries officially compiled for the purposes of managing foreign relations, trade, and tributary affairs; the items they recorded were typically those that appeared frequently in actual diplomatic and commercial exchanges and that possessed institutional significance. The inclusion of hawksbill turtle shell in such yiyu texts thus reflects its important position within China's external trade and commodity exchange system at the time(Lin, 2019).

In other respects, a comparison with the Hakka version further reveals that although certain items in the two texts refer to similar objects, the actual entries included differ in emphasis. For example, the Cantonese text records dried oyster (haogu), whereas the Hakka version primarily lists oyster sauce (guyou). Both are related to the processing of marine products, yet one foregrounds the dried commodity itself while the other highlights its derivative processed product. This contrast reflects differences in everyday usage and trading practices among distinct dialect groups. Such variations suggest that even when confronted with similar natural resources, different communities may develop divergent systems of classification and naming based on their

practical modes of use and everyday needs, thereby shaping distinct material understandings within the lived contexts of the Malay Peninsula.

Overall, in its treatment of the "life" domain, Malayu Yue Yin Yi Yi organizes knowledge through categories such as goods, implements, and human occupations, forming a knowledge structure closely aligned with everyday practice. These lexical items not only respond to the concrete needs of migrants in Southeast Asian society, but also demonstrate that language learning here was not an abstract exercise. Rather, it functioned as a practical tool that enabled individuals to comprehend, navigate, and gradually integrate into their surrounding environment. Through such vocabulary closely tied to daily life, Cantonese migrants were able to progressively construct a basic understanding of the material environment and social relations of Malay society.

6.4 Movement: Linguistic Practices from Transoceanic Mobility to Spatial Positioning

In Malayu Yue Yin Yi Yi, the category of movement does not refer merely to physical motion. Rather, it constitutes a composite domain encompassing transoceanic navigation, settlement upon arrival, and the comprehension of spatial order. Relevant vocabulary is primarily distributed across categories such as "shipboard implements," "housing," and "building materials," together forming a coherent trajectory that traces the Cantonese migrant experience from departure, to arrival in Southeast Asia, and onward to the gradual entry into and understanding of local social space. Through the way these lexical items are arranged within the text, we can observe how Cantonese migrants, in the process of language learning, progressively constructed their cognitive maps of Southeast Asian space and situated themselves within it.

First, within the category of "Shipboard Implements," the text records a number of terms directly related to maritime activities, such as huochuan (kapal api, steamship), Tang ships (Chinese junks), and rudder (kemudi), indicating that Cantonese migrants possessed practical experience of seafaring in their daily lives. In particular, the juxtaposition of Tang ships and steamships reflects the coexistence of different maritime technologies within the Chinese migrant experience, and further reveals the interweaving of old and new technologies in the maritime environment of Southeast Asia from the late nineteenth to the early twentieth century. The so-called Tang ship refers to a Chinese-style sailing vessel, long used as a merchant ship for transporting goods and commodities, and serving as a key vehicle for Chinese transoceanic mobility and regional trade. In the early period, the Dutch East India Company (VOC) conducted trade voyages between Nagasaki and Batavia (present-day Jakarta) via Chinese junks, making these vessels an important ship type linking East Asian and Southeast Asian trading networks, and facilitating the

expansion of Chinese commercial activities throughout the Nanyang region (Cheng, 2018). The term huochuan (fire ship), meanwhile, reflects the process through which modern maritime technologies entered the Chinese lexical system and were gradually understood and assimilated. Research indicates that terms such as huochuan and huolunchuan (fire wheel ship) first appeared around 1838 and were primarily used to denote steamships. For late Qing society, the significance of such naming lay not merely in identifying a previously unknown object, but in the effort to incorporate it into an existing Chinese framework of expression and cognition. The designation huolunchuan was derived from the visual resemblance of steamships to traditional Chinese paddle-wheel vessels, while the term huochuan had already appeared in historical records prior to Sino-Western military conflicts and was subsequently extended to encompass the concept of the steamship. As understanding of Western maritime technology deepened, people gradually came to recognize that the propulsion of these vessels did not originate from "fire" itself, but from steam power. Correspondingly, the terminology evolved, revealing the dynamic interaction between linguistic change and technological knowledge in the process of intellectual adaptation (Lin, 2015).

From this perspective, the category of "shipboard equipment" does not merely present the names of means of transport, but rather constitutes a coherent body of knowledge concerning cross-sea mobility. For Cantonese migrants, maritime travel represented the crucial first step in "entering the Nanyang," and the risks, technologies, and bodily experiences involved in this process therefore needed to be clearly named and incorporated into language learning. This, in turn, reflects how migrants conceptualized and systematically constructed knowledge about transoceanic movement.

Among the spatially related vocabulary, the inclusion of printing house (yinziguan) in the category of "building materials" is particularly noteworthy. This term indicates that Cantonese migrants were no longer concerned solely with spaces of residence and movement, but were increasingly encountering new types of sites associated with knowledge production and the circulation of written texts. From the nineteenth century onward, as Western missionaries entered treaty ports such as Guangzhou, modern printing technologies were introduced into China. Printing houses thus became key sites for the production of religious texts, translated works, and new forms of knowledge (Wang, 2007).

In sum, the appearance of "printing house" in Cantonese language-learning texts is not incidental; rather, it indicates that spaces tied to textual production and knowledge circulation had entered the lived world of Cantonese migrants as recognizable and practically meaningful sites.

7.0 Conclusion

This article compares two Malay-language learning texts produced by migrants from different Chinese dialect groups—Zheng Ke Yin Yi Mu Lai You Hua and Malayu Yue Yin Yi—to argue that language textbooks should not be understood merely as passive by-products of migrants' adaptation to local society. Rather, they functioned as crucial gateways of knowledge through which migrants came to understand unfamiliar environments, enter the Nanyang world, and gradually learn how to act and live within it. Through close analysis of lexical choices, classificatory structures, and everyday thematic domains, this study demonstrates that even within the shared context of colonial Malaya, different dialect groups constructed distinct systems of linguistic knowledge. These differences did not arise simply from linguistic structures themselves, but were deeply rooted in migrants' respective social positions, economic networks, and everyday material experiences.

In contrast to the Hakka version, whose knowledge configuration centers on labor, subsistence, and bodily experience, the Cantonese text Malayu Yue Yin Yi displays a markedly stronger port-city and commercial orientation. As a long-standing hub of both domestic and international trade, Guangzhou had earlier and more frequent exposure to overseas commodities, technologies, and forms of knowledge. These historical experiences were directly sedimented in the structure and content of the language-learning text. Whether in its detailed recording of medicinal materials, ornaments, and commodity circulation, or in its clear classification of maritime transport and public spaces, the Cantonese text presents a framework of everyday understanding closely aligned with interregional trade, commercial exchange, and the circulation of knowledge.

Crucially, these differences do not remain at the level of abstract knowledge, but are concretely embedded in ways of perceiving, understanding, and naming the material world. The Cantonese text's emphasis on medicinal substances, rare commodities, and decorative goods reflects the lived experience of Cantonese migrants long embedded in commercial and trading networks. It also reveals that language here was not merely a tool for referring to objects, but a practical means of organizing experience, classifying the world, and engaging with newly encountered systems of knowledge.

This article therefore argues that such language-learning texts should be treated as key sources for understanding migrants' processes of knowledge construction. Through acts of naming and classification, these texts preserved not only linguistic equivalences, but also the pathways through which migrants understood society, positioned themselves within it, and made sense of their surroundings. The differences between the Cantonese and Hakka texts illuminate how migrants' economic roles and commercial positions in colonial Malaya profoundly shaped their perceptions of the material environment and their sense of social location.

In sum, Malay-language learning texts compiled by different dialect groups were closely intertwined with the economic activities and everyday lives of their users. This relationship directly permeated the internal structure of the texts, making language a vital medium through which we can re-enter historical societies and examine how knowledge was generated. By closely reading these seemingly modest booklets, we gain a more intimate view of how overseas Chinese migrants learned their way into the unfamiliar world of the Nanyang through language, and how, through lived experience, they developed distinct systems of linguistic knowledge and world-making. This perspective not only deepens our understanding of internal diversity within Chinese communities in colonial Malaya, but also offers a promising avenue for future research at the intersection of language, material culture, and migration history.

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潮汕移民家书（侨批）与口述历史的文化记忆：以马来西亚槟城张氏家族为考察物件

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摘要

本文以马来西亚槟城大山脚张氏家族为个案，结合家族侨批、移民家书与口述历史数据，探讨潮州移民在跨国流动过程中如何透过书信书写、亲属网络与信仰实践，持续建构其文化记忆与身份认同。不同于既有研究多以中国侨乡为中心、强调“出洋”经验，本文尝试从马来西亚在地社会语境出发，重新理解侨批在侨居地的生命历程及其文化意义。在跨地域、跨世代的往返过程中，侨批成为连接原乡与异乡的重要媒介，使离散家族得以在时空断裂中维系历史连续性。透过张氏家族的个案分析，本文进一步指出，祖先崇拜、民间信仰与丧葬风俗并非单纯的宗教或习俗实践，而是移民群体响应离散处境、寻求精神安顿的重要文化机制。本文主张将侨批研究与口述历史相结合，使“文献记忆”与“人的记忆”相互对话，补足宏观移民史难以呈现的情感经验与伦理实践。本文认为，侨批应被视为马来西亚历史与文化地景的一部分，其研究有助于深化对华人跨域迁移、文化记忆与身份生成之复杂性的理解，并为侨批研究提供一种立足华侨华人研究的在地化视角。

关键词：潮州移民、侨批、移民家书、口述历史、马来西亚

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Cultural Memory of Chaoshan Migrant Letters (Qiaopi) and Oral History: A Case Study of the Teo's Family in Penang, Malaysia

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Abstract

Taking the Teo's family in Bukit Mertajam, Penang, Malaysia, as a case study, this paper integrates family Qiaopi (remittance letters), migration correspondence, and oral history data to explore how Teochew migrants constructed their cultural memory and identity through letter writing, kinship networks, and religious practices during the process of transnational mobility. Distinguishing itself from existing China-centric studies that primarily emphasise the "emigration" experience, this research attempts to re-examine the life course and cultural significance of Qiaopi from the localised social context of Malaysia. Through transregional and intergenerational exchanges, Qiaopi became a vital medium bridging the ancestral home and the host land, enabling diasporic families to maintain historical continuity amidst temporal and spatial ruptures. Based on an analysing of the Teo family, the paper further argues that ancestor worship, folk beliefs, and funeral customs are not merely religious or traditional practices, but essential cultural mechanisms through which migrant groups respond to their diasporic conditions and seek spiritual solace. This paper advocates for the integration of Qiaopi studies with oral history, facilitating a dialogue between "documentary memory" and "human memory", thereby capturing the emotional experiences and ethical practices often overlooked in macro-migration histories. Ultimately, this research contends that Qiaopi should be recognised as an integral part of the Malaysian historical and cultural landscape. This study deepens the understanding of the complexities of transnational migration, cultural memory, and identity formation, whilst offering a localised perspective for the field of Chinese Overseas studies.

Keywords： Teochew Migrants, Qiaopi, Migration Correspondence, Oral History, Malaysia

一、引言

在马来西亚的历史与社会脉络中，华人移民并非仅是一段跨越海洋的流动史，更是一种深层而持续生成的文化经验。自十九世纪中叶起，潮汕地区因战乱频仍、民生困顿，加之西方殖民势力扩张所带动的全球资本与劳动力流动，大批潮州人被迫或主动离开原乡，南渡东南亚，开启了所谓“过番”与“下南洋”的世纪迁徙。颜清湟（2010）指出，此一移民过程大致可区分为两种类型：其一为以宗族、地缘为纽带的“亲属移民”（kinship migration），其二则是因受雇、负债或被中介贩运而来的“契约劳工移民”（credit-ticket migration），即俗称的“苦力”或“卖猪仔”（颜清湟 2010：23–24）。这些移民的足迹由暹罗延伸至新加坡与马来亚群岛各地，逐渐形成出以潮州话、宗族组织与宗教信仰为核心的跨地域社群网络。然而，若从迁移与定居的宏观叙述，转向移民日常生活与情感结构的层次观察，最能具体折射潮州人移民经验的，并非抽象而庞杂的经济体系，而是那一封封跨越山海、往返于原乡与侨居地之间的侨批书信。相较于统计数字或官方档案，侨批以其高度私人化的书写形式，真实保存了移民主体在异地谋生过程中，与原乡家庭之间所承受的伦理责任、亲属关系与情感张力，因而成为理解潮州人移民精神世界的重要文本类型。

《马来亚潮侨通鉴》曾就潮州人南来路径作出概括性描述：“潮侨出洋，初至暹罗，于暹罗创有丰功伟绩，拥有极大势力，人数最众，故暹罗遂成潮州人之第二故乡。由此分散南下，有至苏岛之旧港（后移占碑）及廖内各小岛，有至马来亚之新加坡及柔佛”（潘醒农，1950）。此一记载不仅勾勒出潮州人由泰国向马来群岛扩散的空间轨迹，也揭示其移民网络乃由商业活动与亲缘关系交织而成的流动结构。潘醒农进一步指出，潮侨在异乡立足之后，“常将血汗所得，按月寄回赡养家人，因此潮汕之入超赖以挹注”（潘醒农，1950）。这一论述清楚显示，侨批并非单纯承担经济汇兑的功能，而是深度嵌入家庭伦理与情感责任之中。对移民个体而言，定期汇款既是履行孝道与家庭义务的实践，也是维系自我身份与原乡归属感的重要方式；而随侨汇附寄的家书文字，则进一步将金钱交换转化为情感叙述与道德承诺，使“家书抵万金”成为特定历史条件下的“产物”。

从文化记忆的视角来看，侨批正是一种介于私人书写与社会制度之间的记忆媒介（medium of memory）。它透过原乡与异乡往来的反复书写、寄送与保存，将个体经验转化为可被家庭乃至族群的集体记忆，使离散状态下的家族得以在时间与空间的断裂之中，持续建构其历史的延续性。正因侨批兼具文本、制度与情感记忆的多重属性，其史料价值早已超越单纯的经济史或移民史范畴，而成为理解华人跨域流动与文化认同建构的重要关键。基于上述意义，侨批档案遂于 2013 年 6 月经广东、福建省档案局

联合申报，成功入选联合国教科文组织《世界记忆名录》（International Memory of the World Register）[4]，被视为人类共同的文化记忆（cultural memory）与重要历史遗产。就历史现实而言，马来西亚与潮汕侨乡原存侨批数量本应极为可观，但由于年代久远、战乱频仍，加之家庭保存条件有限等多重因素，大量文献已然散佚，现今得以留存者尤显稀少。正是在这“残存文献”的条件之下，透过对家族侨批文献的细致整理，并结合口述记忆加以阐释，方能补足宏观叙述所难以触及的移民经验与情感层面。

从文书性质而言，侨批（亦称“番批”）[5]兼具经济与文化的双重属性，长期以来被视为跨国移民社会中最具代表性的民间文书类型。在形式上与汇款制度相结合的实用凭据，但在文化意义上，则更可被理解为传统家书在跨国迁移条件下的延续实践，承载着移民主体对于家庭伦理、情感关系与身份认同的书写。因此，侨批并非单一功能的经济文本，而是一种深度嵌入移民日常生活的书信文化。若依中国地域来源加以区分，侨批大致可分为“闽南侨批”、“潮汕侨批”、“梅州侨批”等类型，其中以潮汕与闽南侨批的留存数量最为可观，因其流布范围广、数量庞大且内容丰富，长期以来成为华侨研究的重要材料。自 2007 年至 2020 年间，由潮汕历史文化研究中心与广西师范大学出版社合作编纂的《潮汕侨批集成》，历经 13 年整理，累计出版 4 辑、共 139 册，收录侨批文献逾 12 万件，奠定了相关研究的重要史料基础。然而，现有研究仍以中国视角的“出洋经验”为叙述重心，较少以“侨居地”社会为出发点，尤其多元族群并存的马来西亚情境中考察侨批如何在当地社会被理解与保存。

本文正是在此研究脉络中尝试转换观察视角，将侨批置于马来西亚的在地社会语境加以重新理解。对马来西亚潮州人而言，侨批不仅是寄往原乡的通信工具，更是一种在异乡安身立命过程中不断被赋予意义的文化象征。其所承载的既包括跨洋的亲情维系与经济往返，也折射出移民群体如何在殖民体制与资本结构之中寻找生存位置，并在多元族群共处的社会环境里，持续重构对“家”、“国”与“身份”的认知。社会人类学者拉波特（Nigel Rapport）指出：“流亡、移居、放逐、劳力移动、观光、都市化与逆都市化（counter-urbanization）都是现代文化的基调，而失根（being rootless）、徘徊于不同世界之间（displaced between worlds）、生活于失落的过去与流动的当下，或许是现代居旅意识（the journeying，modern consciousness）最相称的比喻”（拉波特，1998）。此一论述不仅揭示现代移民社会的普遍

[4] UNESCO, Qiaopi and Yinxin: Correspondence and Remittance Documents from Overseas Chinese. Accessed June 2013,https://www.unesco.org/en/memory-world/qiaopi-and-yinxin-correspondence-and-remittance-documents-overseas-chinese（2025 年 1 月 30 日查询）。

[5] 侨批的“批”字在闽南方言里不与“信”同音，也不是“信”的俗称，其功能不仅仅是汇款单，是一种“银信合封”的特殊信件。在信中也会批明银款的分配情况；“回批”是侨眷给侨子的回信答复，这种特殊的书信格式正式“批”批示义的体现（林丹、陈凡凡 2018：31）。

处境，也深刻契合马来西亚潮州人长期游移于原乡与侨居地之间的状态。他们所形成的，并非截然断裂的离散经验，亦非完全融入的同化过程，而是一种介于两者之间、持续协商与调整的“流动性”。侨批书信的文字书写，正是这种跨地域、跨情感状态的档案，其内容既记录现实生活的艰辛与期盼，也折射身份认同在流动过程中的生成。

基于此，本文认为侨批研究若欲超越文献整理与制度分析的层次，势必需纳入口述历史的研究方法，透过寄件人、收件人或其后代的口述记忆，不仅得以补充文本中未明言的生活情境与情感经验，更能使“文献记忆”与“人的记忆”相互交织，从而建构更具人文厚度的移民叙事。近年来，中国学界已逐步展开相关尝试，如广东与梅州地区推动的“寻访侨批银信后人”活动与“侨批口述史计划”，显示侨批研究正由文献中心逐渐转向记忆与主体经验层面（李建伟，2019）。相较之下，马来西亚有关侨批的研究，仍多停留于表面，对于侨批作为文化遗产与身份叙事资源的潜在意义，尚待进一步开拓。因此，本文以马来西亚潮阳张氏家族所保存之侨批文献为研究核心，结合其家族书信与后代口述资料，探讨潮州人家族如何在跨国流动过程中维系亲属网络、重构家族认同，并透过书信书写延展其文化记忆。本文尝试从马来西亚的在地立场出发，回应拉波特所提出的“居旅意识”问题，重新思考侨批作为一种兼具“在地性”与“跨地域性”的文化文本，所折射出的华侨经验、情感伦理与身份生成的复杂面向。换言之，本文不再将侨批视为中国南方社会的延伸史料，而是将其纳入马来西亚历史与文化地景之中，借此以“从南洋观看中国”的视角，建构立足在地的侨批研究论述。

二、从中国到南洋的跨域：张氏家族的移民个案

本文以槟城大山脚（Bukit Mertajam）张氏家族为个案，探讨潮汕移民在马来西亚的定居经验及其侨批往来的文化意义。研究资料主要取自2020 年 1 月至 2024 年 4 月间所进行的 8 次口述访谈，以及张氏家族尚存的 14 件移民家书（其中 13 件为回批，1 件为未寄出信件）。透过对槟城大山脚及中国广东潮阳谷饶镇张氏家族后代的采访，结合其家族侨批，将口述资料与侨批文献结合起来，从而探究其家族移民至马来亚的历史背景和中国保持密切联系的侨批，其中所扮演的重要功能。

本研究以“在地化的侨批史”为出发点，意在突破过去以中国为中心的侨批研究视野。过去的侨批研究多着眼于中国侨乡的经济与社会史层面，而较少关注这些书信在南洋落地后的意义与生命历程。本文通过张氏家族的个案，呈现马来西亚潮州人群体如何在移居的过程中重新定义“家”的边界，使侨批成为横跨中国与马来西亚的精神与文化通道。首先，本文以马来西亚张氏家族成员的整体概况作为梳理，具体考察其家族移民的具体过程和背景。

（一）张氏家族近代移民之背景

现居马来西亚槟城大山脚阿儿玛（Alma）的张氏家族，其祖籍为广东省汕头市潮阳区谷饶镇。谷饶旧称“赤寮”，至清代因农业兴盛改名“谷饶”，寓意“五谷丰登”。据汕头市潮阳区统计局之普查（2021），2020 年谷饶镇总人口约 20 万人，其中海外华侨华人逾 10 万，堪称潮阳最具代表性的侨乡之一。潮阳移民遍布东南亚，尤以暹罗、印度尼西亚与马来西亚为主要落脚地。根据现有资料统计，马来（西）亚潮籍人口自 1911 年的 97207 人至 1947 年已增至 364188 人，足见潮州人移民的规模与影响力，为便于理解与阅览，本文统整如下表：

表1：1911至1947年马来亚潮籍华侨分布区域

马来亚各区	年份/人数		
	1911年	1931年	1947年
新加坡 Singapore	37,567	82,405	157,188
槟　　城 Penang	16,428	27,813	48,901
马六甲 Malacca	1,961	3,687	7,208
霹　　雳 Perak	14,488	20,167	33,091
雪兰莪 Selangor	5,206	10,464	21,198
森美兰 Negeri Sembilan	1,247	1,762	2,518
彭　　亨 Pahang	949	1,754	2,770
柔　　佛 Johor	19,355	35,935	54,539
吉　　打 Kedah	不详	23,045	33,319
吉兰丹 Kelantan	不详	不详	660
登嘉楼 Terengganu	不详	不详	800
玻璃市 Perlis	不详	不详	1996
总计（人）	97,201	207,032	364,188

数据来源：

（1） 引自《华侨汇编·马来半岛之劳动者》（页4-6），何海鸣纂辑，1922，北京：侨务旬刊社。

（2） 引自《马来亚潮侨通鉴》（页37-38），潘醒农，1950，新加坡：南岛出版社。

（3） 引自《马来亚华侨志》（页111-113），华侨志编筹委员会编，1959台北：华侨志编筹委员会。

（4） S.C. CHUA (1964). *Report on the Census of Population 1957* (pp. 68). State of Singapore: Government Printer.

从上表可见，潮州人移居马来亚的分布以新加坡、柔佛、槟城、霹雳、吉打为主，其中北马槟城与威省地区虽人数较南部为少，却形成了以宗族血缘为核心的紧密社区。本文研究的张氏家族，即是槟城威省大山脚地区早期潮籍移民家庭之一。

张氏家族的移民历程可追溯至 20 世纪初。根据受访者张金友及其妹张月碹的口述回忆，其祖父张亚耀（1909-1959）出生于广东潮阳谷饶乡，因家境清寒，青年时期即离乡南渡南洋谋生。其实际过番年份已难以确考，惟综合家族记忆与时代背景推测，约在 1930 年前后。张亚耀抵达马来亚后，落脚于槟城大山脚一带，从事橡胶割采与椰林管理等劳动工作，逐步建立家庭生计的基础。

其后，张亚耀迎娶廖氏亚兰（1925-1991），婚后共育有 6 子 4 女，家族后裔迄今已历五代。值得注意的是，传统族谱或世系图往往以男性为核心书写单位，女性成员多半仅以“某氏”略过，甚至完全缺席；然而，透过口述历史的方式，女性在家族生活中的位置与角色，方得以重新被看见。因此，本文在整理张氏家族世系时，特别保留所知的女性成员的姓名与排行，以回应此一书写上的长期缺漏。依出生序列而论，张亚耀之子女依序为：长子张合顺、二子张合葵、三子张合坤、四子张合平、五子张合财、六子张合胜；女儿则为长女张合娇、二女张合云、三女张合端，以及幼女张合莲。据家族口述，张亚耀早年于原乡已生有长子张合顺，后因生计考虑，将其留在家乡由父母抚养，随后携妻南来马来亚谋生，其余子女皆出生并成长于马来亚，呈现出典型跨世代移民的家庭结构。

张合葵（1926-2009）为张亚耀之第二子，亦为本文主要讨论之家族支系核心人物之一。其与陈氏林枝（1928-2018）婚后共育有 6 子 5 女，分别为：长子心贤、二子胜明、三子金福、四子金海、五子金友、六子金成；女儿则为长女月香、二女玉珍、三女月珠、四女月碹、五女月美。其后代子孙人数已达 30 余人，家族网络随之向外延展。在此世系之中，女性成员不仅是婚姻与血缘关系中的“附属角色”，更在家务劳动、情感维系、跨世代记忆传递等层面，实质参与家族的日常运作。尤其在移民家庭的情境下，女性往往同时承担照顾者、劳动者与文化中介者的角色，其经验对理解家族如何在异地生根、延续与转化，具有不可或缺的意义。下图即依据受访者所提供之资料，整理而成之张氏家族世系表。

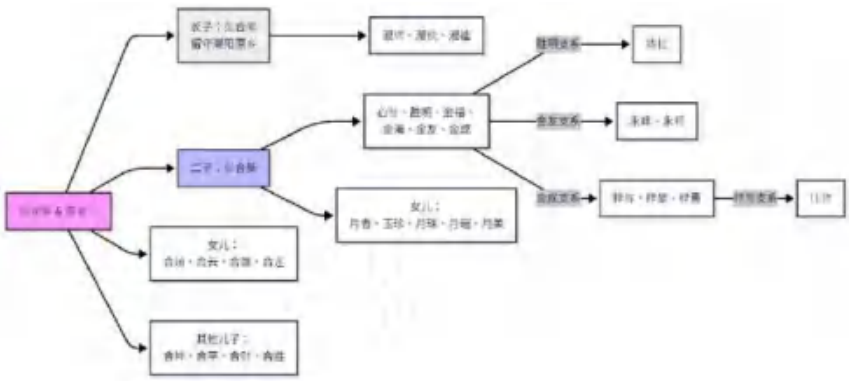

图 1：张氏家族五代世系图

张氏家族的家族网络延续至今，虽地缘分散，但节庆往来频繁，显示传统宗族情感的延续。受访者张金友表示，其祖父早逝，未曾谋面；长兄张合顺留居中国，家族书信成为双方唯一的精神连结（张金友：2020）。此一跨国通信关系，正是潮州人移民经验中最具代表性的情感纽带。

（二）张氏家族的侨批记忆与经验

受访者张月碹回忆，其祖父初到马来亚时经济拮据，目不识丁，无法亲自书写家书，遂托请识字者代笔。随着经济状况改善，他逐渐通过批局寄信与家乡保持联络。张氏家族的侨批往来，正体现出潮侨在异地维系亲缘的深层文化逻辑。张月碹回忆：“我们家都是拜托熟识的亲友若有回乡，就会请光生伯、流沙伯（友人）帮忙带信带钱，这样比较安心。”（张月碹：2020）早期侨批多依赖“水客”[6]携带，需配合船期，往返时间往往长达数月。随着批局制度普及，[7]寄信对象除家书与汇款外，亦包含生活用品，如米粮、衣物、药材等。

《南洋商报》1932 年 7 月 23 日报道曾记述当时的“写批摊”现象：

> 因中国工人，未受教育，甚少识字，然或只身南渡谋生，每月恒须寄信付款，以养育家乡之妻子家人。奈因己不识字，当然不能自写家信，端赖人代为书写，故写批摊乃应运而生。考本坡之有写批摊，由来已久，据此种职业者，大约为受环境支配略识文字之华人。因南渡后，欲就商场，乏人介绍，欲徒劳工，奈气力不足，只好排设小摊，于市区之中心，或在大小坡各信局之附

[6] 所谓“水客”，是经常乘船往来于唐山和东南亚，一方面带货贸易，另一方面帮忙带款以赚取利润者，这种带款方式，难免存在着钱款被挪用、拖欠的风险（陈春声 2021：280）。

[7] “福建广东一带之民局，多兼营或专营往来国外华侨之信件与汇款，又名批局，或称批馆。潮州区之批局尤盛，按其营业实际与民信局似同而实异，盖潮州批局乃不带普通信件，惟专为华侨汇寄银信者也。”（饶宗颐 1965：797-798）。

> 近，以应欲寄信，而为不识字之劳工代笔。（《南洋商报》1932 年 7 月 23 日）

此种“写批先生”的存在，反映了侨批不仅是金融与通信的媒介，更是民间文化传播与识字实践的重要场域。正如陈春声所指出：“从现存批信的情况看，有许多信件都是别人代笔的，但是东南亚各地都有专门的代笔写批者，也有少数批局的信笺已经印好程序化的问候语句，只留下汇款的金额让寄批者填写”（陈春声，2021），这一制度化的情感书写，构成早期南洋潮州人社会独特的文字文化。

张氏家族的书信往来在 1940 年代一度中断。其一因二战期间潮汕与马来亚相继沦陷，邮路被日军控制，侨汇遭掠夺；其二则因战后国共内战，政治动荡再度阻断通信。直至 1950 年代末，马中联系方才逐渐恢复。张合葵（1926-2009）凭厨艺谋生，为家计奔波之余，仍坚持以书信维系与兄长张合顺的往来。受访者回忆：“父亲写得一手好字，凡家中大小事皆亲自执笔，不愿假他人之手。”（张金友，2022）这种执笔的坚持，既是文书行为，也是情感的仪式。侨批往来在 1990 年代后逐渐式微。随着邮政与银行体系的完善，“银信合一”的功能被现代汇款制度取代，再加上张氏家族成员陆续取得马来西亚国籍，与中国家乡的联系随之淡化。由此可见，侨批制度消逝的背后，实则映照出“华侨”身份在去殖民化进程中的转变，从“离散者”走向“在地公民”，侨批的社会功能亦由“寄家书”转化为“记忆”。

然而，张氏家族仍保存少量 90 年代信件，成为今日研究的珍贵线索。受访者提到，早期信件多于 1969 年的“五一三事件”中遗失或焚毁。该事件为马来西亚史上极为敏感的族群冲突，许多华人家庭因战乱失去财物与文件。按受访者的口述得知的五一三事件（13 May Incident）乃马来西亚于 1969 年 5 月 13 日爆发的一场种族冲突事件。马来西亚联邦政府官方解释此事件主要是马来人和华人的种族冲突，原因是在当时两族的政治、经济能力差异甚大，故而引发冲突。然而，大部分华人认为此事件实际上是马来人针对华人所展开的屠杀行为。这次的种族冲突导致许多人受伤甚至死亡，家破人亡者，受牵连者不计其数，其中以华人占多数。此乃马来西亚历史中的敏感词汇与历史的空白，更是马来西亚的政治禁忌。

本文在尊重受访者隐私的前提下，不详述事件经过，但此段口述材料揭示国家暴力与族群创伤，亦深刻影响了私人记忆的留存与消逝。换言之，侨批的遗失不仅是物质层面的缺席，更是一种历史记忆被抹除的隐喻。从张氏家族的个案可见，潮汕移民的跨域史并非单向的“出洋”叙事，而是一种延宕百年的往返运动。侨批既为寄汇的工具，更是跨国亲情与文化认同的象征。透过侨批与口述记忆的结合，我们得以窥见马来西亚潮州人如何在移居之中重新界定“家”的意义，使“过番”的历史不再只是中国侨乡的延

伸叙述，而成为马来西亚社会文化史中不可或缺的章节。

三、从文本到文化的记忆：张氏家族的侨批与移民家书

文字语言是人类自我表达与认知能力的产物，而书写则是记忆得以物化、留存的媒介。因此，语言表达是透过形式的介入才成为“文本”，即文本是符号状态的语言。当人类的文化有了跨越时间回望过去的视野，几千年的回忆空间得以展现——过去仍存于现在——而文字正是其中的关键（扬·阿斯曼，2012）。侨批作为文字载体，不仅保存了跨洋通信的生活痕迹，更蕴含移民家族的情感记忆与文化价值。它的意义不仅在于经济或亲情的往返，更在于透过书信的文字书写，形成由个人记忆延展至家庭记忆、再至集体文化记忆的精神脉络。

（一）语词与记忆：从“批”到“信”的转化

关于“潮汕侨批”一词的源流，学界尚无一致说法。有学者认为“批”在潮语中有“成批”之意；亦有学者主张“批”与“信”同义。陈春声则指出，若无汇款功能者，严格而言应称为“信”而非“批”，惟在民间语境中，二者往往混称为“批信”（陈春声，2021:）。本文采其观点，将张氏家族 1990 年代后之书信统称为“移民家书”，而早期真正具“侨批”性质者，因战乱与社会变动多已焚毁。受访者张月碹回忆，多数侨批内容多为报平安、问候家人、婚嫁消息与批款分配等家常事务（张月碹，2022）。目前仅存最早一封为 1990 年 11 月 10 日张合顺寄自中国潮阳的回批。透过张氏后代之口述与书信文本的交互阅读，本文尝试从书写中窥见信仰、礼俗与伦理的延续，进而理解移民家书作为文化记忆载体的意义。

（二）祖先崇拜：报本反始的伦理秩序

陈剑虹于《槟榔屿潮州人史纲》中指出，“和世界各地的潮汕人一样，槟榔屿潮州人的时年八节习俗，都以祭拜祖先作为重要内容，有意识的折射慎终追远，返本溯源的传统伦理观念。在春节、元宵、清明、端午、中元、中秋、冬至和除夕八个节日中，以清明和冬至的活动最能反映潮州人知恩、崇恩和报恩的宗教和伦理观念”（陈剑虹，2010）。在此文化结构中，祭祖不仅是礼俗行为，更是家族记忆得以延续的关键仪式。诚如 1991 年廖氏（张合葵之母）去世后，张合顺于 2 月 23 日致信胞弟合葵，言及：“幸有槟城各弟妹对后事办理圆满清楚，无限感激，永记恩德，谨致敬意。因远隔千山万水，未能前往吊唁，恕不孝之罪。各侄儿媳意欲设炉奉拜祖母，万望弟途回唐，带香火回返故里。若是未得短期内回乡的话，则函来香火在信内，以便设炉奉祭勿误！以表孝心！”此一文字所显现的，不仅是跨国亲情的惋叹，更展现潮州人将“香火”视为祖先的象征，其流转于信件与物质之间，形构出离散中的精神连结。

此举不仅体现了孝道的具体实践，也象征着移民如何以仪式之形式回应地理的断裂与应对的策略。正如陈达所言：“对于祖先的崇奉侍十分显然的，对于耀祖荣宗认为是人生最体面的事业之一。他们一方面相信去世的先祖，有操纵后代子孙祸福之权；一方面又相信做子孙者对于祖宗有祭祀的义务”（陈达，2011）。由此观之，书信中提及的祭祖与寄款行为，正是移民伦理秩序的书写化体现。

在 1993 年 1 月 29 日张合顺另一封家书中，亦详述年节祭祖与批款分配之事，文辞恭敬，礼节周全：

合娇及其他各胞弟妹妹婿如晤：

新春好，百业昌盛步步高，家庭幸福日日乐，生意兴隆通四海，财花茂盛达三江。来仪收到，详知一切，昨天收到托亲友转寄来 600 元，又收弟合葵寄来 400 元，由兄嫂发落给各孙儿女，计各男孙每人 100 元，各女孙每人 40 元，余兄嫂收用，助年节当为拜祖，皆大欢喜。多谢关怀，感恩不浅，谨致敬意！得悉弟妹要再次回唐见面，更为欢喜，只候捷报早达，目前市面每百元马币相当人民币叁仟多元，特此奉告。两地平安，侄淑钦建设楼房，因资金紧缺，未建设圆满，现厝宅宽大，安身免忧，余面谈。并祝近安！

胞兄　合顺

1993.1.29

此类书信反映了宗族伦理在文字层面的再生：书信不仅传递金钱，更再现家族间的情感流通与秩序。值得注意的是，马来西亚潮州人多于义山祭祖，而非传统祠堂。就受访者表示，他们逢年过节时父亲都会寄款到中国给大伯祭祀祖先，而且潮州人尚食粿，更有“时令做时粿”之俗。一般上受访者家会准备朴籽粿、红桃粿、酵粿（发粿）等，清明则有红桃粿、酵粿；冬至有冬至丸（汤圆）（张月碹，2022）。这些食物与节气的结合，使祖先崇拜不仅是信仰，更是味觉与时间的文化记忆。

（三）民间信仰：跨洋的精神延续

潮州移民在海外落地后，神明信仰遂成社群精神的支柱。孔复礼指出，“当移民社会去往一个新的地方时，必然透过分香仪式请神灵一同前去。有时移民所供奉的只是特殊行业的守护神，但庙宇仪式的地区性通常相当鲜明，因为行业通常是与来自特定区域的移民相一致的”（孔复礼，2019:）。信仰因此成为连结原乡与新居的文化桥梁。潮州人常奉祀玄天上帝、三山国王与大伯公，并以“拜老爷”或“营老爷”的习俗仪式凝聚族群（陈友义，2012）。

张氏家族书信中多次出现祭祀“宋朝大元帅”之事，可见此神灵信仰仍具地域特征。1993 年 9 月 2 日及 1994 年 4 月 9 日两封信中，张合顺分别提及“敬拜宋朝大元帅”与“助清明佳节奉敬宋朝元帅之用”，并称其祭仪“隆重热闹”，如下图所示：

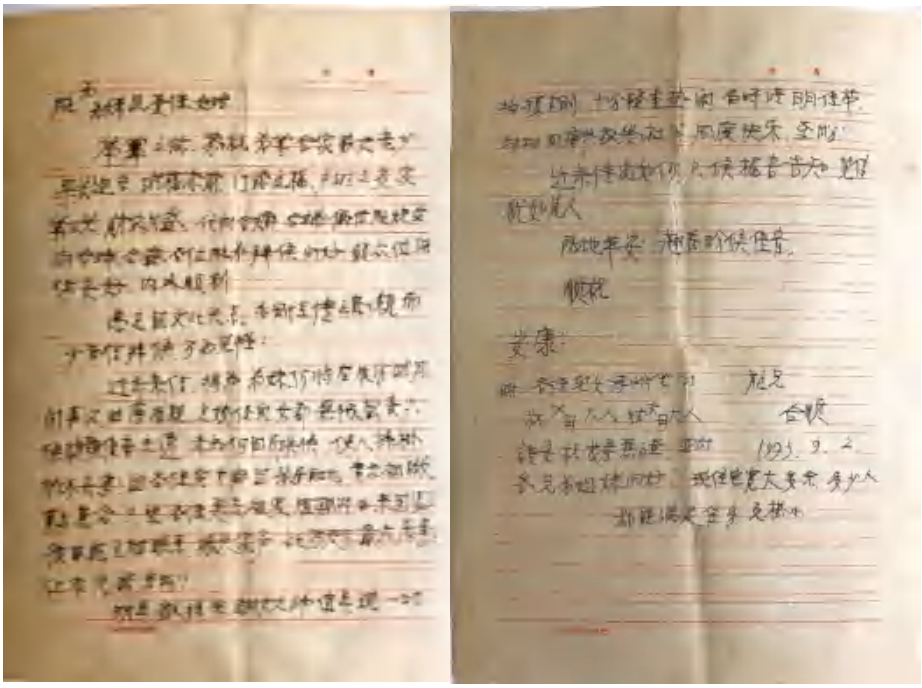

图 2：1993 年 9 月 2 日马来西亚槟城张氏家族所藏家

据明代隆庆《潮阳县志·坛庙志》记载：“大忠祠在灵威庙左桐阴亭之西祠，祀宋故丞相信国文公天祥之神。其事始邑人前给事中萧龙者，谓公当颠沛之际，驻师潮阳，敬谒双庙，其孤忠大节于张、许无异礼宜并祀于东山。因白之知县姜森分巡佥事王相，创建斯祠列为三忠，而相为之记时”（〔明〕林大春、黄一龙，1985）。即祥兴元年（1278）赵昺即位，封文天祥为少保、封信国公。文天祥上表铲除潮州叛将陈懿（都统）、刘兴（知州），并于同年十一月到达潮阳。当时降元叛将陈懿、刘兴勾结张弘范，追赶文天祥的部队。文天祥从海门西征路上，经过蚝坪得当地百姓相助，于小北山麓与元军展开一场激战。当时战死之将士不计其数，而当地民众就把战死之士葬于小北山麓，从和平一直延伸到赤寮（今谷饶），临昆山坡的“五穴合共三十八位”即当时战死之将士合葬之地。该信仰象征忠义与守节此信仰自潮阳延伸至海外，形成跨域的精神网络。

对远居马来西亚的张氏后代而言，对于“宋朝大元帅”这一神祇的认

知，多已随世代更迭而逐渐失传。受访者即坦言，其对该神明的认识，乃是透过家族书信的零散提及方得其名，而其来历与祭祀意涵，早已难以确指（张月碹，2022）。相较之下，笔者于 2024 年 4 月赴潮阳进行田野访谈时则发现，张合顺一系之后代至今仍持续祭祀“宋朝大元帅”，相关仪式在当地宗族生活中尚存其踪，且祭祀规模不小。这一显着的差异，恰反映出跨地域迁移过程中，信仰记忆在离散与断裂之中所经历的转化。对身处海外的家族成员而言，正是由于祭祀实践的中断与历史传承的模糊，反而在情感层面激发出一种“寻回”的渴望。这种对祖先或神明的再追寻，并非单纯的“寻根”行为，而是离散族群在时空断裂之中，试图重建文化根源与精神安顿的重要途径。换言之，信仰在此不仅是一种宗教信仰的实践，更是一种承载家族记忆与身份想象的形上寄托；其所指向的并非神明的崇拜，而是对“从何而来”这一根源性问题的持续追问。

（四）丧葬风俗：风水与“做福基”的生命观

潮州人素来重视风水，其相关观念不仅体现在身后安葬之事，亦延伸至生前对自身与家族命运的安排，形成一套涵盖生死的礼俗体系。如“二次葬”、“翻金瓮”、“筑生居”等仪式，皆以祈求一生顺遂、福泽子孙为核心目的。其中，在世之人预先修筑墓穴者，潮州地区称为“筑生居”，而马来西亚潮州人则多称之为“做福基”或“做生基”（张月碹：2022）。此类做法反映出潮州人对生命延续与家族兴衰的整体性理解，认为个人的身后安置与后代子孙的福祉密切相关。

在这一信仰脉络中，风水宝地被视为影响家族命运的重要关键。正如俗语所言：“富贵官品，皆由安葬所致；年寿延促，亦由坟垄所招”（叶春生，2008）。生死、福祸与空间配置之间，被赋予高度的象征关联。因此，人们往往慎重延请风水先生择定吉壤，以修筑生居。生居修筑完成后即可立碑，并以红色油漆涂饰碑文，象征当事人尚在人世；待其身故之后，再将碑文改涂为绿色，以示生命状态的转变。

潮州人的“二次葬”或“翻金瓮”，其性质与闽南地区丧葬礼俗中的“捡骨”相近，皆属于对初葬的再处理。《广东民俗大观》对其过程有详尽描述：第一次埋葬称为“大葬”或“寄土”，三年之后再行开棺，依次取出踝骨、腿骨、脊椎骨等，清理干净，并按蹲坐姿势装入一个口小腹大的陶瓮中，美其名曰“金瓮”，再另择穴位重新安葬，修建永久性墓穴，此即所谓“风水”（刘志文，1993）。在这一过程中，骨骸颜色被视为判断风水吉凶的重要依据：若骨色转黄，则象征墓地得气，先人可庇佑子孙；若骨色发黑，则被认为穴位不佳，需另寻“安身”之所。通过对祖先遗骸的再次安置，生者试图在死者与后代之间重新建立秩序，确保家族的长久安定。

这一重视风水与祖先安置的丧葬观念，在张氏家族的家书中亦可见其延续。1993 年 10 月 26 日，张合顺致信槟城张合葵，信中详细说明为其

妻筹办“做福基”之事，并多次提及择吉日立碑、筹措经费等细节。信中所言“目前土体基本完成，并将择十月大利期吉日升碑圆满清楚”，显示风水时辰与仪式完成度，均被视为关乎成败的重要环节。尤为值得注意的是，张合顺在信中特别感谢张合葵出资相助，使其兄嫂得以完成“做福基”的心愿，显示此类丧葬实践并非个人行为，而是透过跨国家族网络与经济支持，共同完成的集体行动。由此可见，侨批/移民家书不仅承载日常经济往来，更保存了张氏家族关于“风水”的文化记忆。其背后的意义，并不止于趋吉避凶的信仰逻辑，而在于通过慎重安置祖先，祈求门庭兴旺、子孙发达，从而维系家族的整体秩序与情感连结。

从表面观之，这类做法或可被视为“迷信”，然而若置于潮州人丧葬礼俗的文化语境中加以理解，其人文意涵实则以“孝”为中心：生者通过对死者的妥善安排，建立生命延续的伦理关系，使人们在面对死亡时，重新体悟生命的价值。从更广的层面来看，祭祀祖先与敬奉神明，一方面凝聚了家族成员之间的情感纽带，另一方面也为身处离散的移民群体提供精神上的安顿与慰藉。正如家书中所呈现的，尽管家族成员远在马来西亚，未必清楚所祭祀神明的历史渊源，但其对祖先与神灵的敬意始终明确而坚定。“山不在高，有仙则灵；满天神佛，在乎诚心”所强调的，正是信仰实践中的态度，而非神明本身的差异。由此观之，张氏家族通过家书所展现的祭祀行为，不仅见证了侨乡与南洋之间持续互动的宗教实践，也折射出潮州人在跨地域迁移过程中，如何借由风水与信仰，维系家族记忆与文化认同。

四、结语

本文以张氏家族的跨国移民经验为线索，尝试从马来西亚的在地视角，重新审视潮州侨批与移民家书在华人离散历史中的文化意义。透过家族书信、口述记忆与田野资料的交互阅读，本文认为侨批并非仅属于中国侨乡的历史遗产，而是在侨居地持续被书写、保存与再诠释的文化文本。其价值不只体现在经济层面的“银信合一”，更深植于移民家庭的情感结构、伦理实践与身份想象之中。

张氏家族的个案显示，跨国通信不仅维系了原乡与异乡之间的物质往来，更构成一种情感与记忆的通道。无论是书信中反复出现的汇款安排、节庆问候，抑或对祖先祭祀、神明信仰与丧葬风水的叙述，皆反映出潮州移民如何在地理分离与政治变迁之中，持续重构“家”的意义。侨批与移民家书在此过程中，既是日常生活的记录，也是家族记忆得以延续的媒介。尤为重要的是，本文透过对祖先崇拜、民间信仰与“做福基”等丧葬习俗的分析，指出这些看似传统的礼俗实践，实则承载着移民群体对生命延续、家族兴衰与精神安顿的深层关怀。在离散与失落的处境中，信仰并非简单的宗教崇拜，而是一种回应断裂、修复记忆的文化实践。正是在这些反复

的仪式与书写之中，移民群体得以在异乡确认自身的来处，并为未来寻找立足之地。

从研究方法而言，本文强调将侨批文献与口述历史结合的重要性。透过后代的记忆叙述，侨批不再只是静态的历史文本，而成为持续生成意义的文化对象。这种“从文本到记忆”的研究路径，不仅有助于补充宏观移民史的不足，也使个体经验与家族情感得以进入学术视野。综言之，本文主张侨批研究若要深化其学术潜能，需超越单一的中国中心视角，将侨居地社会纳入分析框架之中。以“从南洋观看中国”为研究立场，不仅能够重新理解侨批在跨域流动中的文化功能，也有助于将华人移民史纳入马来西亚社会文化史的整体脉络。张氏家族的经验显示，潮州移民的历史并非单向的“出洋”叙事，而是一段跨越百年的往返过程；而侨批，正是这一过程最为细腻、也最具人文深度的见证。需要说明的是，本文以马来西亚槟城张氏家族为单一研究个案，材料主要来自现存侨批、移民家书及后代口述记忆，其结论难以直接推广至所有潮州移民或马来西亚华人社会，亦无法全面涵盖不同阶层、行业与区域移民群体的差异经验。然而，正是透过此类微观个案的深入考察，方能揭示宏观华侨史叙述中往往被忽略的情感结构、伦理实践与文化记忆层次。未来研究可在此基础上，进一步扩大个案范围，比较不同家族、不同侨居地或不同方言群体之间侨批实践的异同，或结合更多田野调查与跨区域档案材料，以深化对华人跨域迁移经验与文化认同建构机制的理解。

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附录

图 1：张氏家族所藏家书与相关资料之皮箱，左为张金友先生、右为张月碹女士, 笔者于 2023 年 6 月 18 日访谈时所摄。

图 2：马来西亚槟城张氏家族祖先牌位，笔者于 2023 年 6 月 18 日访谈时所摄。

图 3：张亚耀与廖氏亚兰遗像，笔者于 2023 年 6 月 18 日访谈时所摄。

图 4：张合葵（身着黑色西装者）返乡与张合顺及亲友之合照，张金友提供。

图 5：笔者于 2024 年 4 月 10 日进行寻访张合顺中国后人之田野访谈期间，与张合顺后人及槟城张氏后人合影，地点：广东潮阳铜盂镇灵山寺。

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七府古庙：越南南方华人信仰中心的历史、建筑与文化传承

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摘要

七府古庙是越南南方最早建立的华人宗教信仰中心之一，主要供奉关圣帝君关羽。该庙因来自福州、漳州、琼州、泉州、潮州、广州、宁波等七个府籍的华人共同创建并参与祭祀而得名，长期承载着越南南方华人社会的历史记忆。七府古庙整体采用中华传统庙宇建筑形制，融合木雕、石雕与琉璃彩绘等多种传统工艺形式；庙内神像材质多样，涵盖木雕、陶瓷、宣纸塑像及钢筋混凝土等，体现出不同时期的艺术风格与工艺特征。作为区域性重要的宗教与文化活动中心，七府古庙每年举行春节、上元节、关圣帝君诞、中元节及下元节等祭祀活动，参与者不仅包括华人群体，也涵盖周边越南民众，从而在实践层面促进了中越文化的互动与交流。通过对七府古庙历史沿革、建筑与神像系统以及节庆实践的考察，本文指出该庙宇不仅是华人宗教信仰的重要载体，也是越南南方华人移民在跨文化语境中建构跨籍贯宗教共同体、维系社会组织与集体认同的重要制度性空间。

关键词： 七府古庙，华人文化，建筑艺术，雕刻工艺，信仰中心

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That Phu Temple：History, Architecture, and Cultural Heritage of a Chinese Community Religious Center in Southern Vietnam

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Abstract

The That Phu Temple is one of the earliest Chinese religious centers established in southern Vietnam, enshrined Guan Sheng Dijun. The temple derives its name from the joint establishment and participation in worship by Chinese immigrants originating from seven prefectures—Fuzhou, Zhangzhou, Qiongzhou, Quanzhou, Chaozhou, Guangzhou, and Ningbo—and has long embodied the historical memory of the Chinese community in southern Vietnam. In its overall form, the That Phu Temple adopts a traditional Chinese temple architectural style, characterized by a integration of various traditional craft techniques, including wood carving, stone carving, and glazed ceramic decoration. The statues of deities within the temple are made from diverse materials, such as carved wood, ceramics, papier-mâché, and reinforced concrete, reflecting the artistic styles and craftsmanship of different historical periods. As an important regional center for religious and cultural activities, the That Phu Temple annually conducts ritual events, including the Lunar New Year, the Lantern Festival, the birthday of Guan Sheng Dijun, the Zhongyuan Festival, and the Xiayuan Festival. Participants include not only members of the Chinese community but also residents from surrounding Vietnamese communities, thereby facilitating cultural interaction and exchange between China and Vietnam at the level of religious practice. Through an examination of the historical development, architectural form and deity system, as well as festival practices of the That Phu Temple, this paper argues that the temple functions not only as an important carrier of Chinese religious beliefs but also as a key institutional space through which Chinese immigrants in southern Vietnam constructed an inter-prefectural religious community and sustained social organization and collective identity within a cross-cultural context.

Keywords: That Phu Temple, Chinese culture, architectural art, carving craftsmanship, religious center

一、引言

越南南部自 17 世纪以来逐渐形成规模可观的华人聚居区，伴随移民定居而出现的宗教信仰与会馆制度，成为维系族群组织、社会秩序与文化认同的重要机制。华人庙宇不仅是宗教祭祀场所，更是集议事、互助、慈善与文化传承于一体的社会空间。在东南亚华人研究中，宗教空间被普遍视为理解族群认同建构与社区整合的重要切入点。

现有关于越南华人宗教与庙宇的研究，多集中于胡志明市堤岸地区，对边和、同奈等南部城市的华人信仰中心关注相对有限。尤其是以多府联合形式存在的庙宇，其组织结构、空间布局与社会功能如何在跨籍贯群体中发挥整合作用，尚缺乏系统的个案分析。七府古庙作为越南南部历史较早、影响力显着的华人庙宇之一，为探讨上述问题提供了理想案例。

七府古庙由不同府籍华人共同参与建立，其信仰体系以关帝为核心，并在长期发展过程中形成相对稳定的组织与仪式结构。这一联合性建庙模式，不仅反映了华人社会内部的协商与合作机制，也在一定程度上弱化了籍贯差异，对构建更广泛的社区认同产生积极影响。然而，相关研究多停留在历史沿革或建筑描述层面，对其社会功能与文化意义的分析仍显不足。

基于此，本文围绕以下研究问题展开讨论：一是：七府古庙在历史发展过程中如何形成其联合性的组织与信仰结构？二是：庙宇的建筑空间与神祇配置如何反映并塑造华人社区的价值观与社会关系？三是：在当代社会语境下，七府古庙如何通过宗教与社会活动实现文化传承与功能转型？

本文采用质性个案研究方法，结合历史文献、田野调查与访谈资料，对七府古庙的历史、建筑与社会实践进行综合分析。通过该个案研究，本文旨在深化对越南南部华人宗教空间社会功能的理解，并为东南亚华人传统信仰在现代化进程中的持续运作与转型提供经验性观察。

二、研究方法

本研究采用质性研究取向，以七府古庙为个案，对其历史发展、建筑空间、宗教仪式与社会功能进行综合分析。研究设计旨在通过多源资料的交叉验证，揭示越南南部华人联合型宗教空间的运行机制及其文化意义。

（一）研究对象与研究范围

研究对象为位于越南同奈省边和市的七府古庙，该庙被普遍视为南部地区较具代表性的华人信仰中心之一。研究范围涵盖庙宇的历史沿革、建筑空间结构、神祇体系、主要宗教仪式，以及其在当代社会中的文化与社会功能。

（二）资料来源

本研究的数据主要来源于以下三个方面：

（1）文献资料

通过系统梳理有关越南华人移民史、会馆制度与宗教信仰的学术研究成果，构建研究的历史与理论背景。同时参考地方志、庙宇碑刻、管理委员会文件及相关历史记录，以核对七府古庙的建庙背景、发展阶段与重要历史事件。

（2）田野调查

研究者于 2024 年期间对七府古庙进行了多次实地考察，考察时间涵盖平日与主要宗教节庆时段。田野调查重点记录庙宇的整体布局、建筑结构、装饰题材与神祇配置，并通过持续性观察了解不同时间段内庙宇空间的实际使用情况。此外，调查亦涵盖关帝诞辰等主要宗教节庆及日常祭祀活动，以理解宗教仪式与社会活动在具体空间中的展开机制。

（3）访谈资料

本研究辅以半结构式访谈，于田野调查期间对约 10–15 位与七府古庙相关的访谈对象进行了交流，受访者包括庙宇管理人员、长期信众及部分地方居民。访谈内容主要涉及庙宇的历史记忆、仪式实践、管理模式、慈善活动及其在社区中的社会角色。访谈以现场记录与整理笔记的方式进行，在征得受访者同意的前提下用于学术分析，以补充文献与观察所得的信息。

（三）分析方法

在资料分析过程中，本文采用主题分析法对田野笔记与访谈资料进行归纳整理，识别反复出现的核心主题，如联合型组织结构和宗教空间的社会整合功能及仪式与社区认同等。

在建筑与空间分析方面，本文依据庙宇研究中常用的分析框架，从以下维度进行描述与比较：

（1）整体空间布局（轴线结构、内外空间划分）；

（2）主要与附属祭祀空间的分布；

（3）建筑装饰与象征元素；

（4）神祇体系的空间配置及其象征意义。

通过上述标准化分析，探讨建筑空间如何反映并塑造庙宇的宗教功能与社会功能。

（四）研究可靠性与局限

为提高研究结论的可靠性，本文通过文献、田野观察与访谈资料之间的交叉验证，尽量减少单一资料来源可能带来的偏误。然而，本研究仍主要依赖质性资料，对仪式参与规模及其社会影响的量化分析相对有限。未来研究可结合比较研究或长期田野调查，以进一步深化对不同类型华人庙宇社会功能的理解。

三、七府古庙概述

七府古庙最初为关帝庙，主要供奉三国时期蜀汉名将关羽（字云长，？—219），在越南南方华人社会中俗称为翁庙（越南语称 chùa Ông）。七府之名源于福州、漳州、琼州、泉州、潮州、广州、宁波等七个府籍的华人共同创建并参与祭祀。作为越南南方较早建立的华人宗教信仰中心之一，七府古庙在早期华人移民社会中承担着重要的宗教与社会功能。

七府古庙位于同奈河沿岸，庙前临水、周围环绕古树，其空间布局既符合华人传统宗教建筑依水而建的观念，也反映了华人移民在陌生环境中对风水秩序与宗教安全感的重视。该选址与自然环境的结合，使庙宇在宗教实践与日常生活中长期发挥稳定作用。

从历史层面看，七府古庙是十七至十八世纪中华文化在越南南方都会区域传播与发展的重要见证。清代地方文献《嘉定城通志》中关于中华文化在农耐大铺蓬勃发展的记载，反映了七府古庙及其周边地区在早期华人社会中的文化影响力。

随着华人移民在同奈地区定居并与当地社会持续互动，七府古庙在部分建筑细节与仪式实践中逐渐吸收本土元素，但其整体空间格局、色彩体系与神祇结构仍保持鲜明的华人宗教特征。这种在延续传统的同时进行有限调整的过程，体现了华人宗教信仰在越南社会语境中的地方化发展路径。

在当代社会中，七府古庙仍是越南南方华人重要的宗教活动场所与精神寄托空间，其持续运作不仅维系了华人社区内部的信仰秩序，也使庙宇成为连接历史记忆、族群认同与现实社会生活的重要文化纽带。

在当代社会中，七府古庙依然是越南南方华人重要的宗教实践空间与精神寄托场所。其持续运行不仅维系了华人社区内部的信仰秩序，也使庙宇成为连接历史记忆、族群认同与现实社会生活的重要纽带。

四、七府古庙的建筑与神像系统

（一）选址与整体空间格局

七府古庙占地约 3000 平方米，坐落于同奈河沿岸，整体空间由砖墙围合，四角设有石雕麒麟，形成相对独立而完整的宗教场域。门朝向西南并正对同奈河，其临水而建的选址方式，不仅可从移民时期对交通与商贸通达性的需求理解，也契合华人传统宗教建筑中关于水气财关系以及风水秩序的空间想象（Lê，2018；Vũ，2020）。相关研究指出，南部华人庙宇往往通过临水、围合与门向相结合的方式来界定神圣与世俗的边界，并将庙宇融入社区的日常网络之中，从而同时实现宗教护佑与社会整合功能（Trần，2002；Nguyễn，2016）。因此，七府古庙位于村落核心区域的空间事实，可被视为其区域性宗教中心角色的制度化呈现：它既便于信众集体祭祀，也强化了跨府籍群体在公共空间中的持续互动（Nguyễn，2016）。在当代城市化进程中，该庙仍持续承担宗教功能，同时又被纳入文化遗产与历史景观的保护体系之中，显示其社会意义从族群宗教空间进一步扩展为地方公共文化资源[8]。

（二）庙宇总体布局与建筑形制

七府古庙共有三个进出口，其中正门朝向同奈河，依照三关门格局建造，体现出华人庙宇在空间入口设置上对礼制秩序与神圣层级的强调。庙宇屋顶铺设传统阴阳瓦，并以昂首翘望的双龙装饰，展现典型的华人宗教建筑风格，其象征意义常与权威、护佑及神圣空间的界定相关（Lê，2018）。正门门额以青石雕刻七府古庙四个汉字，红漆木门庄重典雅，进一步强化了庙宇作为区域性信仰中心的象征形象（Nguyễn，2016）。

庙院右侧墙上便门的匾额书有七府五行庙，设计相对简洁，门体由两扇较大的木门构成；庙后另一侧便门则刻有七府观音殿字样。这两道便门平时关闭，仅在春节、关圣帝君诞等重大节庆时开放，显示出庙宇通过门禁制度对空间使用进行阶段性区分，从而维持仪式秩序与神圣性（Trần，2002）。

步入三关门后，迎面为一处占地约 1000 平方米的宽敞院落，铺设宝龙青盘石，占据庙院总面积的一半以上。相关研究指出，华人庙宇中的前庭空间不仅承担交通与集散功能，也是节庆仪式、表演活动与社区互动的重要场所（Vũ，2020）。南方解放前，每逢节日或关公忌辰，华人社区常在此举办庆典活动，院内悬挂中华龙灯，并设舞台进行麒麟舞、狮龙舞等

[8] 本文所使用的田野资料主要来源于研究者于 2023 年至 2024 年间在越南同奈省边和市七府古庙进行的多次实地调查，包括对庙宇空间结构、建筑细节与宗教实践的系统观察，以及对庙宇管理人员、长期信众与周边居民所进行的半结构式访谈。相关资料以田野笔记与访谈记录形式保存，并用于本文的学术分析。

表演，使宗教仪式与社区娱乐在同一空间中交织展开（Nguyễn，2016）。

庙院左侧建有一座五行庙，专供祭祀五行娘娘（金、木、水、火、土）。该庙面积约 20 平方米，砖墙粉刷水泥，地基铺设青盘石，屋顶覆以红色阴阳瓦，整体形制简洁。庙内设有灵位，上书五行娘娘字样，并供奉五座石膏塑像，反映出五行信仰在南部华人宗教体系中与自然秩序、身体平衡及日常生活密切相关的功能性取向（Vũ，2020）。庙后尚存一处高耸的白蚁窝，当地信众普遍将其与一则神示性梦境叙事联系起来[9]。

（三）殿堂结构与附属建筑的功能分化

七府古庙的殿堂结构与附属建筑在整体布局上呈现出明确的功能分化，反映出庙宇在宗教实践、社会组织与公共活动中的多重角色（Nguyễn，2016）。庙宇主体建筑沿中轴线展开，由前殿、正殿及左右厢房构成，形成层次分明且具有仪式秩序的空间体系。

前殿位于庙宇入口区域，是信众进入庙宇后的首要礼仪空间，主要承担日常上香、简式祭拜及信众集散等功能。其相对开敞的空间形态，使前殿成为连接外部社会与内部神圣空间的重要过渡区域，这一空间特征在华人庙宇研究中常被视为区分世俗与神圣领域的关键节点（Trần，2002）。正殿则处于整个庙宇轴线的核心位置，是七府古庙最为神圣的祭祀空间，集中供奉关圣帝君等核心神祇，承担年度重要祭典与集体仪式的主要功能。通过前殿与正殿在空间层级上的区分，庙宇内部形成了由世俗向神圣逐级递进的宗教秩序，这种空间逻辑与中国南方关帝庙的传统范式高度一致（Lê，2018）。

左右厢房在功能上与华人会馆体系密切相关。左侧厢房与福州会馆相连，现多用于文化展示、事务处理及会议活动；右侧厢房则与广东会馆相关联，部分空间作为庙祝与管理人员的日常起居与接待场所，其余区域用于信众交流与临时活动。相关研究指出，将会馆功能嵌入庙宇空间，是南部华人社会中整合宗教、经济与社会组织的重要方式，使庙宇在宗教场所之外同时发挥公共议事与社会协调功能（Nguyễn，2016）。

在关帝庙主体建筑之后，另建有近现代修建的观音阁，形成相对独立但功能互补的附属建筑空间。观音阁内供奉观音菩萨、包公、赵玄坛、太岁、孙悟空等多位神祇，其信仰内容相较主殿更具多元性与实用性，主要回应信众在平安、财富、司法、公正及日常生活事务等方面的现实需求（Vũ Thị Lan，2020）。观音阁的增设显示出七府古庙在历史发展过程中，通过

[9] 关于五行庙后白蚁窝的起源，当地信众普遍以“神示梦境”的口述叙事加以解释。该说法主要来源于田野调查期间对庙宇管理人员及长期信众的访谈记录，属于民间宗教叙事的一部分，并不作为历史事实加以论证，而是用于分析信众如何通过象征性解释赋予自然现象以宗教意义。

附属空间的扩展不断调整信仰结构，以适应信众构成与社会需求的变化（Trần，2019）。

总体而言，七府古庙通过前殿、正殿、厢房及附属建筑之间的功能分工，构建起一个集宗教仪式、社会组织与公共活动于一体的复合型空间结构。这种空间安排不仅有助于维持宗教秩序，也为跨府籍华人群体提供了持续互动与合作的制度性场所，是七府古庙得以长期发挥区域性信仰中心功能的重要基础（Nguyễn，2016）。

（四）建筑装饰与工艺特征

七府古庙的建筑装饰与工艺体系集中体现了中国南方华人传统庙宇的艺术特征与宗教象征意义（Lê，2018）。庙宇整体采用木构体系，梁柱之间以榫卯结构相互衔接，不仅增强了建筑的稳定性，也体现出传统木构建筑在长期实践中形成的技术智慧。即便历经多次修缮，主体结构仍能保持整体格局的连续性，反映出该类建筑形式在越南南方热带气候条件下较强的适应能力（Lê，2018）。

在装饰艺术方面，七府古庙广泛运用木雕、石雕与陶塑等工艺手法，装饰部位涵盖梁柱、额枋、斗拱、神龛及屋脊等关键空间节点。题材内容丰富，包括龙凤瑞兽、四灵、八仙、花鸟纹样以及历史故事与民间传说等。这类装饰题材在华人庙宇中通常承担祈福、辟邪与象征伦理秩序的功能，并通过程序化的图像语言强化神圣空间与日常空间之间的象征边界（Trần，2002；Vũ，2020）。

屋脊与檐部装饰多采用西贡梅树陶窑烧制的彩陶构件，其色彩以绿色、钴蓝、乳白色和棕色为主，形成鲜明而稳定的视觉体系。相关研究指出，南部华人庙宇彩陶装饰在构图上往往强调层次叠加与动态表现，以在有限的建筑尺度中营造丰富的视觉深度，这一特征体现了南方华人庙宇装饰艺术中繁而不乱的美学取向（Lê，2018）。

整体而言，七府古庙的建筑装饰并非单纯追求视觉效果，而是通过材料选择、装饰布局与题材配置，将宗教信仰、伦理秩序与审美观念融为一体（Nguyễn，2016）。这种装饰体系既延续了中国南方关帝庙的传统艺术风格，也在长期使用与维护过程中逐步形成具有地方特征的宗教建筑形态，为理解越南南方华人信仰空间的文化内涵与地方化过程提供了重要线索（Trần，2019）。

（五）神像系统与材质结构

七府古庙内部神像系统构成复杂，涵盖关帝信仰体系、道教神祇、佛教神祇以及部分具有民间信仰性质的形象，体现出越南南方华人宗教信仰在长期实践中形成的多元整合特征（Nguyễn，2016）。其中，关圣帝君作为庙宇的主神，居于正殿核心位置，与关平太子、周仓将军等配祀神将共

同构成相对完整的关帝信仰体系，象征忠义、武德与社会秩序，是华人移民社会中最具凝聚力的信仰核心（Lê，2018）。

除关帝信仰外，庙内还供奉多位道教与佛教神祇，如赵玄坛、太岁、九天玄女、天后元君、金花娘娘、福德正神、注生娘娘，以及观音菩萨、地藏王菩萨等。相关研究指出，这类神祇多与财富、平安、婚育、航海与超度亡灵等现实生活需求密切相关，反映出华人信仰体系在移民社会中由单一崇拜向功能性、多层次结构发展的趋势（Vũ，2020；Trần，2019）。

在神像材质方面，七府古庙呈现出明显的多样性与时代层次。庙内神像既包括传统的木雕、陶瓷与宣纸塑像，也存在以钢筋混凝土制成的近现代神像。这种多种材质并存的现象，一方面反映了庙宇在不同历史阶段的修建、扩建与重塑过程；另一方面，也体现了宗教实践在材料、技术与经济条件变化中的适应性调整（Lê，2018）。相较于早期以木雕和陶塑为主的神像，近现代采用钢筋混凝土制作的神像更强调耐久性与公共展示功能，显示出庙宇在持续使用中的现实考虑（Nguyễn，2016）。

值得注意的是，庙内供奉的白无常在当地华人信仰中常被视为阴间财神，其角色并非源自经典宗教体系，而是华人民间信仰在冥界秩序与财富观念层面的地方性演绎（Vũ 2020）。这一现象显示出七府古庙并未严格遵循单一宗教正统，而是在长期实践中包容并整合多种信仰资源，以回应不同信众群体在心理与社会层面的多样化需求（Nguyễn，2016）。

总体而言，七府古庙的神像系统通过主神—配祀神—功能性神祇的层级结构，以及多样化材质的并存，构建起一个具有高度弹性与包容性的宗教信仰网络。这一系统既延续了中国南方华人庙宇的传统信仰谱系，也在越南南方社会语境中不断调整与重构，使庙宇得以在跨文化环境中长期稳定地发挥宗教与社会功能（Trần，2019）。

（六）建筑与神像系统的地方化特征

七府古庙的建筑形制与神像系统在整体上延续了中国南方华人关帝庙的传统范式，但在长期的历史发展过程中，也逐步呈现出适应越南南方社会环境的地方化特征（Lê，2018）。这种地方化并非对原有传统的断裂或替代，而是在保持核心信仰结构稳定的前提下，通过空间配置、神祇组合与建造方式的调整加以实现（Trần，2019）。

在建筑层面，七府古庙依然遵循以中轴线为核心的庙宇布局原则，前殿、正殿与附属建筑层次分明，体现出典型的华人宗教建筑秩序。然而，其选址方式、空间尺度及材料使用，则明显体现出对当地自然环境与社会条件的回应。庙宇临河而建的格局、围合式院落的形成，以及近现代修缮中对耐久材料的采用，反映出华人移民在越南南方热带气候与城市发展背景下，对传统建筑模式所进行的现实性调整（Lê，2018）。

在神像系统方面，七府古庙以关圣帝君为核心，维持了关帝信仰在庙宇体系中的主导地位，同时又通过引入观音菩萨、地藏王菩萨、赵玄坛、太岁等神祇，构建起一个涵盖忠义伦理、超度救赎、财富祈求与日常庇佑等多重功能的信仰结构（Vũ，2020）。这种多神并祀的格局与中国南方民间宗教传统高度一致，但其具体神祇组合与信仰重心，则明显受到当地华人社会结构与现实需求的影响（Nguyễn，2016）。

尤为值得注意的是，部分具有民间性质的神祇形象，如白无常被视为阴间财神，并非源自正统宗教经典，而是华人民间信仰在越南社会语境中对冥界秩序与财富观念的地方性演绎（Vũ，2020）。这类信仰元素的存在，显示出七府古庙在宗教实践层面对多元观念的高度包容性，使庙宇得以覆盖不同阶层、不同府籍信众的心理需求（Trần，2019）。

总体而言，七府古庙的地方化过程表现为一种延续与调整并存的动态机制：一方面，庙宇通过建筑格局与主神体系的稳定性，维系了华人宗教传统的连续性；另一方面，又通过附属空间的增设、神祇系统的扩展及材料与技术的更新，回应了越南南方社会环境与华人移民生活实践的变化（Nguyễn Minh Tuấn，2016）。正是在这一持续调适的过程中，七府古庙得以成为跨府籍华人宗教共同体长期运作的核心空间，并在中越文化互动中展现出独特的地方化形态（Trần，2019）。

五、七府古庙的节庆结构与宗教和社会功能

七府古庙作为越南南方华人重要的宗教中心，其年度祭祀活动构成了一套相对稳定而有序的节庆体系（Vũ，2020）。这一体系既延续了中国南方关帝庙与道教三元信仰的传统节序，又在越南社会语境中不断调整其社会功能，使节庆活动成为维系华人宗教共同体与社会网络的重要机制（Nguyễn，2016）。

（一）节庆体系的时间结构与核心节点

从时间分布来看，七府古庙的年度节庆主要围绕春节、上元节、关圣帝君诞、中元节与下元节展开，形成以神明诞辰与岁时节令为双重轴线的节庆结构。其中，关圣帝君诞（农历六月二十四）是全年规模最大、仪式最为隆重的祭祀活动，处于节庆体系的核心位置；春节与上元节标志着新年秩序的开启与确立；中元节与下元节则分别对应超度亡灵与消灾解厄的宗教功能（Vũ，2020）。

这种节庆安排在整体上与中国南方华人社会的传统节序高度一致，但在七府古庙的具体实践中，节庆重心明显集中于关帝信仰及其相关仪式，显示出该庙宇在多元信仰结构中仍以关帝崇拜为核心的宗教取向（Nguyễn，2016）。

（二）节庆仪式的组织方式与制度化特征

七府古庙的节庆活动并非自发举行，而是由庙宇理事会统筹组织，并由不同府籍或会馆轮值协助完成。这种轮值制度在春节与关圣帝君诞等重要节日中尤为明显，不仅有助于维持祭祀秩序与公共安全，也使不同府籍华人得以在制度框架内平等参与宗教事务（Nguyễn，2016）。

在仪式内容上，七府古庙的节庆活动以祭祀礼仪为中心，包括上香、献供、诵读祭文与集体跪拜等环节，整体流程庄重而规范。相较于部分华人庙宇中常见的戏曲、歌舞或大型娱乐表演，该庙更强调仪式本身的神圣性，娱乐性成分相对弱化。这一特点使其节庆实践更接近传统关帝庙的祭祀模式，也体现出庙宇在宗教规范层面的自我约束（Trần，2019）。

（三）节庆活动的社会功能：从宗教实践到社区整合

尽管七府古庙的节庆活动在形式上以宗教仪式为主，但其社会功能并不局限于信仰实践本身。通过节庆期间的大规模聚集，华人信众得以在庙宇空间中重新确认彼此之间的社会联系，从而强化跨府籍的共同体认同（Nguyễn，2016）。节庆活动在一定程度上起到调节日常社会关系的作用，使平日因工作与居住分散而相对疏离的群体重新建立互动。

此外，中元节等节庆期间所开展的慈善分发活动，如向贫困家庭提供粮食与生活物资，使宗教节庆成为资源再分配与社会关怀的重要平台。（Vũ Thị Lan，2020）这类活动不仅增强了庙宇在华人社区中的道德权威，也扩大了其在当地社会中的影响力，使节庆实践逐渐超越宗教边界，向公共福利领域延伸（Trần，2002）。

（四）节庆实践与跨族群互动

值得注意的是，七府古庙的节庆活动并非仅限于华人群体参与。部分重要节日亦吸引周边越南民众前来参拜或观礼，使庙宇成为跨族群互动的公共场所。在这一过程中，关帝信仰及其节庆实践被赋予超越族群边界的象征意义，成为连接不同社会群体的文化媒介（Trần，2019）。

这种跨族群参与并未削弱七府古庙的华人宗教属性，反而在一定程度上强化了其作为区域性宗教中心的公共性，使庙宇在越南多元宗教与文化环境中获得持续存在的社会基础（Nguyễn，2016）。

（五）小结：节庆结构与宗教共同体的维系机制

总体而言，七府古庙的节庆活动呈现出以关帝信仰为核心、以岁时节令为框架、以制度化组织为保障的结构性特征（Vũ，2020）。其节庆实践在形式上延续了中国南方华人宗教传统，在功能上则逐渐转向社区整合、慈善分配与跨族群交流的平台（Nguyễn，2016）。通过节庆这一周期性机制，七府古庙得以持续激活华人宗教共同体的内部凝聚力，并在越南社会

语境中不断调整其社会角色，从而实现宗教传统的延续与地方化发展（Trần，2019）。

六、结语

本文以越南南方七府古庙为研究个案，从历史沿革、建筑与神像系统以及节庆实践三个层面，考察了华人移民在异域社会中如何通过关帝信仰与庙宇制度，建构跨府籍的宗教共同体，并在中越文化互动的社会语境中实现信仰的延续与地方化转化。

研究表明，七府古庙并非单一籍贯或会馆的附属宗教空间，而是由来自不同府籍的华人共同创建与维护的区域性信仰中心。其建筑布局与殿堂结构在整体上延续了中国南方关帝庙的传统范式，通过中轴对称、内宫外郭等空间秩序，确立了稳定而清晰的宗教仪式体系。同时，庙宇在选址方式、材料使用与附属建筑设置等方面，又体现出对越南南方自然环境与社会条件的现实回应，显示出华人宗教建筑在移民语境中的适应性调整。

在神像系统层面，七府古庙以关圣帝君为核心，整合道教、佛教及民间信仰神祇，构建起一个功能多元、层级分明的信仰谱系。这种并非严格排他的神祇组合方式，使庙宇能够覆盖信众在伦理规范、现实生活与精神慰藉等多个层面的需求，也反映出华人民间宗教在跨文化环境中的高度包容性。部分具有地方性色彩的信仰元素，如对冥界神祇功能的再诠释，进一步揭示了信仰在实践层面的地方化机制。

从节庆与祭祀实践来看，七府古庙形成了一套以关帝信仰为核心、以岁时节令为时间框架、以理事会制度为组织基础的节庆体系。节庆活动在形式上强调祭祀仪式的规范性与神圣性，在功能上则逐渐超越单纯的宗教实践，成为维系华人社区内部关系、进行慈善分配以及促进跨族群互动的重要平台。通过周期性的节庆实践，七府古庙持续激活并巩固了跨府籍华人宗教共同体的凝聚力。

总体而言，七府古庙不仅是越南南方华人宗教信仰的物质载体，更是一种具有制度意义的社会空间。其长期稳定运行，依赖于建筑形制、信仰体系与节庆机制之间的相互支撑。通过对七府古庙的考察，可以看到华人移民宗教并非静态地“移植”原乡传统，而是在具体社会环境中不断协商、调整与重构。七府古庙的形成与发展，正是华人宗教在东南亚地区实现地方化、制度化与共同体化的重要例证。

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