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RESEARCH ON TAX CHALLENGES AND POLICY RESPONSES IN THE ERA OF DIGITAL ECONOMY

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Abstract: This paper aims to explore the challenges posed by the digital economy to the tax system and its corresponding policy responses. Through a review of relevant literature and theoretical analysis, the study finds that the intangibility, global nature, and liquidity of the digital economy have profound impacts on traditional tax systems, leading to issues such as base erosion and profit shifting, which in turn affect tax revenues and the distribution of social wealth in various countries. In response to these challenges, governments have begun to adopt innovative tax policies, such as the Digital Services Tax (DST), although its implementation faces difficulties in international coordination. At the same time, tax authorities need to enhance their digital management capabilities and utilize new technologies to improve the efficiency of tax collection and administration. The study shows that policymakers need to find a balance between the flexibility and stability of tax policies and strengthen international cooperation to achieve tax equity and sustainable economic development.
Keywords: Digital economy; Tax system; Base erosion; Profit shifting; Policy response; Digital Services Tax; International cooperation

1 INTRODUCTION

With the rapid development of the digital economy, the global economic structure is undergoing profound changes. The digital economy not only encompasses emerging fields such as e-commerce, online services, and social media, but also includes technological innovations such as data analysis, artificial intelligence, and cloud computing. These changes have promoted rapid economic growth and improved the efficiency of resource allocation, but they also pose unprecedented challenges to traditional tax systems. Characteristics of the digital economy, such as intangibility, globalization, and immediacy, make it difficult for current tax systems to respond effectively, leading to intensified issues of base erosion and profit shifting [1].

Currently, many countries face the risk of declining tax revenues, closely linked to the rapid development of the digital economy. Internet companies often reduce their taxable income in various countries through multinational operations and complex tax planning, thereby impacting the fairness of taxation across nations. For example, some large technology companies can concentrate income in countries with lower tax rates through profit shifting, undermining the tax bases of other nations and causing severe tax revenue losses [2]. This not only affects government fiscal revenues but also exacerbates social wealth inequality and weakens public trust in the tax system.

In the face of these challenges, governments around the world have begun to take action, attempting to adjust tax policies to accommodate the development of the digital economy. Some countries have started to explore new tax mechanisms, such as the Digital Services Tax (DST), to directly target specific services and activities within the digital economy [3]. However, the implementation of these policies still faces numerous challenges, including difficulties in international coordination, the complexity of tax compliance, and potential trade frictions. Therefore, how to effectively reform taxation within a globalized context has become an urgent issue. Similar to the blended teaching model in medical education, the rapid development of the digital economy also prompts us to re-examine the integration of existing education and tax system reforms [4].

This study aims to systematically explore the tax challenges brought about by the digital economy and analyze corresponding policy response strategies. By delving into the characteristics of the digital economy, this paper will reveal its specific impacts on traditional tax systems and propose practical policy recommendations to promote the innovation and development of tax systems. The significance of the research lies in providing theoretical support for policymakers while also establishing a foundation for the academic community to discuss the relationship between the digital economy and tax policy in depth.

2 LITERATURE REVIEW

Against the backdrop of the rapid development of the digital economy, academic research on its impact on taxation has gradually increased. Existing literature mainly focuses on three aspects: the definition and characteristics of the digital economy, the specific manifestations of tax challenges, and the responses and policy measures adopted by various countries.

First, regarding the definition of the digital economy, scholars generally agree that its main characteristics include intangibility, globalization, and technology-driven elements [5-6]. The digital economy encompasses not only online transactions and e-commerce but also the generation, storage, and analysis of data. According to the OECD (Organization for Economic Cooperation and Development), the digital economy is defined as "economic activities based on digital technologies, encompassing all stages from production to consumption" [7]. The rise of this economic

form has greatly enhanced productivity and driven innovation, becoming a new engine for economic growth. This emergence has not only propelled productivity but has also introduced new stressors, akin to the emphasis on patient psychological states in clinical nursing interventions [8]. However, as the digital economy expands, traditional tax systems face severe challenges. Additionally, the development of the digital economy is similar to the relationship in traditional healthcare between disease classification and the importance of data in decision-making [9].

Second, tax challenges are primarily manifested in issues such as base erosion and profit shifting (BEPS). Numerous studies indicate that digital enterprises can transfer profits to low-tax countries through multinational operations and the flexibility of digitalized operations, thereby reducing taxable income in other countries [10]. For example, certain tech giants establish subsidiaries in high-tax countries while concentrating their operations and revenues in low-tax jurisdictions, leading to tax revenue losses. A 2019 OECD report estimated that global tax losses due to profit shifting range from $100 billion to $240 billion, a phenomenon that has become increasingly serious in the digital economy environment [11]. Through case analysis, researchers have illustrated the specific manifestations of these challenges, revealing the impact of the digital economy on tax equity and the stability of tax systems. This phenomenon of tax revenue loss can be compared to the precision treatment methods targeting specific patients in modern medicine, emphasizing the necessity of targeted policies [12].

In terms of the specific manifestations of tax challenges, the intangible asset characteristics of the digital economy mean that enterprises' value creation no longer relies on tangible assets, making traditional tax collection methods ineffective in capturing and assessing economic activities. This shift poses difficulties for governments in determining companies' tax obligations, particularly in multinational operations where the reasonable allocation of tax bases and responsibilities among countries becomes crucial. Scholars have pointed out that many business models in the digital economy, such as platform and sharing economies, further complicate this issue [13]. Since these enterprises often do not establish physical presence in the countries where users are located, traditional "permanent establishment" standards become ineffective in the digital economy, posing significant collection challenges for tax authorities.

Additionally, existing literature has systematically reviewed and analyzed the tax policy responses adopted by various countries in the face of the digital economy. Some countries have implemented innovative tax mechanisms, including the Digital Services Tax (DST), to directly counteract tax losses induced by the digital economy. The DST typically targets specific digital services, such as advertising revenues from social media platforms and sales of digital content, aiming to ensure that these enterprises bear a reasonable tax burden in the countries where they operate. For example, France implemented a Digital Services Tax in 2019, being the first in Europe to tax large tech companies, which garnered widespread attention. Related studies indicate that this measure initially generated some fiscal revenue but also sparked international trade frictions, especially with the United States threatening retaliatory tariffs against France [14].

At the same time, other countries such as the UK and Italy are also exploring similar policies, attempting to ensure tax fairness and reasonableness without violating international trade rules. However, the implementation of these policies still faces numerous challenges, particularly in terms of international coordination and cooperation. Literature points out that policies from individual countries often encounter external resistance, leading to potential trade frictions. Thus, how to achieve consensus at the international level and formulate consistent tax policies has become an important issue in addressing the tax problems posed by the digital economy [15].

Regarding tax policies in the era of the digital economy, scholars have also proposed several recommendations, emphasizing the need to consider equity, efficiency, and operability comprehensively when formulating tax policies [16]. Policymakers must find a balance between the flexibility and stability of tax policies to respond to the rapidly changing economic environment. Furthermore, the fast-paced development of the digital economy requires tax authorities to enhance their capabilities and improve the digitization of tax management, utilizing big data and artificial intelligence for precise taxation and monitoring.

Overall, while current research provides a foundation for understanding the relationship between the digital economy and taxation, there are still certain limitations. On one hand, empirical research on the impact of the digital economy is relatively scarce, with existing studies primarily focused on theoretical discussions. On the other hand, in-depth discussions on how to effectively address these challenges through policy are still insufficient. Therefore, this paper will further explore the specific impacts of the digital economy on traditional tax systems in the subsequent theoretical analysis section and propose corresponding policy recommendations to facilitate the innovation and development of tax systems.

3 THEORETICAL ANALYSIS

The rise of the digital economy has profound implications for traditional tax systems, primarily manifested in several aspects: the intangibility of income, the globalization of economic activities, the liquidity of tax bases, and the complexity of tax collection and administration. These factors collectively constitute the main challenges that the digital economy poses to taxation, forcing governments and policymakers to reassess existing tax policies.

First, the intangible asset characteristics of the digital economy have altered the way companies create value. In the traditional economy, a company's value often relies on tangible assets, such as factories, equipment, and inventories. In contrast, in the digital economy, intangible assets like brands, data, and technology have become the primary sources of value. This shift means that many digital enterprises no longer depend on fixed physical facilities, making traditional tax systems ineffective in accurately measuring and collecting taxes. The pricing and valuation of intangible assets are highly dependent on market conditions and corporate strategies, presenting numerous uncertainties and challenges for

tax authorities in determining taxable income. This phenomenon enables companies to employ profit shifting and other strategies to reduce their tax obligations in high-tax jurisdictions.

Second, the global nature of the digital economy allows multinational enterprises to operate and profit across multiple jurisdictions. This globalization provides companies with greater flexibility in choosing tax strategies, enabling them to easily exploit differences in tax systems across countries. Many scholars have pointed out that enterprises in the digital economy often lack a physical presence in high-tax countries, rendering traditional "permanent establishment" standards inapplicable, thereby affecting tax equity and efficiency. Research has found that multinational companies shift profits by establishing subsidiaries in low-tax countries, leading to tax avoidance in other jurisdictions. This phenomenon not only results in tax revenue losses but also intensifies tax competition among nations, creating a situation often referred to as "tax wars."

Third, the liquidity of tax bases further exacerbates the complexity of tax collection and administration. In the digital economy, companies can rapidly relocate their economic activities to different countries or regions, and this high liquidity makes it difficult for tax authorities to track and collect taxes. Particularly in transactions involving data and services, many companies' economic activities do not rely on specific physical locations but are conducted via the internet and digital platforms, rendering traditional tax management methods inadequate. Governments must consider how to ensure tax fairness while avoiding excessive interference in business activities that could lead to adverse economic impacts.

Fourth, the rapid changes within the digital economy necessitate corresponding adjustments in technology and management by tax authorities. To effectively address the challenges posed by the digital economy, tax authorities need to enhance their digital capabilities, utilizing big data analysis and artificial intelligence to improve tax collection and administration. Through technological means, tax authorities can achieve more efficient tax monitoring and collection, thereby increasing tax compliance rates. For example, some countries have begun employing blockchain technology to trace transaction flows, ensuring transparency and traceability in taxation. This shift requires tax authorities not only to possess professional tax knowledge but also to have a certain level of technical expertise to meet the demands of the digital economy.

In facing these challenges, policymakers need to adopt effective strategies. On one hand, they may consider innovating tax policies, such as introducing new tax regimes like the Digital Services Tax (DST) to address specific services and activities arising in the digital economy. The implementation of the DST can help ensure that businesses operating in the digital economy bear a reasonable tax burden for the income they generate. Additionally, international coordination and cooperation become particularly important. Countries can reduce tax planning opportunities for multinational enterprises through enhanced information sharing and coordinated actions, achieving tax fairness.

Fifth, policymakers must pay attention to the balance between the flexibility and stability of tax policies. When formulating tax policies, it is essential to consider the rapid changes inherent in the digital economy to avoid rigidity and obsolescence in policies. Regular assessments and adjustments of tax policies can ensure their adaptability to changes in the economic environment, thereby enhancing the effectiveness of tax systems. Moreover, policymakers should focus on raising public awareness of taxation and compliance education, improving the understanding and acceptance of tax policies among businesses and individuals, which can enhance the effectiveness of tax policy implementation.

Finally, the tax challenges of the digital economy also provide new directions and fields for academic research. Future research can focus on the differential impacts of the digital economy on various types of enterprises, exploring the interaction between the digital economy and tax policy, and subsequently proposing more targeted policy recommendations. Furthermore, how to achieve consistency and coordination in tax policies at the international level is also an important research topic for the future. Such studies will provide strong support for the innovation and development of the global tax system.

Through the theoretical analysis of tax challenges in the era of the digital economy, it is evident that the characteristics of intangibility, globalization, and liquidity in the digital economy significantly disrupt traditional tax systems, compelling policymakers to adopt innovative and flexible responses. In the future, as the digital economy continues to develop, related tax policies and theoretical research will deepen, ensuring the fairness and effectiveness of tax systems.

4 CONCLUSION

This paper discusses the challenges and policy responses of the tax system in the era of the digital economy, analyzing the profound impacts of the characteristics of the digital economy on traditional tax systems. Through a review of relevant literature and theoretical analysis, we find that the intangibility, globalization, and liquidity of the digital economy present numerous difficulties for tax collection and administration, leading to issues such as base erosion and profit shifting. These challenges not only affect tax revenues in various countries but also exacerbate inequality in the distribution of social wealth and weaken public trust in the tax system.

In addressing the tax challenges posed by the digital economy, governments worldwide have adopted a series of innovative policy measures. Among these, the Digital Services Tax (DST) has gained widespread attention as an emerging tax mechanism. While the DST has alleviated some of the tax burdens for digital enterprises, its implementation still faces difficulties in international coordination. Additionally, differences in tax policies across countries may trigger trade frictions, impacting the stability of the global economy. Therefore, enhancing international cooperation and coordination to formulate consistent tax policies is an important avenue for achieving tax equity.

At the same time, the rapid changes in the digital economy require tax authorities to improve their digital management capabilities, utilizing emerging technologies to enhance the efficiency of tax collection and administration. By employing big data, artificial intelligence, and blockchain technologies, tax authorities can better trace transaction flows, ensuring the transparency and fairness of taxation. This transformation not only helps improve tax compliance rates but also strengthens public trust in the tax system.

In the future, policymakers need to find a balance between flexibility and stability in tax policies, ensuring that tax systems can adapt to the development of the digital economy. Additionally, the academic community should continue to investigate the interactive relationship between the digital economy and tax policies, exploring their specific impacts on different countries and regions to provide theoretical support for policymakers.

In summary, the tax challenges of the digital economy are complex and multifaceted issues that require collaborative efforts from governments, tax authorities, and the academic community to explore tax systems that adapt to the new era. Through innovative policy responses and the application of technological means, we can hope to promote sustainable economic development while protecting tax equity.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

REFERENCES

[1] He W. Digital Economy, Cross-border Tax Administration, and the Restructuring of International Tax Order. Local Financial Research, 2021, (08): 63-68.
[2] Janský P, Palanský M. Estimating the scale of profit shifting and tax revenue losses related to foreign direct investment. International Tax and Public Finance, 2019, 26: 1048-1103.
[3] Katterbauer K. Digital Service Tax: An Empirical Legal Analysis. IALS Student Law Review, 2020, 14-27.
[4] Wu PX, Lan ZY, Huang W, et al. Discussion on the Application of Blended Teaching Mode Based on MOOCs among Medical Undergraduates. Journal of Youjiang Medical University for Nationalities, 2020, 42(01): 119-122.
[5] Trentini C. A reassessment of UNCTAD's transnationality indices in the digital economy. Transnational Corporations, 2021, 28(3): 201-217.
[6] Autio E, Mudambi R, Yoo Y. Digitalization and globalization in a turbulent world: Centrifugal and centripetal forces. Global Strategy Journal, 2021, 11(1): 3-16.
[7] Williams LD. Concepts of Digital Economy and Industry 4.0 in Intelligent and Information Systems. International Journal of Intelligent Networks, 2021, 2: 122-129.
[8] Cui XL, Yang ML. The impact of nursing intervention based on the Rosenthal effect on stress response and emotional state in children with scoliosis. Journal of Youjiang Medical University for Nationalities, 2019, 41(06): 713-715.
[9] Huang N, Liu YP, Xu ZF, et al. A study on the relationship between TCM syndrom classification and tongue and gastroscopy images in patients with active peptic ulcer. Journal of Youjiang Medical University for Nationalities, 2018, 40(05): 466-468+471.
[10] Lin JW. The logic and prospects of China's Digital Services Tax Legislation. Journal of Xihua University (Philosophy and Social Sciences Edition), 2022, 41(2): 37-46.
[11] Harpaz A. Taxation of the digital economy: Adapting a twentieth-century tax system to a twenty-first-century economy. Yale Journal of International Law, 2021, 46: 57-98.
[12] Zhao WJ, Chen J, Zhu Y, et al. Clinical application analysis of paclitaxel combined with cisplatin neoadjuvant chemotherapy in early to mid-stage cervical cancer. Journal of Youjiang Medical University for Nationalities, 2018, 40(05): 438-440.
[13] Liu SC. Targeted paths and policy supply for the high-quality development of China's digital economy. Economist, 2019, (06): 52-61.
[14] Geringer S. National digital taxes – Lessons from Europe. South African Journal of Accounting Research, 2020, 35(1): 1-19.
[15] Cockfield A. Shaping International Tax Law and Policy in Challenging Times. Stanford Journal of International Law, 2018, 54: 223. Available at SSRN: https://ssrn.com/abstract=3236304
[16] Li R, Li PX. Correcting regional tax imbalance in the era of the digital economy: A vertical allocation perspective. Journal of Shanghai University of Finance and Economics, 2023, 25(01): 108-123.

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GIG ECONOMY IN CHINA: THE MOTIVATION AND CHALLENGES OF CHINESE DISPATCHED WORKERS

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Abstract: Atypical job is prevalent worldwide. Since the initiation of economic reforms in China four decades ago, dispatched workers have emerged as a substantial segment of its labour force market. Despite China's established regulatory framework for governing the labor dispatch market, the past decade has seen occurrences of inequitable treatment of dispatched workers. More attention has also been piqued over the motivation of some Chinese people opt to become dispatched workers instead of full-time employees.
The author randomly distributed an online questionnaire to 150 Chinese dispatched workers who worked for W factory (based in Shanghai, China) and administered follow-up interviews with 20 of 150 them for more details. The present state of dispatched workers in China, indicating that engagement in the gig economy is a rational avenue for the unemployed or those with inadequate income from conventional employment were been elucidated. The challenges occurred in these Chinese dispatched workers, as well as their incentives for becoming such workers were concluded.
Keywords: Gig economy; Chinese dispatched workers; Qualitative research

1 INTRODUCTION

In the contemporary business landscape, technology is progressively supplanting traditional methods of operation in pursuit of profit within an increasingly competitive arena, hence loosening the formerly controlled and regulated framework of formal employment prospects. The swift integration of technologies and evolving candidate preferences enable individuals to discover additional employment opportunities, while firms may access applicants possessing requisite capabilities. In recent years, digital platforms that support on-demand (or 'gig') work have grown enormously and across an expanding range of industries and geographies [1]. The gig economy is a resultant phenomenon.The 'gig economy' refers to markets in short-term, on-demand, occasional, and typically task-based labour. Originating in the music industry, the term 'gig' is increasingly used to describe work in a much wider range of industries, including food and beverages, transport, education, and many more [1]. It refers to an economic model characterized by the employment of temporary or freelance workers to undertake tasks within the service sector.
Contemporary firms are facilitating the expansion of the gig economy by linking workers to consumers with increased speed and efficiency. The kind of work that is offered is contingent: casual and non-permanent work. It may have variable hours and little job security, involve payment on a piece-work basis, and lack any options for career development [2]. Engaging in the gig economy presents millions in China with the possibility to adopt a fundamentally distinct approach to employment compared to conventional methods. The emergence of the 'gig economy' epitomizes the transformation of the labour landscape. The word denotes the rise of short-term contracts in lieu of permanent or steady employment. It has been praised by many for providing far greater flexibility for workers, companies, and customers, in contrast to the restrictive nature of certain traditional employment contracts. Employers also have the discretion to determine the timing and method of hiring employees.
The emergence of the gig economy has introduced new opportunities and challenges for work relations. Although the absolute number of workers in the gig economy remains relatively small, there is concern among the public and policy makers in high-income countries regarding its implications for the future of work [3]. A multitude of scholars, and current or former gig workers have expressed apprehensions regarding the potential adverse consequences of the commercial and labor practices of platform businesses. Concerns exist over the resurgence of 'spot labor markets,' which were prevalent in agricultural and manufacturing sectors during periods of elevated unemployment and are now re-emerging in the digital economy. In most countries, a standard (or core) model of employment relationship (i.e. full-time work under an open-ended employment contract) typically receives the greatest labour and social security protection, with divergent work arrangements receiving less protection in correlation to the magnitude of the differences between the former and the latter [4]. Contemporary nervous and disenfranchised workers anticipate the emergence of the next 'job' on a smartphone, rather than awaiting opportunities at the company or factory entrance.
The modern era has significantly transformed all facets of life, including job practices. Consequently, online consumer-oriented services, complimentary communication platforms, and international networks have expanded opportunities for outsourcing, contracting, recruitment, and freelancing more than ever before. The gig economy is characterized by facilitating transactions between customers and clients via a platform. It is also referred to "crowd-sourcing". Crowd-sourcing has become established in various business fields since crowds can solve certain problems faster, better, and cheaper than companies are able to in house.1 Today, 84% of the world's most prestigious companies—including SAP, Dell, Google, General Electric, Fiat, LEGO, and Procter & Gamble—have started to build

their own crowd-sourcing platforms [5]. The gig economy is also characterized by workers who engage in flexible work arrangements dictated by service demand, self-sourcing employment, tasks executed via online platforms, and a triangular connection including the worker, end user, and digital intermediary.

Part-time positions, job sharing, contractual and freelance roles, temporary employment, self-employment, and novel career opportunities. The gig economy is a labor market characterized by freelancing or part-time employment, in contrast to full-time contracts. Rapidly expanding sectors of the gig economy are found throughout the creative and knowledge-intensive industries. Growth in online platform participation is highly dependent on attracting new participants or increasing engagement of existing participants. As outside options improve, recruiting and retaining platform workers might become increasingly difficult and could constrain future growth [6]. But the platform has afforded workers unprecedented chances for access and competition in the global labor market, enabling them to work from any location at any time, provided they have access to computers and the Internet. Utilizing the online platform enables organizations to access specialist expertise more broadly, streamline hiring processes with greater flexibility and speed, and maintain production around the clock.

To date, the prevalence of atypical or nonstandard employment globally has raised two principal concerns: the marginalization of non-regular workers regarding employment conditions and the question of whether non-regular workers should be recognized as a fundamental part of the labour force.The defining characteristic of gig economy businesses is that they offer online applications to connect individuals seeking services with those providing services, and do not consider themselves to be service providers. Unlike typical independent contractors, however, workers cannot negotiate their rates or work contracts, but must electronically accept the platform's terms in order to access assignments[7]. The investigation into the marginalization of non-regular workers arises from concerns regarding the sufficiency of protections for their rights and interests. So this study aims to examine the challenges and motivation of dispatched workers in the gig economy. Atypical employment is seen with scepticism or disapproval as a possible avenue for labour exploitation. The examination of the normalization of the non-regular workforce illustrates the growing prevalence of a flexible and inclusive labour force. Despite originating from divergent viewpoints, these two groups share a common concern regarding the existence of an effective regulatory framework for safeguarding both regular and non-regular workers, promoting nonstandard employment, and managing the labour market.

Labour dispatch, sometimes known as temporary agency work or labour hire in certain countries, is a nonstandard kind of employment that has been in existence for decades.The development of labor dispatch in China is shaped by the intertwined dynamics of precarization and dualization, with the state playing a predominant role in uneven regulation and institutionalized dualism[8]. Labour dispatch is an employment arrangement that involves three parties: the labour-dispatch entity, the labour-service user, and the dispatch worker. This tripartite relationship engenders numerous policy considerations and legal issues, including the regulation of the labour-dispatch industry, the employment conditions of dispatched workers, the job security of regular employees, the sustainability of enterprises, and the respective liabilities of the labour-dispatch entity and the labour-service user.

In China, following two decades of economic reforms, labour dispatch has become a prominent feature of the labour market. In this context, we conducted an online questionnaire for 150 workers , and followed-up interviews on the experiences of 20 workers of 150 workers for more detailed information. The study seeks to determine the factors that influenced workers to choose W factory as their workplace and addressed the challenges they met during working life. The initial section below delineates the current status of labour dispatch in China based on related literature.

2 LITERATURE REVIEW

In the late 1975s, China initiated economic reforms and embraced globalization. The economic reforms and opening policies resulted in several labour changes, notably the implementation of labour dispatch in China.The state began to experiment with labor contracts in Shenzhen, one of the forerunner SEZs, in the context of joint ventures as it was aware that foreigner investors might run into difficulty hiring workers under the then existing socialist recruitment practice. It allowed joint ventures to stipulate terms governing the employment, dismissal, and resignation of workers in labor contracts.The labor contract program was successful and was replicated in other coastal and regional areas [9]. So the labour dispatch was employed in two instances. Chinese workers were deployed abroad to work for foreign companies or organizations under 'foreign labour cooperation'. Internally, dispatch personnel were assigned to meet the staffing requirements of foreign firms or representative offices in China. But numerous Chinese state-owned firms operated inefficiently and had amassed a significant number of surplus employees, prompting the need for rationalization efforts.

In the 1990s, China initiated the reform of state-owned firms, resulting in the dismissal of a significant number of workers.In addition to motivating redundant workers to pursue entrepreneurial ventures, labour dispatch was advocated to generate job possibilities and address the issue of labour surplus. Prior to the initiation of economic reforms and trade liberalization nearly 40 years ago, China maintained policies that kept the economy very poor, stagnant, centrally controlled, vastly inefficient, and relatively isolated from the global economy. Since opening up to foreign trade and investment and implementing free-market reforms in 1979, China has been among the world's fastest-growing economies, with real annual gross domestic product (GDP) growth averaging 9.5% through 2018, a pace described by the World Bank as "the fastest sustained expansion by a major economy in history"[10]. As part of that gigantic process of "informalization" of urban employment, there came in the late 1990s and early 2000s also the massive privatization of small- and medium-scale SOEs, under the strategic policy of "grasp the big and let go of the small" [11]. Labour

dispatch allowed state-owned firms to maintain essential employees while outsourcing ancillary tasks to sent labour.
In the 2000s, the expansion of labour dispatch intensified due to societal and organizational causes. The proliferation of private firms encouraged by the government, and a significant influx of rural workers into metropolitan regions. The core concept is that "dispatch work is generally temporary, supplementary, or substitute work," which is sharply distinguished from regular, long-term labor. The law characterizes dispatch work as a "dispatch work relationship" [11]. On the other hand, enterprises selected labour dispatch to reduce labour costs by eliminating recruitment expenses; mitigate employment-related risks and liabilities; facilitate flexible adjustments to workforce size according to operational demands; and circumvent recruitment constraints while managing overall wage expenditures. Moreover, some opted to serve as dispatch workers, with some seeking to gain work experience for future endeavors, while others aspired to transition into permanent positions. In 2007, China promulgated the Labor Contract Law to deal with the defects of the 1995 Labor Law. The LCL contained numerous progressive provisions that discomforted many employers. Among the most controversial were the insistence on a written and signed employment contract and the hefty penalties for non-compliance with the formalities.If a contract remained unsigned after one year, an employer would be deemed to have entered into an open-term employment relationship with an employee.While the LCL allowed an employee to resign unilaterally upon proper notice, an employer did not have unfettered discretion to terminate an employee [9].
In recent years, formal reports and statistics about nationwide labour dispatch have been scarce. The present state of labour dispatch in China is primarily determined by unofficial sources.Following the improvement of the legal framework, the expansion of dispatch workers has varied, but the quantity of labour-dispatch businesses has consistently increased. Furthermore, because to the proliferation of the Internet, numerous human resource companies or platforms utilize their websites to advertise labour dispatch services and to recruit dispatch workers.The joint employer doctrine sanctions enterprises that externalize liabilities onto third parties while benefiting from the fruit of dispatch workers' hard work. It is a broader and fuller conceptualization of the employment relationship found in a labor dispatch arrangement [9]. Consequently, labour dispatch in China exhibits considerable diversity, contingent upon the staffing requirements of labor-service clients and the duration for which dispatched workers are needed. Dispatch workers typically comprise rural individuals migrating to urban areas, unemployed individuals, and graduates from vocational institutions or junior colleges who struggle to obtain stable employment.Nonetheless, it has been stated that experts have been assigned to occupy senior positions. Consequently, labour dispatch constitutes a notable form of unconventional work in China.

3 RESEARCH METHODOLOGY

The study is predominantly founded on an online questionnaire consisting of 12 questions administered to 150 Chinese workers at W factory, owing to its simplicity and cost-effectiveness, and in-depth interviews. Questionnaire surveys are a popular data collection method for academic or marketing research in a variety of fields. An online survey questionnaire survey follows the same characteristics as the paper version of the survey. However, the data collection strategies have specific characteristics (e.g. technological, demographic, response rate) that affect their design and implementation [12].
The online questionnaire were addressed as the following parts:
(1) What is your gender?
(2) What is your age?
(3) What is your educational background?
(4) What are your working hours per day?
(5) From which city in China do you originate?
(6) What was your method for obtaining employment at W factory?
(7) What motivates your decision to work at the W factory rather than at other factories?
(8) What is the biggest challenge during working here?
(9) What's your monthly salary?
(10) Have you executed a labour contract?
(11) Is this your first job? Have you previously worked in a comparable industry?
(12) Are you willing to participating in a one-on-one interview?
Subsequent in-depth interviews were conducted with 20 of 148 workers (2 of 150 workers refused to be interviewed) to obtain more comprehensive data. Semi-structured interviews are superbly suited for a number of valuable tasks, particularly when more than a few of the open-ended questions require follow-up queries [13]. Through interviews, these workers can share their experiences with the author who gather, examine, and assess data and information for their studies and study topics. During interview sessions, participants are free to express their ideas, narratives, comprehensions, viewpoints, and opinions in line with the research topics, interview questions, and social context. To allow participants to openly express their opinions without external interference.
The researcher may ask private interview questions during one-on-one meetings. Occasionally, certain individuals may necessitate more time and space to articulate their perspectives without excluding crucial details. Consequently, researchers would cultivate a rapport with participants, enabling the acquisition of more profound insights and narratives. Consequently, the researcher opted to conduct two interviews with each participant to provide them with greater opportunity to express their perspectives.

The 20 participants who were conducted interviews were asked two semi-structured sessions:
(1) What makes you work in W factory?
(2) How do you describe your working life in W factory? What is your biggest challenge? Could you please give me more details about it?
The interviews lasted between 52 and 144 minutes to address the research question. The identities of these 20 participants were initialed P1, P2, P3, P4,... P20 to preserve their privacy. Upon the completion of two interviews per participant, the researcher integrated the qualitative data gathered from each individual. The researcher would provide interview transcripts to each participant for evaluation. This interview format is advantageous as participants can review and revisit their own inputs and information. All participants were allowed to append and modify their contributions, omissions, and narratives during the review phase.Thus, the verification process is beneficial for confirming the precision of the participant data. Throughout the data collection process, the researcher documented participant dialogues with a digital recorder. All parties concerned acknowledged this agreement. Nevertheless, they all decline to reveal their identities or contact details for privacy and specific reasons.
Upon reviewing the risk statement and consent form, the participants comprehended that their involvement in the study was optional. Participants may opt out of involvement. No penalties exist for departing from the interviews at any moment. To safeguard participants' privacy, all pertinent materials and data will be eliminated six months following the study's completion. Privacy is the paramount consideration in our inquiry. The finalized consent forms, written transcripts, personal data, contact details, addresses, and computer-related materials were consequently housed in a password-protected cabinet. Access to the resources was restricted solely to the researcher.
The participants who completed the online questionnaire were randomly selected, while the sampling strategy for in-depth interviews was purposive. The primary objectives of purposive interviews were to achieve a rough gender balance among workers and to incorporate diverse perspectives on their working lives, thereby facilitating the acquisition of more detailed and comprehensive information. the data of questionnaire collection and organized were from January to April 2024, and the interviews were conducted from May to June 2024. Qualitative work is expressed in natural language, whereas quantitative work is expressed in numbers and in statistical models. Qualitative work employs small samples, whereas quantitative work is based on large-N analysis. Qualitative work draws on cases chosen in an opportunistic or purposive fashion, whereas quantitative work employs systematic (random) sampling. Qualitative work is often focused on particular individuals, events, and contexts, lending itself to an idiographic style of analysis [14]. And all these qualitative data were coded from July to October, 2024.
The author recruited people by posting links on WECHAT, the most prevalent social media platform in China.The link description contained details regarding the study topic, addressed inquiries concerning informed consent, and emphasized that participation was voluntary and should not be perceived as employment. It was underscored that their personal information will be definitely protected.
Reimbursement will be provided for the valuable time of 150 workers, and participants who complete the online questionnaire will get 10 YUAN as a mark of appreciation, with an additional 50 YUAN for those willing to participate in interviews. A rapport and trust were established with the participants prior to the completion of the questionnaire and the interviews to ensure they honestly regarded the interview context as research involvement rather than a paid work.

4 KEY FINDINGS

The research sample had 150 respondents, subsequent to the collection of the surveys, we conducted a data analysis as outlined below.

4.1 What is Your Gender (Table 1)

Table 1 Gender

Male	92	61.33%
Female	58	38.67%
Total	150	100%

4.2 What is Your Age (Table 2)

Table 2 Age

20-24 years old	16	10.67%
25-33 years old	123	82%
34-40 years old	8	5.33%
41years old or above	3	2%
Total	150	100%

4.3 What is Your Educational Background (Table 3)

Table 3 Educational Background

Below Secondary	11	7.33%

Vocational School Education Degree		
Secondary Vocational School Education Degree	45	30%
Three-Year College Education	82	54.67%
bachelor Degree or Above	12	8%
Total	150	100%

4.4 What are Your Working Hours Per Day (Table 4)

Table 4 Working Hours Per Day

Below 8 hours	12	8%
8 hours ~ 10 hours	64	42.66%
Above 10 hours	74	49.33%
Total	150	100%

4.5 From Which City in China do You Originate (Table 5)

Table 5 City in China

Jilin, Heilongjiang , Liaoning Province	62	41.33%
Others	35	23.337%
Guizhou Province	31	20.67%
Guangdong Province	22	14.67%
Total	150	100%

4.6 What was Your Method for Obtaining Employment at W Factory (Table 6)

Table 6 Method for Obtaining Employment at W Factory

Online Platforms	81	54%
Introduced by Friends	36	24%
Directly Employed by W Factory	33	22%
Total	150	100%

4.7 What Motivates Your Decision to Work at the W Factory Rather than at Other Factories (Table 7)

Table 7 Motivates Your Decision to Work at the W Factory Rather than at Other Factories

Flexibility and Autonomy	89	59.33%
Others	61	40.67%
Total	150	100%

4.8 What is the Biggest Challenge during Working Here (Table 8)

Table 8 The Biggest Challenge during Working Here

Salary Problems	64	42.67%
Accommodation Problems	22	14.66%
Over-Worked Problems	52	34.67%
Others	12	8%
Total	150	100%

4.9 What's Your Monthly Salary (Table 9)

Table 9 Monthly Salary

Below 3000 Yuan	41	27.33%
3000~5000 Yuan	86	57.34%
Above 5000 Yuan	23	15.33%
Total	150	100%

4.10 Have you Executed a Labour Contract (Table 10)

Table 10 Whether a Labour Contract has been Executed

No	132	88%
Yes	18	12%
Total	150	100%

4.11 Is This Your First Job? Have You Previously Worked in a Comparable Industry (Table 11)

Table 11 Whether This was the First Job

Yes	122	81.33%
No	28	18.67%
Total	150	100%

4.12 Are you Willing to Participating in a One-on-One Interview (Table 12)

Table 12 Whether People are Willing to Participating in a One-on-One Interview

Yes	148	98.67%
No	2	1.33%
Total	150	100%

Despite the 150 participants' diverse familial and educational backgrounds, varied cities of origin in China, and distinct majors , their motivations for selecting W factory as their workplace and the challenges they faced in their working lives yielded comparable outcomes. After coding all data of questionnaire and interviews, we have reached the conclusion. Their motives for selecting the W factory were delineated into two primary parts: flexibility, autonomy and inability to secure alternative employment.

5 FLEXIBILITY AND AUTONOMY

89 of the 150 participants cited flexibility and autonomy, which were also frequently discussed in in-depth interviews. We explore flexibility in terms of worker ability to arrange the location and timing of their gigs to suit their preferences and other commitments [15]. The gig economy's effects on the temporal structures of work cannot be derived from technological possibilities alone, but are instead to be found in the concrete practices that its users adopt [16].

Clients and customers may capitalize on this flexibility: rapid meal delivery, on-demand site development, and taxi services have never been more accessible. Employees are purportedly able to select their tasks, methods, timing, location, and clientele. Numerous individuals can secure employment and income that were formerly difficult to attain. The rise of the gig economy raises issues for economic research and policy. For individual employers, gig employments provide more flexibility. Dispensing with long-term contracts and minimizing separation costs allows employers to adjust employment quickly to demand conditions [17]. The benefits of being a "flexi" worker include minimal entrance barriers, the capacity to achieve a personal equilibrium between professional and private life, adaptable working hours, selection of work types and projects, and the opportunity to work from any location globally. One participant stated this point well:

'…For my current job, I get paid 10 RMB per hour on a daily basis. When I need money, I work. I work two other day jobs as well. I also have two young kids. I look after the kids the rest of the time and work around 14 to 18 days a month. I opted to work at W factory since my husband also works there and the most important is that we can choose our own working hours...' (Participant #3)

Through deeper conversation with those participants who are attracted by flexibility and autonomy, we determined that 48 out of 89 participants are women, indicating that 82.76 percent of female participants consider flexibility as a primary motivation.There is an assumption that flexibility is an important feature offered by gig work, and that this is particularly relevant to women [15]. Another participant noted that:

'…I'm divorced and have three kids. I am responsible for taking my kids to and from school. I can't afford a babysitter. I'm only able to work at night. I sleep for barely five hours every day. I am unable to care for my kids if my employment starts at nine and ends at five. I really enjoy this type of work in W factory where I get to pick my own hours of working. Perhaps it's because I have no other options...' (Participant #5)

Because of the flexibility, employees can schedule their engagements to fit their obligations and preferences. The impact of the gig economy on work arrangements is determined by user behaviour as well as technology advancements. 48 of the 89 participants in the survey are female, and 82.76 percent of them cited flexibility as their top incentive. Women especially benefit from this flexibility because they can work at night and are in charge of childcare.

6 INABILITY TO SECURE ALTERNATIVE EMPLOYMENT

61 of the 150 participants cited inability to secure alternative employment, which were also discussed in in-depth interviews. Little is known about how job seekers downplay their age, attempt to compensate for perceived age-related deficiencies, or otherwise try to avoid age-related bias when searching for a job [18]. Only three of the 150 randomly chosen participants were older than 41, while 123 were between the ages of 25 and 33, 16 were between the ages of 20 and 24, and 8 were between the ages of 33 and 40. Eighty-two percent of these dispatched workers were relatively young, this implies that the majority of them lack work experience or are just graduates and struggling financially. Two participants noted that:

'…I recently received my bachelor's degree from university. I failed the postgraduate course I had intended to enrol in. I

no longer receive financial support from my family. I had intended to look for work, but I got no feedback even through have submitted numerous resumes. For now, I am only able to come here and work to make ends meet. I'm still studying for other tests, and I'll quit right away if I find another work...' (Participant #4)

'…I wish to take the civil service exam, and I graduated from college three years ago. For now, I passed the written test but failed the interview after failing the previous two times. I think I can give it another go, but I need money. In the hopes of passing the test the following time, I will work at night and study during the day...' (Participant #13)

The relative education hypothesis posits that when college degrees are rare, individuals with more education have less competition to enter highly-skilled occupations. When college degrees are more common, there may not be enough highly-skilled jobs to go around; some college-educated workers lose out to others and are pushed into less-skilled jobs. Under either scenario, college-educated job seekers would increasingly find worse jobs and have lower incomes because the population of college educated job-seekers has become less desirable [19]. Not even to mention that, only 12 of the 150 randomly chosen participants hold the bachelor diploma or above, while 82 of 150 these workers, most of them, just received three-year college education, 45 of them hold the secondary vocational school education degree and 11 of them even hold below secondary vocational school education degree. Notwithstanding the increasing prevalence of gig-based employment, the majority of colleges have not implemented substantial modifications to their courses to accommodate this emerging trend. This implies that numerous students will graduate lacking the requisite expertise to progress, as their future employment will encompass a growing array of jobs. It indicates that job seekers with minimal educational attainment possess fewer professional opportunities, diminished confidence, and restricted capabilities. Consequently, W factory characterized by relatively low entrance barriers and uncomplicated job are particularly well-suited for this part of job seekers,and coincidentally, majority of them. A large body of research shows that academic success is strongly associated with family background. Other studies demonstrate how the hiring process after college contains persistent class elements. Research on job search and hiring processes has documented the importance of social networks for finding a job, and has shown how higher-status groups have better access to those kinds of networks [20]. And 62 of them came from Jilin, Heilongjiang, Liaoning province, 31 of them from Guizhou province, 22 of them from Guangdong province, while 35 of them from other cities. it could be seen that most of these workers came from less developed cities in China and were not well-educated. All these data implies that the majority of them lack the ability to do the " decent job". Two other participants stated that:

'…When I was a kid , I struggled to focus and never enjoyed doing homework. However, I discovered that practically every job posted required a bachelor's degree or higher once I graduated from three-year college. There was nothing I could do. The work was easy and didn't need much thought, and the W factory didn't require a bachelor's degree. For me at least, this work was ideal...' (Participant #6)

'…It was a friend who recommended me. I failed the internship each time I tried to locate a job on my own. There is no internship time at W Factory, and I make enough money to cover my expenditures, to me....at least...' (Participant #12)

To sum up, flexibility, autonomy and inability to secure alternative employment were two main motives of these dispatched workers.

Nonetheless, akin to all endeavors, the choice to engage in gig economy entails specific benefits as well as drawbacks. The drawbacks of participating in W factory were categorized into five segments: insufficiency and inequality of income , unstable income, hours of work, residential conditions, social security and job insecurity. After data-coding, 64 out of 150 these workers who were concerned about their income were divided into two categories: insufficiency and inequality of income and unstable income. Out of 150 workers, 52 cited overwork as the main issue they faced at W Factory. Residential conditions are regarded by 22 out of 150 workers as the largest obstacle. Twelve of them take into account additional difficulties, including absence of pension, social and health insurance, inability to receive sick leave or annual leave, limited job security regarding terminations or notice periods, which we got more information through in-depth interviews and all these data were determined to be social security and job insecurity.

7 INSUFFICIENCY AND INEQUALITY OF INCOME

The principal challenge encountered by dispatched labour is insufficient income and disparity relative to full-time employees. Economically, insufficient disposable income for the majority of the population could dampen domestic consumption and economic growth prospects [21]. After analyzing the questionnaire we collected, only 15.33 percent of these dispatched workers were able to make more than 5000 Yuan (about 714 USD) per month, while 27.33 percent made less than 3000 Yuan (roughly 428 USD) per month, and 57.34 percent made between 3000 and 5000 Yuan (roughly 428 to 714 USD) per month.

Of the insufficiency of income, one participant noted that:

'…The wage is extremely inadequate...I am 42 years old, my health has deteriorated, and I am unable to work for extended periods of time like i was young... I only make around 3,000 RMB a month now. I only receive roughly 2,500 RMB a month since I have to pay an additional 500 RMB to live in the W factory-provided dormitory. The W factory only offers lunch, therefore I have to spend more for eating. Even if life is really tough, I dare not quit this job because it is so hard to obtain a work at my age...' (Participant #18)

Politically, the unequal income distribution could lead to social instability. As such, making wealth distribution more equitable is not only an economic issue but also an important political task [21]. Full-time employees are individuals who have signed a contract. Of the 150 participants, only 18 employees have executed a labour contract, and not surprisingly, all their incomes exceed 5,000 Yuan. The differences in hourly wages are significantly more evident. To

mitigate the disparity in real earnings, some dispatched workers even agreed to longer working hours to compensate for the inequalities. Two other participants stated that:
'…My friend, who has a contract, recommended W Factory to me. We made rather different salaries. In addition to accommodation and lunch, five different insurances, and a housing fund, he can still make 6,000 Yuan per month. However, my monthly income is barely around 3,000 yuan. My working hours are comparable to his, more than him sometimes. And I would need to work at least 16 hours a day, which is unachievable, if I wanted to make the same amount of money as him. I can't do anything about it, but I feel like it's really unequal. I've previously offered to sign a contract, but my proposal was turned down due to my education background. According to the manager in W factory, a lot of people are interested in applying for this job, and even if I don't, a lot of people will still do it. Therefore, I guess i have no power to address the injustice...' (Participant #1)
'…I did introduce one of my friend to work in W Factory. She launched her own restaurant after graduating from three-year college, but it didn't work out. She can't even afford food during that time. There is nothing i can do about the wage difference because her education level is insufficient...' (Participant #9)

8 UNSTABLE INCOME

The second issue encountered by dispatched workers is unstable income. Due to their low income and considerable income inequality, salary payment unpredictability exacerbates their difficulties more. Due to the attributes of the Chinese economy, dispatched workers in China opt to engage in platforms as a preferred secondary income source or as a primary income supplemented by sporadic offline employment. the sole source of money they produce. However , dispatched workers frequently did not get their wages on time due to insufficient protection of their rights. The government acknowledged that wage shortfalls could precipitate social upheaval. Income instability primarily results from employment uncertainty, which will be further upon thereafter. One participant noted that:
'…A labour contract was not signed by me. I got paid by the hour, so it was that the longer I worked, the more I made. The main issue, though, was how inconsistently the wage was paid. My wage fluctuated between once a month, every three months, and sometimes every six months. The only advantage working in W factory was that at least I had food and a place to live. Even if I report the untimely paid stuff to the police, nobody would care because I didn't sign a contract ,and i might get fired...' (Participant #20)

9 HOURS OF WORK

The majority of dispatched workers have longer working hours than full-time workers, and more working days per week. Critically, workers' level of agency and their ability to choose how to allocate their time in practice dictate whether flexibility is desirable or empowering, though there are also concerns that greater working-time autonomy may lead to an intensification of work and overtime [15]. According to the questionnaire, 8 percent of these workers work fewer than 8 hours per day, 42.67 percent work between 8 and 10 hours per day, and 49.33 percent work more than 10 hours per day.
'…I could make roughly 5,000 yuan a month even if I didn't sign a labour contract. I got up and worked for almost twelve hours every day. I was simply physically exhausted because the work was not cognitively taxing. I worked twelve hours a day to increase my income, but I had no personal life. I seemed to live for my work...' (Participant #17)
'…I agreed to work eight hours a day and receive a predetermined monthly pay when I signed the contract. I was frequently requested to "voluntarily work overtime," nevertheless. Basically, everyone even those who signed labor contract like me will have to overwork. We were told that we have the 'right to decline', but we would receive criticism if we didn't do what they told us to do. People frequently put in 10 hours a day at work. Everyone was doing it, even if I didn't like it. I couldn't do anything about it...' (Participant #8)

10 RESIDENTIAL CONDITIONS

The residential conditions for these workers were not good as well. The majority of them reside in dormitories supplied by their employers at W factory construction sites. We were told that these residences are overcrowded and deficient in essential furnishings, sanitation amenities, heating, and air conditioning.
'…I live in the W factory-provided dormitory and pay 500 RMB a month for accommodation because the rent in Shanghai is so expensive that my wage is insufficient to support it...We are a dorm only for girls, and there are sixteen bunk beds here. In the summer, there are only four electric fans, no tables, two chairs and no air conditioning for sure... There is even nowhere to hang clothes because the space is so tiny. The entire building owns only one washing machine. I have to do my own laundry by my hands. In the summer, it's fine, but in the winter, doing laundry is extremely cold ...' (Participant #7)
'…I live in the dorm of W factory as well. Ten of us men share a single room. There are simply two electric fans and no air conditioning... The room is somewhat tiny, however there is a balcony for cloth hanging...' (Participant #14)
'…Ten people shared a tiny room, i have no privacy at all. making the accommodations quite subpar. There was no private washing rooms, the process of hitting the loo were open to the public, and each room's soundproofing was terrible. A good night's sleep was basically impossible. I find it incomprehensible that such accommodations cost 500 yuan a month...' (Participant #15)

11 SOCIAL SECURITY

Full-time employees are entitled to social security benefits, including a pension, unemployment insurance, health insurance, and subsidized public housing. But do dispatched workers receive equivalent social protection? Only 12 percent of the dispatched workers possessed signed labour contracts, but the remaining 88 percent did not. The issue of inadequate social protection for these workers mostly stems from discriminatory institutional frameworks that do not mandate businesses to offer social security to migrant workers.

'…I have not signed a labour contract. Upon commencing this position, I was presented with a contract to sign; however, I was informed privately that should I choose not to sign and give up the five social insurances and housing fund, I would receive an additional 1,000 yuan a month in base salary. I perceived such insurances as largely ineffective, and if I refrained from signing the contract, I could receive an additional 1,000 yuan; hence, it seemed prudent to pursue that option...' (Participant #11)

'…I didn't sign labor contract, and i have been employed here for a year. It's quite exhausting. My eyes have been giving me a lot of trouble lately, and I frequently make mistakes at work. I need health insurance in order to visit the doctor, which is something I want to do. I haven't paid for this insurance because I haven't signed a contract, but I can't pay all the treatment on my own. Even though my vision is becoming fuzzy, I feel like I can wait a little while longer before I have to borrow money to see a doctor...' (Participant #16)

12 JOB INSECURITY

Dispatched workers typically exhibit a low unemployment rate, partly because they cannot sustain prolonged unemployment. Nevertheless, a low unemployment rate does not imply poor job mobility for dispatched workers. Conversely, their career mobility far exceeds that of full-time workers. The elevated job mobility of these people is partially attributable to their concentration in the unskilled labour market, where competition for employment is significantly robust, perhaps due to their incomplete understanding of the nature of their occupations.

According to the survey, 81.33 percent of the workers at W factory are not employed in their initial position. Fifty-four percent were recruited via online employment platforms, twenty-four percent were referred by friends, and only twenty-two percent were directly employed by W factory. We can see that the majority of individuals are employed in W factory via internet networks. The absence of physical barriers in the digital realm enables clients to access workforce at any time. While online labour dispatch platforms frequently identify themselves as middlemen, they effectively undertake certain employer functions.

Another facet of job insecurity is that only a little fraction of dispatched workers own written contracts with their employers: dispatched workers typically find themselves in a vulnerable situation regarding salary payment issues in the absence of formal contracts.

'…I didn't sign labor contract. I'm afraid to make a mistake at work because I could be fired at any time with no pay...' (Participant #2)

'…I've never had a job that lasted longer than three months before this one. I've been here for four months, though, and I don't see why there should be a contract. I can leave whenever I want...' (Participant #10)

'…I fell very insecure about this job. If I don't work hard, I think I'll get fired. The people who work with me switch from one group to another. People leave because their accommodation isn't good or because they have to work too many hours. It's hard, but at least I can make money. Having a contract would be better for me; that way I'll be safer...' (Participant #19)

13 CONCLUSION

In contrast to conventional full-time employment, where job are allocated to workers, dispatched workers , or gig workers , possess enhanced autonomy about the nature of the work they select. Individuals engage in the gig economy due to flexibility and autonomy, inability to secure alternative employment. The challenges they met were mainly classified into six parts, insufficiency and inequality of income, unstable income , hours of work , residential conditions , social security and job insecurity.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

REFERENCES

[1] Tan Z M, Aggarwal N, Cowls J, et al. The ethical debate about the gig economy: A review and critical analysis. Technology in Society, 2021, 65: 101594. https://doi.org/10.1016/j.techsoc.2021.101594.

[2] Woodcock J, Graham M. The gig economy. Polity, 2020.

[3] Wood A J, Graham M, Lehdonvirta V, et al. Good gig, bad gig: autonomy and algorithmic control in the global gig economy. Work, employment and society, 2019, 33(1), 56-75. DOI:10.1177/0950017018785616.

[4] Schoukens P, Barrio A. The changing concept of work: When does typical work become atypical? European Labour Law Journal, 2017, 8(4): 306-332. https://doi.org/10.1177/2031952517743871.

[5] Blohm I, Zogaj S, Bretschneider U, et al. How to manage crowdsourcing platforms effectively? California Management Review, 2018, 60(2): 122-149. https://doi.org/10.1177/0008125617738255.
[6] Farrell D, Greig F. The online platform economy: Has growth peaked? Available at SSRN 2911194, 2017. http://dx.doi.org/10.2139/ssrn.2911194.
[7] Tran M, Sokas R K. The gig economy and contingent work: An occupational health assessment. Journal of occupational and environmental medicine, 2017, 59(4), e63-e66. DOI: 10.1097/JOM.0000000000000977
[8] Zhang L. Contextualizing precarious work: labor dispatch, boundary-drawing, and the politics of labor regulation in post-socialist China. Labor History, 2021, 62(5-6): 556-574. https://doi.org/10.1080/0023656X.2021.1983529.
[9] Li K N. Re-Conceptualizing the Notion of " Employer": The Case of Labor Dispatch Workers in China. Brooklyn Journal of International Law, 2015, 40(2): 5.
[10] Morrison W M. China's economic rise: History, trends, challenges, and implications for the United States. Current Politics and Economics of Northern and Western Asia, 2019, 28(2/3), 189-242.
[11] Huang P C. Dispatch work in China: a study from case records, part I. Modern China, 2017, 43(3), 247-287. https://doi.org/10.1177/0097700417693590.
[12] Regmi P R, Waithaka E, Paudyal A, et al. Guide to the design and application of online questionnaire surveys. Nepal journal of epidemiology, 2016, 6(4), 640. DOI: 10.3126/nje.v6i4.17258.
[13] Adams W C. Conducting semi-structured interviews. Handbook of practical program evaluation, 2015: 492-505. https://doi.org/10.1002/9781119171386.ch19.
[14] Gerring J. Qualitative methods. Annual review of political science, 2017, 20(1): 15-36. https://doi.org/10.1146/annurev-polisci-092415-024158.
[15] Hunt A, Samman E, Tapfuma S, et al. Women in the gig economy: paid work, care and flexibility in Kenya and South Africa, 2019.
[16] Lehdonvirta V. Flexibility in the gig economy: managing time on three online piecework platforms. New Technology, Work and Employment, 2018, 33(1): 13-29. https://doi.org/10.1111/ntwe.12102.
[17] Friedman G. Workers without employers: shadow corporations and the rise of the gig economy. Review of keynesian economics, 2014, 2(2), 171-188. https://doi.org/10.4337/roke.2014.02.03.
[18] J Lyons B, L Wessel J, Chiew Tai Y, et al. Strategies of job seekers related to age-related stereotypes. Journal of Managerial Psychology, 2014, 29(8): 1009-1027. https://doi.org/10.1108/JMP-03-2013-0078.
[19] Horowitz J. Relative education and the advantage of a college degree. American Sociological Review, 2018, 83(4), 771-801. https://doi.org/10.1177/0003122418785371.
[20] Witteveen D, Attewell P. Family background and earnings inequality among college graduates. Social Forces, 2017, 95(4), 1539-1576. https://doi.org/10.1093/sf/sow109.
[21] Chiang MH. Post-industrial development in East Asia: Taiwan and South Korea in comparison. Springer, 2018. https://doi.org/10.1007/978-981-13-0274-9_6.

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IMPORTANCE OF COMPUTER IN MARKETING ORGANIZATION AND ITS CUSTOMERS

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Abstract: This study explores the importance of computer in marketing organizations and customer engagement, focusing on key design elements such as usability, aesthetics, strogebility, and security. The rapid evolution of digital commerce has made computer a crucial platform for marketing organizations to engage with customers. However, the role of computer in influencing strive customer information and record keeping has not been fully explored. The primary objective of this research is to investigate how various aspects of computer contribute to enhanced marketing organizations in their business activities engagement. Using a sample of 200 participants and employing SPSSv22 for data analysis, the study applied descriptive statistics, correlation, and regression analyses to assess the relationship between computer components, marketing organization and customer engagement. The results show strong correlations between the stroge factors and customer's information with security being the most significant predictor of engagement. This study provides actionable insights for marketing organizations, highlighting the need to invest in record keeping, user-friendly, and aesthetically pleasing computer to store customer information and improve marketing activities. The findings contribute to the literature by bridging gaps in understanding the critical role of computer in digital marketing strategies. Recommendations for future research include examining other emerging computer's elements such as personalization and AI-driven interactions.
Keywords: Computer; Marketing; Organization; Stroge; Customers

1 INTRODUCTION

In the current computer age and digital economy, a company's computer plays a pivotal role in shaping its interactions with both existing and potential customers. A well computer manage serves not just as a marketing tool but as a dynamic platform for communication, engagement, and transaction. In many instances, it is the first point of analyzing market improvements by considering the total number of custmers's engament, making it critical to the success of a company's overall marketing strategy. As Kotler and Armstrong point out[1], in the digital era, the computer is often a company's most powerful marketing channel, blending both record keeping and other functional roles. With the exponential growth of e-commerce and the increasingly competitive nature of digital markets, companies must differentiate themselves not only through their products and services but also through their technological presence. Computer has moved beyond its early stages of being purely an aesthetic choice to becoming a vital element of strategic business decisions. Another research findings stress that customers now judge the credibility and reliability of businesses based largely on their technological tools appearance I.e computer. Therefore, optimizing the structure, stroge, and usability of a computer can significantly influence customer's information perceptions, engagement, and ultimately, customer retention.

Moreover, computer impacts a company's ability to drive conversions. According to Palmer [2], businesses with active computers that cater to user organizations' needs are more likely to see improved sales through an ads, higher traffic, and better engagement. The stroge information (SI), visual appeal by sending video or image to customers, functionality, and content all contribute to this outcome. As Nielsen observes[3], computers that are not only visually appealing but also provide smooth, intuitive navigation enhance customer information retention and increase the likelihood of conversions. Despite the proven benefits of computer usage, many businesses still underestimate its importance, either neglecting the user experience or failing to align their technology presence with their brand identity through computer adds. This often results in underperforming computer that alienate potential customers and negatively affect the company's bottom line [4]. There is growing evidence that suggests that Marketing organizations that prioritize computer as part of their overall marketing strategy enjoy a competitive advantage over those that do not.

Given the current state of digital transformation, the motivation for this study lies in understanding how the stroge information of a company's computer influences not only customer retention but also the broader marketing strategies of organizations. While many studies focus on individual components of computers, such as soft ware, hard ware, hard disc, CPU or visual aesthetics, fewer have considered the cumulative effect of these elements on business performance and customer's information. This research aims to bridge this gap by examining the role of computer in shaping both marketing strategies and stroge customer information.

2 OBJECTIVES AND RESEARCH QUESTIONS

2.1 Objectives

1. To examine the role of computer in storing customer information and engagement.
2. To explore the relationship between computer and marketing development.
3. To assess how different computer elements (e.g., IS, visual aesthetics, data) affect customer retention.
4. To identify best practices in computer for marketing organizations aiming to enhance customer retention and loyalty.

2.2 Research Questions

1. How does computer store the customer information and engagement in marketing organizations?
2. What are the key computer elements that impact customer engagement and development?
3. How do customers perceive a brand based on the computer stroge?
4. What strategies can marketing organizations employ to optimize computer for better customer retention?

3 LITERATURE REVIEW

3.1 Concept of Computer

Computer refers to an electronic device for storing and processing data, typically in binary form, according to instructions given to it in a variable program. Computers can perform billions of calculations per second, which allows them to multitask, or perform multiple tasks at once.
In the office, computers are used for writing and sending emails, scheduling meetings, and collaborating with team members and clients. Mobile devices are also widely used in business for sending and reading messages, opening business files, and connecting to social media.

3.2 How Marketers Used Computer in Marketing Organization?

Marketing professionals use computer technology to plan, manage and monitor campaigns. By analyzing and manipulating data on computers, they can increase the precision of marketing campaigns, personalize customer and prospect communications, and improve customer relationship management. Computer technology also makes it easier for marketing professionals to collaborate with colleagues, agencies and suppliers.
ICT systems also allow your marketing to store, process, analyze and share vast amounts of data (better decision making). The information available from marketing organization data enables marketing managers and employees to make decisions quickly and accurately so that they can manage marketing operations effectively and respond rapidly to marketing opportunities or threats. Communication networks also enable marketing decision-makers in different locations to work together easily when they need to take joint decisions.
Furthermore, by automating marketing processes and giving employees ICT tools, your marketing can improve its individual and overall productivity [Increased Manufacturing Productivity]. On the production line, for example, solutions such as computer-aided design can help to reduce set-up times and improve manufacturing accuracy so that employees spend less time on reworking. Access to manufacturing data enables managers to plan production more effectively, making better use of resources and reducing lead times.
Moreover, quality of customer service is an important differentiator for marketing (Improved Customer Service) . Your marketing company can use ICT solutions to offer faster response to and higher standards of service to its customers. If you run a call center, for example, your agents can access databases that provide comprehensive customer information, including purchase history and product preferences. The information helps them deal quickly and efficiently with inquiries, boosting customer satisfaction. Service personnel working in the field can access customer, service and product databases using smartphones with secure Internet connections. This enables them to fix problems quickly and effectively, again boosting customer satisfaction.
And then, communication networks enable your project teams to collaborate effectively (Greater and Virtual Collaboration). By using videoconferencing or web conferencing over the Internet, teams can hold virtual meetings that bring together members from different locations, or different marketing organizations, such as suppliers or marketing partners. This helps to create stronger selling teams and enables the teams to maintain progress on important selling. In a product development program, for example, teams can reduce overall producing time and get new products to market faster, giving the marketing company a strong competitive advantage.
In other hand, ICT solutions can help your marketing organization to reduce costs, increase revenue and improve profitability. Using videoconferencing to host meetings between members in different locations, for example, reduces travel costs. Production data can help staff identify quality problems, reducing waste and reworking costs. Call center agents can use information available on their customer databases to increase revenue by identifying opportunities for selling additional products or services. Cost reductions and revenue gains make an important contribution to overall profitability.

3.3 How Computer Helps Marketers in the Marketing Operational Activities ?

3.3.1 Web-based promotion

The internet provides marketing with an advertising channel that can potentially reach millions of customers all around the world. Web advertising can take many forms, including banner and in-text advertisements on popular websites, emails sent to past or potential customers and video advertisements played before or during online videos, *according to Small Business Trends.*

Advertising on the web (Computer) can be cheaper than traditional advertising through media such as TV, radio and print, which can make it attractive to new companies with small advertising budgets. Using computers to graph the results of different web-based promotions can help small businesses determine which digital marketing tools are providing the best return on investment.

3.3.2 Market research tools

Market research is the collection of data concerning the current state of a market, consumer preferences and competitors. Administering surveys to customers is one of the most common ways that businesses conduct market research. Computers offer a way for companies to give surveys without actually going out and meeting customers. One role of information technology in marketing is the gathering survey data on a company's website, using third-party internet services or sending out email questionnaires [5].

Another major tool for researching marketing results is an analytics programs. Free platforms, such as Google Analytics, can help your small business see where customers are coming from as they visit your website, what keywords they're using to find you and which pages they most visit, explains digital marketing website SEOVY.

3.3.3 Distribution channel tracking

The methods that a company uses to distribute products and services to customers are a core component of its overall marketing strategy. Computers allow companies to distribute their products and services to remote users via the internet, without the need for a physical office or retail storefront. Digital distribution can be advantageous to small companies that want to sell to consumers all across the country and keep start-up costs low.

3.3.4 Creating ads for other media

While the internet allows companies to use computers for promotion, research and distribution, computers are also used to help prepare advertisements for other media. For example, modern print magazines and newspapers often use computers to help design the layouts of pages. Graphic designers and media specialists use computers to edit photographs for print media ads, audio for the radio spots and video for TV commercials.

4 METHODOLOGY

This study aims to investigate the importance of computer in marketing organizations and customer retention. The methodology involves both qualitative and quantitative approaches, ensuring comprehensive data collection and analysis. The study used survey approach. Surveys were distributed to Marketing organizations and customers of those marketing organizations with computers. A total of 200 respondents participated in the survey. The participants were selected using stratified random sampling to ensure diverse representation from different marketing organizations and customer demographics. The survey included structured questions to measure information of customers of computer's elements such as data stroge, aesthetics, and interactivity, along with their impact on improving marketing organizations' activities and organizational development. Survey data were analyzed using SPSS version 22. Descriptive statistics were employed to summarize the demographic characteristics and computer perceptions of the participants. Correlation and regression analyses were performed to explore the relationship between computer and information of the customer. For qualitative data, thematic analysis was applied to interview transcripts, identifying common themes related to the strategic importance of computer.

5 RESULTS

The results of the study provide valuable insights into the relationship between computer and information of the customer. This section presents the findings from the descriptive statistics, correlation analysis, and regression analysis.

5.1 Descriptive Statistics

Table 1 summarizes the descriptive statistics for key computer elements as perceived by the respondents. The mean scores indicate the level of importance assigned to each computer element.

Table 1 Descriptive Statistics for Key Computer Elements

Design Element	Mean	Standard Deviation
Aesthetics	4.5	0.62

Usability	4.4	0.68
Interactivity	4.2	0.71
Speed	4.0	0.75
Record keeping	4.6	0.59

The results indicate that respondents rated computer aesthetics (mean = 4.5) and record keeping (mean = 4.6) as the most critical computer elements. Usability (mean = 4.4) and interactivity (mean = 4.2) also received high scores, suggesting that customers place significant value on a visually appealing and user-friendly computer. Speed (mean = 4.0) was also important but received the lowest score among the listed elements, indicating room for improvement in this area.

5.2 Correlation Analysis

Table 2 presents the correlation coefficients between computer elements and customer's information.

Table 2 C&C between Computer Elements and Customer's Information

Variable	Customer information	Usability	Aesthetics	Interactivity	Keeping record
Customer information	1.00	0.78**	0.75**	0.72**	0.79**
Usability	0.78**	1.00	0.68**	0.65**	0.74**
Aesthetics	0.75**	0.68**	1.00	0.60**	0.73**
Interactivity	0.72**	0.65**	0.60**	1.00	0.68**
Keeping record	0.79**	0.74**	0.73**	0.68**	1.00

The correlation analysis reveals a strong positive relationship between all computer elements and customer's information. The strongest correlation is observed between keeping record and customer information ($r = 0.79$, $p < 0.01$), indicating that higher perceived record keeping is associated with greater customer' information. Usability ($r = 0.78$, $p < 0.01$) and aesthetics ($r = 0.75$, $p < 0.01$) also show significant positive correlations, emphasizing their importance in enhancing data stroge.

5.3 Regression Analysis

Table 3 presents the results of the regression analysis, highlighting the relationship between computer elements and customer's information.

Table 3 Result

Variable	Unstandardized Coefficients (B)	Standardized Coefficients (β)	t	p-value
Constant	1.32	-	3.45	0.001
Usability	0.45	0.32	4.21	0.000
Aesthetics	0.30	0.28	3.80	0.000
Interactivity	0.25	0.20	3.00	0.003
Record keeping	0.50	0.36	5.10	0.000

The regression analysis shows that computer elements significantly predict customer information, accounting for approximately 65% of the variance ($R^2 = 0.65$). Among the predictors, security ($\beta = 0.36$, $p < 0.001$) has the most substantial positive effect on customer information, followed by usability ($\beta = 0.32$, $p < 0.000$) and aesthetics ($\beta = 0.28$, $p <$

0.000). Interactivity also contributes positively ($\beta = 0.20$, $p < 0.003$), but to a lesser extent. The results indicate that enhancing these Computer elements can significantly improve customer information in marketing organizations.

6 DISCUSSION

The findings of this study highlight the significant impact of computer in customer information within marketing organizations. The strong positive correlations between computer elements (usability of computer data, aesthetics, interactivity with customers, and record keeping) and customer information reinforce the notion that using with computer in marketing organization is essential for improving, developing organizational activities and retaining customers. The study revealed that usability of customer's data is a key driver of customer information, aligning with existing literature that emphasizes the importance of user-friendly interfaces [6]. Organizations are more likely to engage with computers that facilitate easy navigation and intuitive data storage. This supports the idea that usability of data information directly influences organizational development and decision-making. Aesthetics also emerged as a critical factor influencing customer perceptions and engagement. The findings echo those of Palmer [2], who noted that visually appealing product pictures and send it via an email through computer it can create positive emotional responses, fostering a connection between the organization and the customer. This relationship suggests that organizations should prioritize aesthetic elements in their computer activities to enhance their organizational activities and customer loyalty.

The strongest correlation was found between perceived record keeping and customer information. This is consistent with the findings of other research, indicating that customer's information are increasingly concerned about record keeping for previous customers. Ensuring robust record keeping measures can mitigate losing customer data and boosting sales, which is essential for maintaining long-term customer relationships. The importance of interactivity on customer information is particularly noteworthy. Engaging features such as live chats, interactive content, and personalized experiences encourage user participation and can lead to higher satisfaction levels. This aligns with the insights of other research findings, which highlighted the importance of interactive elements in enhancing customer experiences through computer usage. The results suggest that marketing organizations must invest with using of computer that prioritize usability, aesthetics, record keeping, and interactivity with customer information. By understanding the critical role these elements play, marketing organizations can create a customer's data office that attracts and retains customers.

7 RECOMMENDATIONS

1. Marketing organizations should prioritize usability of customers' data in their computer to facilitate seamless navigation. Regular usability checking to see activities of their customers and customer feedback mechanisms can help identify areas for improvement.
2. Organizations should focus on creating visually appealing computer that reflect their brand's pictures identity. Collaborating with professional computer wizards to ensure a consistent and attractive visual presentation can enhance customer perception.
3. Given the strong link between perceived record keeping and customer information, marketing organizations must implement robust record keeping protocols. Regular record keeping audits and clear communication about record keeping practices can help build customer loyalty and long term relationship with the customers.
4. Incorporating interactive elements, such as live chats, polls, and personalized recommendations through computer with customers, can enhance customer experiences.
5. Marketing organizations should adopt a mindset of continuous improvement, regularly updating their computers to incorporate emerging trends and technologies. Staying informed about advancements in computer can help organizations remain competitive in the modern computer landscape.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

REFERENCES

[1] Kotler, P, Armstrong, G, Agnihotri, PY, et al. Principles of marketing (13th ed.). New Delhi: Pearson Education. 2019.
[2] Palmer A. Social change and gendered gift giving rituals: A historical analysis of valentine’s day in Japan. Journal of Macromarketing, 2020, 31(1): 44-56.
[3] Nielsen. Marketing environment, AFs printing press, USA, Phillidapia. 2020.
[4] Tsai-Chi Kuo, Ming-Lang Tseng, Hsiao-Min Chen, et al. (2021) Distribution analysis of supply chain networks with low carbon emissions. Computational Economics, 2018, 52, 1353−1374. DOI: https://doi.org/10.1007/s10614-017-9675-7.

[5] Deng, X, Gibson, J, Jia, S. Does expressway consume more land of the agricultural production base of Shandong province? Computational Economics, 2018, 52, 1293-1316. DOI: https://doi.org/10.1007/s10614-017-9747-8.
[6] Kotler, P, Hermawan, K, Iwan, S. Marketing 3.0: From products to customers to the human spirit. Hoboken, NJ: Wiley. 2019. DOI: https://doi.org/10.1007/978-981-10-7724-1_10.

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INNOVATIVE PATHS FOR THE COMMUNICATION OF YUE CULTURE IN THE NEW MEDIA ERA

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Abstract: With the advent of the digital age, the widespread use of new media technologies such as social networks and multimedia platforms has provided unprecedented opportunities for the dissemination of traditional Chinese culture. However, the development of these technologies also brings challenges, such as audience dispersion and dilution of cultural values. Against this background, this paper attempts to repackage and disseminate Shaoxing Yue culture through new media platforms, with a particular focus on international students as an audience group. This paper attempts to use new media as a major channel to disseminate Chinese culture and explores how the interactivity and instant feedback of new media can facilitate cultural dissemination. It is found that customised content and targeted marketing strategies have effectively expanded the audience base of traditional culture on social media platforms and greatly enhanced international students' interest in traditional Chinese culture.
Keywords: New media; International Chinese language education; Communication paths

1 INTRODUCTION

With the rapid development of new media technology, Chinese traditional culture and art forms are facing unprecedented communication opportunities and challenges. Chinese traditional opera culture has a long and fascinating history, and it needs new communication channels to adapt to the changes of modern society. How to spread Chinese culture through new media platforms such as WeChat, Weibo, TikTok, and Bilibili and attract the attention and love of international students has become an important research topic.

In recent years, traditional cultural communication has been particularly active on new media platforms, spreading through various channels such as social media, online videos and campus tours, and some of them have established a certain degree of popularity and influence among international students. Based on this, this paper focuses on the communication paths and effects on new media platforms, focuses on the interactivity of new media platforms, and explores how to use innovative paths to enhance the effects of cultural communication, effectively promote the dissemination of traditional Chinese culture, and tell a good Chinese story.

2 REVIEW OF RELEVANT RESEARCH

In today's society, new media communication platforms represented by short videos and webcasts are the main carriers of online public opinion. Against the background of the rapid development of modern information technology, new media platforms such as Facebook, Weibo, YouTube and Bilibili have become the main channels of information dissemination. These platforms have significant influence and coverage, changing the way information is received and redefining the path of information dissemination. For example, Facebook, the world's largest social network, not only allows users to post status updates and share news links, but also promotes interaction through ‘likes’ and comments.

In China, Weibo, with its rapid information dissemination and large user base, has become a platform for extensive communication and discussion between public figures and ordinary users, while YouTube and Jitterbug reinforce the visual appeal of content and user engagement through video sharing, making the dissemination of information more intuitive and interactive. The common feature of these platforms is that they break through the time and space limitations of traditional media, realising the immediacy and global nature of information dissemination and greatly enhancing the efficiency and influence of information dissemination.[1]

Through these new media platforms, communication paths have changed significantly in the new media environment, which not only reflects the innovation of information technology, but also demonstrates the profound impact of the media environment on the social communication model. Compared with the traditional linear communication model, new media communication paths are more dynamic, increase interactivity, and are more significant in terms of networking.

3 RESEARCH DESIGN

The extensive use of social media platforms has successfully attracted a young international student audience and promoted the integration of traditional culture with modern society. This not only reflects the vitality of traditional Chinese culture, but also highlights the importance of cultural exchange and innovation. Therefore, future communication strategies should further strengthen the use of new media platforms and design more attractive content

and interactive methods for young audiences, in order to maintain and expand the audience base of opera and continue to promote the international dissemination of traditional culture.

3.1 Positioning and Planning of Communication Strategies

Based on the data from the study, cultural communication faces a number of challenges, including obstacles to the transmission of cultural heritage, slow commercial processes in the traditional cultural market, and structural changes in the audience base with a sharp decline in the audience for traditional opera. The survey data of this study reveals the trend of the younger generation's exposure to and understanding of traditional culture through new media platforms, pointing out the important role and potential challenges of new media in traditional cultural communication.[2]Based on these dilemmas and findings, the positioning and planning of communication strategies for traditional culture aim to address these challenges and make full use of the advantages of new media to attract and expand the group of young international students.

The two major problems of the obsolete forms of traditional culture transmission and the changing structure of audience groups are precisely one of the major challenges encountered in the process of traditional culture transmission and development. Communication positioning strategy is the cornerstone of communication planning. It determines that the communication needs to be precisely targeted to the audience groups interested in traditional culture. New media is mainly oriented to the young international student audience, and the young international student group, characterised by their high cultural cultivation and comprehensive personal qualities, shows significant subjectivity and differences in the process of art appreciation and appreciation, and has a far-reaching impact on the aesthetic understanding and interpretation of works of art as well as their secondary creations. Some traditional cultures of opera art have profound connotation and demand for cultural knowledge, and at the same time require certain aesthetic ability to understand and appreciate, so young international students become ideal recipients. Young international students not only have the potential to accept new things on their own, but their participation can serve as a new communication node to attract a wider audience. Through their expectations, cultural experiences and feelings, they form a new round of communication momentum for traditional culture.

3.2 Content Creation and Platform Selection

The creation of content and the choice of platforms for the dissemination of traditional culture reflect its unique strategy for successful dissemination in the new media. This version has successfully attracted the attention and love of domestic and foreign audiences through its innovative interpretation of classic traditional culture, combining modern aesthetics and the essence of traditional culture. Its successful dissemination strategy is mainly reflected in the in-depth excavation of content creation and cultural awareness, as well as the precise selection and use of dissemination platforms.

In terms of content creation, some classic shaoxing operas have adopted the strategy of combining innovation and tradition. Based on the successful experience of the dissemination of these programmes at home and abroad, the reasons for their success were explored in depth, and by combining the concept of love with the elements of modern youth, some traditional comedy programmes not only conveyed the core values of traditional culture, but also enabled modern audiences, especially young foreign students, to find empathy with them.

In addition, on the basis of respecting the original script, the script has moderately increased the plot and character design to suit the taste of modern audiences, so as to make it more in line with modern aesthetic habits and viewing habits. In terms of platform selection and utilisation, the communication advantages of new media are fully utilised. Considering that the target audience is mainly the young generation of international students, the play was promoted and shared through social media and video sharing platforms, such as Jittery, Shuttle, WeChat, Weibo, and other new media channels, which effectively increased the visibility and influence of the work.[3] Especially in overseas performances, real-time sharing and interaction through popular local new media platforms, such as YouTube and Facebook, have attracted the attention of a large number of overseas audiences, and realised the success of cross-cultural communication. This strategy not only broadens the audience of traditional Chinese theatre, but also enables traditional opera to be presented on the world stage in a more modern and international form. The above path reflects a deep understanding of traditional culture and the effective use of modern communication technology. Through careful content creation and platform selection, traditional Chinese opera has been successfully brought into the new media era, providing useful practical experience and inspiration for the innovative communication of traditional culture.

3.3 Communication Effectiveness Monitoring and Adjustment

The cross-cultural dissemination of traditional Chinese culture has reached its climax through appropriate communication monitoring and adjustment strategies. Based on the continuous monitoring of the effectiveness of traditional cultural communication, the production team and communication strategists adjusted their communication methods to better meet the needs of audiences from different cultural backgrounds, ensuring that the plays could have a wide impact on a global scale. The success of traditional theatre's cross-cultural communication lies not only in the innovation of its content creation and the accuracy of its platform selection, but also in its fine monitoring and flexible adjustment of communication effects. By systematically analysing audience feedback and media reports on overseas tours of classic shaoxing operas, the production team is able to obtain valuable first-hand information on the acceptance and feedback of audiences in different countries and regions. This continuous monitoring not only covers the number of

audience members and the intensity of their response, but also goes deeper into their understanding and evaluation of the content, performance format and cultural connotations of the productions. Based on these data, the team can make timely adjustments to its communication strategy, including but not limited to adjusting the content of promotional materials, optimising the social media interaction strategy, and even fine-tuning certain aspects of the repertoire itself, so as to better adapt to the cultural background and aesthetic habits of the target audience. In addition, the monitoring of the communication effect of the classical repertoire of shaoxing Opera also includes the real-time tracking of the communication effect of new media. By analysing audience interaction data on various new media platforms, such as the number and nature of likes, shares and comments, the team was able to assess the effectiveness of different communication channels and content types, so as to adjust the communication strategy in a more targeted manner. [4] For example, if a certain type of promotional video receives more interactions and positive feedback on social media, the team may decide to increase the output of this type of content to attract more audience attention and engagement. Importantly, the cultural self-awareness and deep understanding of the combination of tradition and modernity demonstrated in the dissemination process of the classic shaoxing Opera repertoire enabled it to monitor and adjust its strategy not only by pursuing breadth and depth of dissemination, but also by placing more emphasis on how to truly enable audiences from different cultural backgrounds to understand and appreciate the beauty of traditional Chinese culture. Through constant monitoring of communication effects and adjustment of strategies, the classical repertoire of shaoxing Opera has not only attracted widespread attention in China, but has also successfully gone global, becoming a model of modern communication of traditional Chinese culture, and re-bearing this longing with its youthful and beautiful idol temperament, catering for the spiritual needs of modern people, which is a process that not only embodies the use of technology and data, but also highlights respect for cultural differences and deep insight into traditional cultural inheritance and innovation. [5] This process not only reflects the use of technology and data, but also shows respect for cultural differences and a deep insight into the inheritance and innovation of traditional culture.

4 CONCLUSION

This paper shows how traditional opera culture can be revitalised by modern technology through the communication npath of new media platforms. The classical repertoire of shaoxing Opera has made use of the interactive features and wide coverage of social media to effectively expand its audience base, especially among young international students, and successfully stimulate their interest in traditional culture. The implementation of customised content distribution and targeted marketing strategies in this process not only increased audience engagement, but also significantly enhanced the dissemination of traditional Chinese opera works.

These functions of the new media platform have opened up new paths for the inheritance and innovation of the classic repertoire of traditional Chinese opera, allowing these classic operas to be re-presented in a way that is more in line with the aesthetics and consumption habits of the modern society while preserving the cultural essence. By analysing the communication practices of classic shaoxing opera in the new media environment, it can be seen that modern communication technologies play a decisive role in the revitalisation of traditional cultural art forms. In addition, these strategies not only provide an effective method for the modernisation and transformation of the classical repertoire of shaoxing Opera itself, but also provide an important reference for the modern communication of other traditional Chinese art forms, demonstrating the vast possibilities of cultural inheritance and innovation through innovation and adaptation to the technologies of the new era.

With the continuous development and optimisation of new media technologies, it is expected that more targeted and efficient means of dissemination will emerge, which will further promote the efficiency and influence of the classical repertoire of shaoxing opera as well as other traditional Chinese operas. It is also expected that all sectors of society, especially the cultural and educational sectors, will be more supportive and committed to the modernisation of the traditional arts, so as to ensure that this valuable cultural heritage will be revitalised in the new era and be accepted and cherished by a wider global audience.

COMPETING INTERESTS

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REFERENCES

[1] Shi Y. A Feasibility Study on Hunan Culture for International Students. Chinese character culture, 2023, (04): 42-45.

[2] Yang XH. On the Vitality of Yue Opera in Contemporary Times. Language Teaching and Research, 2007, (04): 42 -46.

[3] He BY. The dissemination of regional cultural teaching in teaching Chinese as a foreign language. Comparative Study on Cultural Innovation, 2020, (04): 40-42.

[4] Liang XF. Practice and Research on Bilingual Teaching of Traditional Chinese Opera Under the Background of Cross culture. International Journal of Higher Education Teaching Theor, 2022, (08): 410-419.

[5] Francois Gouin. The Art of Teaching and Studying Languages. Rare books, 2012, (02): 46-48.

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REALISTIC PROBLEMS AND RESPONSE STRATEGIES OF PROTECTING INTANGIBLE CULTURAL HERITAGE OF WUSHU IN ANHUI PROVINCE

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Abstract: With the purpose of promoting the development of the intangible cultural heritage of wushu in Anhui Province, the realistic problems of the protection of the intangible cultural heritage of wushu in Anhui Province are analyzed through literature analysis, logical analysis and other research methods. The results show that the real problems in the protection of martial arts intangible cultural heritage in Anhui Province are: (1) lack of static protection; (2) poor legal protection; (3) lack of protection funds; and (4) thin protection awareness. In response to the above problems, the article puts forward the following coping strategies: (1) use of modern technology for multifaceted recording; (2) establishment of a protection mechanism in line with the policy; (3) strengthening of publicity and education; and (4) increase of financial investment.
Keywords: Wushu; Intangible Cultural Heritage; Anhui; Problems; Strategies

1 INTRODUCTION

As a unique physical and cultural expression of the Chinese nation, the intangible cultural heritage of wushu carries a deep historical and cultural heritage and national spirit. Wushu intangible cultural heritage not only has high historical and cultural value, but also has a unique status in the field of art and science. The protection and inheritance of the intangible cultural heritage of wushu is of great significance to the promotion of national culture, the enhancement of national self-confidence, and the promotion of human cultural diversity.

As one of the important birthplaces of Chinese martial arts, Anhui Province has a rich intangible cultural heritage of martial arts. However, the current protection status of Anhui Wushu Intangible Cultural Heritage is far from satisfactory, and most of the protection work of Wushu Intangible Cultural Heritage is only superficial. At present, Anhui Wushu Intangible Cultural Heritage is facing the problem of lack of personnel in the inheritance, and the social cognition is at a low level. This paper will analyze the real problems facing the protection of martial arts intangible cultural heritage in Anhui Province, and discuss the response problems from the multi-dimensional aspects of modern scientific and technological means, policy and legislation, education and promotion, financial support and so on. It aims to provide theoretical support and practical operational suggestions for the sustainable development of the Wushu intangible cultural heritage in Anhui Province, with a view to contributing to the protection and inheritance of this valuable cultural heritage in a modest way.

2 INHERITANCE VALUE OF MARTIAL ARTS INTANGIBLE CULTURAL HERITAGE IN ANHUI PROVINCE

2.1 Historical and Cultural Values

Anhui has been one of the important birthplaces of martial arts since ancient times. As early as in the period of the North and South Dynasties, a number of martial arts schools have emerged in the Anhui region. Through the development and evolution of successive generations, a unique martial arts culture with Anhui characteristics has been formed, and in modern times, undifferentiated martial arts programs have been recognized as martial arts intangible cultural heritage. These intangible cultural heritages of martial arts not only enjoy a great reputation in Anhui, but also have an important position in the national martial arts circles. These martial arts intangible cultural heritages not only record the historical process of the Chinese nation, but also reflect the cultural characteristics and regional features of different historical periods. Anhui Wushu Intangible Cultural Heritage also integrates various cultural elements such as Confucianism, Taoism, medicine and martial arts, forming a unique cultural style and characteristics. This multicultural fusion makes Anhui Wushu culture more colorful. Through the inheritance and promotion of Anhui Wushu Intangible Cultural Heritage, we can better understand and appreciate the long history and rich culture of the Chinese nation.

2.2 Scientific Fitness Value

Wushu intangible cultural heritage in Anhui Province has significant scientific fitness value. Wushu pays great attention to internal and external cultivation, emphasizing the unity of body and mind. When practicing, Wushu practitioners rely on the coordination of body movement and breathing to achieve the effect of both internal and external training. This form of exercise not only strengthens muscle strength and improves flexibility, but also regulates breathing and improves cardiorespiratory function, realizing both physical and mental training. At the same time, the exercise and breathing methods of Wushu are beneficial to improve body functions, enhance immunity, and play a role in the prevention of disease. Some of the specific movements and breathing methods in wushu can also be used to treat some chronic diseases, such as hypertension, diabetes, etc., to help alleviate the symptoms and improve the quality of life.

2.3 Socio-Educational Value

As one of the traditional sports programs in China, Anhui Wushu Intangible Cultural Heritage has a long history and deep cultural heritage. In many aspects, such as techniques and rituals, it carries profound national cultural information, and can be called a bright treasure in the treasury of Chinese martial arts. Wushu is not only a form of sports, but also an important way of cultural education. Through the study and inheritance of wushu culture, it can cultivate young people's will quality and the spirit of unity and cooperation, and thus improve their comprehensive quality. At the same time, Wushu culture vigorously advocates the spirit of "martial arts and morality", which is of great help to promote social justice and national spirit. Learning and inheriting the intangible cultural heritage of Anhui Wushu helps to enhance people's cultural self-confidence and sense of identity. Through the study and training of Wushu, people can understand and experience the history and culture of the Chinese nation more deeply, and further enhance the sense of belonging and pride in Chinese culture.

2.4 Economic Exploitation Value

With the improvement of people's standard of living, tourism has gradually become a kind of leisure and recreation program, which can relieve stress and broaden the horizons[1]. With the continuous development of tourism and people's increasing pursuit of a healthy life, Anhui Wushu Intangible Cultural Heritage has potential for economic development. With the continuous development of tourism and people's increasing pursuit of a healthy life, Anhui Wushu Intangible Cultural Heritage has potential economic development value. The excavation and organization of Anhui Wushu intangible cultural heritage resources can develop Wushu cultural tourism projects, attract tourists to come to visit and learn, and at the same time, make great contributions to the local tourism economy. With the deepening of global cultural exchanges, cooperation with international wushu organizations, joint development of wushu cultural products, wushu tournaments and other activities can not only enhance the international competitiveness of the wushu industry, but also promote international economic cooperation and cultural exchanges.

3 REALISTIC PROBLEMS IN THE PROTECTION OF INTANGIBLE CULTURAL HERITAGE OF WUSHU IN ANHUI PROVINCE

3.1 Lack of Static Protection

Wushu intangible cultural heritage is one of the important contents of intangible cultural heritage, and plays an important role in the protection, inheritance and promotion of Chinese outstanding traditional sports intangible culture[2]. It is one of the important contents of intangible cultural heritage of wushu, which plays an important role in the protection, inheritance and promotion of Chinese traditional sports intangible culture. The static protection of the intangible cultural heritage of wushu refers to the use of specific scientific and technological means to record the traditional wushu sound, text, technical movements and ancient instruments and other data or information, and preserve them in books, tapes, CDs, or museums, libraries and other carriers. This kind of protection is conducive to people's better understanding, utilization and development of traditional Wushu resources, which in turn generates economic, academic and social benefits. The static protection of the intangible cultural heritage of wushu is one of the important ways to effectively protect traditional wushu. At the same time, we should also recognize that static protection has certain limitations and needs to be combined with dynamic protection to jointly promote the inheritance and development of wushu.

3.1.1 Static protection fragmentation

In Anhui Province, martial arts intangible cultural heritage materials are scattered in the private sector, failing to achieve centralized management and unified protection. As a result, it is difficult to systematically organize and properly protect the many valuable martial arts documents, ancient instruments and technical records. The inheritors of the intangible cultural heritage of wushu are also scattered in different parts of the country, and their inheritance activities are usually confined to their own communities or sects, lacking cross-regional and cross-sectional exchanges and cooperation. Moreover, the aging problem of the inheritors is becoming more and more serious, while the younger generation is not interested in learning and inheriting wushu, which further aggravates the fragmentation of the distribution of the inheritors. The protection mechanism

for the intangible cultural heritage of wushu in Anhui Province is not yet perfect, and there is a lack of unified protection planning and coordination mechanisms. Local administrations and cultural institutions are working separately in the protection work, lacking unified guidance and strong support. The distribution of protection resources is also characterized by fragmentation, and the protection efforts of different regions and schools are not balanced, making it difficult for some important Wushu intangible cultural heritage projects to receive adequate support and protection.

3.1.2 Static protection of non-professionals

Public cultural institutions such as libraries, museums and archives are specialized institutions for the protection of intangible cultural heritage in Anhui Province, but the content of protection through these specialized institutions is extremely limited. These institutions lack professionalism and pertinence in the protection of intangible cultural heritage, resulting in a large amount of data, objects, sites, places, etc. not being effectively protected. At the same time, there is a lack of talents with specialized knowledge in the protection of martial arts intangible cultural heritage in Anhui Province, which makes it difficult for the protection work to be promoted in depth and prevents the systematic research, excavation and protection of martial arts intangible cultural heritage.

3.2 Poor Legal Protection

The intangible cultural heritage of wushu is a treasure of the Chinese nation, and it is the responsibility of each and every one of us to strengthen the legal protection of it. Only by improving legislation, strengthening law enforcement and enhancing intellectual property protection can we effectively protect the intangible cultural heritage of wushu and let it shine more brilliantly in the new era. However, the legal protection of martial arts intangible cultural heritage is still imperfect, which brings many challenges to the inheritance and development of martial arts culture.

3.2.1 Inadequate legal protection system

At present, China's legal protection of intangible cultural heritage is not yet perfect, and laws and regulations specializing in martial arts intangible cultural heritage are even more lacking. This leads to a lack of clear legal basis and guiding principles in the protection process, making it difficult to effectively carry out the protection work. Although the Law of the People's Republic of China on Intangible Cultural Heritage[3] and other legal documents have been promulgated, the protection of Wushu is still not perfect.and other legal documents have been promulgated, there are still insufficient specialized legal documents for the intangible cultural heritage of wushu, and there is a lack of specific legal provisions detailing the scope of protection of the intangible cultural heritage of wushu. The lack of legal documents makes the protection of Wushu intangible cultural heritage lack of legal protection, and cannot solve the many problems that exist in the process of protection of Wushu intangible cultural heritage. In addition, the protection of intellectual property rights for commercial development and cultural dissemination of Wushu Intangible Cultural Heritage is also insufficient. Existing laws and regulations have problems such as unsound planning, unspecific protection measures and unclear protection authorities.

3.2.2 Inadequate oversight and accountability mechanisms

At present, China's monitoring and accountability mechanism for intangible cultural heritage is not yet perfect, and there is a lack of accountability mechanisms specifically for martial arts intangible cultural heritage. This leads to a lack of clear legal basis and guiding principles in the protection process, making it difficult to carry out the protection work effectively. An effective monitoring mechanism is the key to ensure that the intangible cultural heritage of wushu is effectively inherited and protected. However, the current supervision mechanism often focuses on the declaration and recognition stage, and the supervision of the subsequent inheritance activities, the use of funds and the progress of the project is insufficient, making it difficult to form a closed-loop management. How to carry out effective accountability is an urgent issue to be resolved when ineffective protection or irregularities are found in the intangible cultural heritage of wushu. At present, accountability mechanisms often lack clear standards and procedures, making it difficult to enforce accountability and affecting the seriousness and authority of the protection of martial arts intangible cultural heritage. The lack of supervision and accountability mechanisms makes the protection of martial arts intangible cultural heritage lack legal safeguards and fails to solve the problem of insufficient protection of martial arts intangible cultural heritage protection.

3.3 Lack of Funding for Protection

In view of the urgent need for financial support for the organization, preservation and publication of information on the intangible cultural heritage of wushu in Anhui Province, the protection unit of the intangible cultural heritage of wushu in Anhui Province has submitted applications for special funds for protection to the central administration on several occasions. Through field research, it can be understood that although the application amount of each project is as high as millions of dollars, however, up to now, in addition to the representative bearer of the intangible cultural heritage projects in Anhui Province, each person has a subsidy of 7,000 yuan per year, the inheritance of the unit does not have any available funds for the protection. Municipalities have included funding for the protection of intangible cultural heritage in their annual budgets, but the funds invested in organizing, preserving, researching and publishing information, as well as carrying out heritage activities, are very meager.

3.3.1 Limited administration funding

According to relevant documents from the Anhui Department of Culture and the Anhui Department of Finance, although Anhui Province allocates funds to ICH programs, the amount is still insufficient for the huge number of protection objects. For example, in 2017, Anhui Province allocated a total of 12.9 million yuan to ICH projects under the jurisdiction of 12 units in the province. However, this amount of funding is still slightly insufficient for the many ICH programs in need of protection. The distribution of administration funding is also uneven: some Wushu ICH projects with significant cultural value and influence may receive more funding, while some equally important but lesser-known projects may face a shortage of funding. administration funding for the protection of Wushu ICH relies mainly on financial budgets, the allocation of which is often constrained by a variety of factors, such as policy orientation and economic conditions. In addition, there is limited social funding for ICH safeguarding, resulting in narrower channels for raising funds for overall safeguarding.

3.3.2 Single source of funding

At present, funding for the protection of the intangible cultural heritage of the martial arts relies mainly on administration financial allocations. Although the administration has invested a certain amount of money in this area, it is often overstretched in the face of the many martial arts programs that need to be protected and the extensive protection work. This single source of funding has many limitations.

On the one hand, it is difficult for the limited administration funding to meet the all-round needs for the protection of the intangible cultural heritage of wushu. From the inheritance, research and promotion of wushu to the construction of related facilities and the cultivation of talents, all aspects of the work require a large amount of funds to support them. Relying on administration funding alone cannot ensure that all work is adequately funded, which may result in some important conservation projects not being able to be carried out smoothly, or being greatly compromised in the course of implementation due to insufficient funding.

On the other hand, a single source of funding also makes the safeguarding of martial arts intangible cultural heritage vulnerable to changes in the administration's financial situation and policies. Once the administration makes adjustments in the allocation of funds or policies, it may have a direct impact on the protection work, resulting in instability and discontinuity in the protection work.

In addition, a single source of funding is not conducive to mobilizing all sectors of society to participate in the protection of the intangible cultural heritage of martial arts. The potential power of enterprises, social organizations and individuals has not been fully stimulated and utilized, and a good situation of multiple inputs and joint protection cannot be formed.

3.4 Low Awareness of Protection

The protection of the intangible cultural heritage of martial arts is not only closely related to the inheritance and development of culture, but also involves the promotion of national spirit, the maintenance of cultural diversity and the sustainable development of human society. However, at present, the general public's awareness of the protection of the intangible cultural heritage of wushu is still relatively weak, and at the same time, the cultivation of the inheritors of wushu has also been neglected. This requires deep reflection and effective action.

3.4.1 Insufficient public awareness and lack of proactive protection

The intangible cultural heritage of wushu faces the problems of insufficient public awareness and lack of active protection consciousness, which is indeed objective in the current society and poses a serious challenge to the inheritance and development of the intangible cultural heritage of wushu. The general public knows little about the basic concepts, historical origins, cultural connotations and values of Wushu Intangible Cultural Heritage. They may simply regard wushu as a competitive sport or a performing art, but ignore the deep cultural heritage and historical legacy behind it. Given this lack of knowledge, it is often difficult for the public to recognize the unique value of the intangible cultural heritage of wushu in terms of passing on the national culture, enhancing national self-confidence, and promoting physical and mental health. Therefore, they may not pay due attention and enthusiasm to the protection of the intangible cultural heritage of martial arts.

In the fast-paced modern living environment, people tend to pursue activities that bring instant gratification and are more entertaining. In contrast, the learning and transmission of Wushu ICH requires a great deal of time and effort, and it is difficult to see significant results in a short period of time. This has led to a lack of interest in Wushu ICH among many people, which in turn affects their awareness of active protection.

3.4.2 Neglecting the training and support of the relevant inheritors, leading to a break in inheritance

Inheritors are the living carriers of martial arts intangible cultural heritage, carrying a wealth of technical knowledge and cultural connotations. Their existence or not is directly related to whether the intangible cultural heritage of wushu can be effectively inherited and developed. Since China's reform and opening up, with the accelerated process of modernization, a large number of inheritors have moved to the city, detached from the "soil" of production and life, resulting in a disconnect between the life of the inheritors and the survival of the intangible cultural heritage of martial arts. This is directly related to whether the Wushu intangible cultural heritage can be effectively inherited and developed. Only by combining life and production, i.e., cultural places and cultural behaviors, can traditional culture be naturally spread and continued[4].

Therefore, cultivating and supporting the inheritors is a key link in the protection of Wushu ICH. At present, the training mechanism for Wushu intangible cultural heritage bearers is not sound enough. In many places, there is a lack of systematic training programs, professional teachers and necessary teaching facilities, making it difficult for inheritors to receive comprehensive and in-depth study and training.

Due to the existence of the above problems, many Wushu intangible cultural heritage programs are facing the crisis of inheritance faults. The skills and knowledge of the older generation of inheritors cannot be effectively passed on, and the younger generation's lack of interest and enthusiasm in the intangible cultural heritage of wushu has led to the danger of a break in the chain of inheritance.

4 RESPONSE STRATEGIES FOR THE PROTECTION OF INTANGIBLE CULTURAL HERITAGE OF WUSHU IN ANHUI PROVINCE

4.1 Multifaceted Documentation Using Modern Technology

The purpose of digital conservation of martial arts intangible cultural heritage is to realize the real record of its inheritance data, and digital conservation is also to give it a "second life"[5]. Digital preservation is also to give it a "second life". Using high-definition cameras, audio recordings and three-dimensional scanning technology, we digitally record the performance process and details of the techniques of Wushu ICH, and set up a digital archive of Wushu ICH to ensure the safe storage and easy retrieval of data. Utilizing cloud storage technology to back up and share the digital resources of martial arts ICH to prevent data loss and promote resource sharing. Develop VR and AR Wushu ICH experience programs to enable audiences to immerse themselves in the charm of Wushu ICH. Simulate the Wushu training environment through VR and AR technologies to provide novel training methods for Wushu enthusiasts and athletes. These technologies are utilized to recreate historical scenes, allowing the audience to more intuitively understand the historical background and cultural connotations of the Wushu Intangible Cultural Heritage.

4.2 Establishment of Policy-Compatible Protection Mechanisms

Since legislation cannot be realized in the short term' making full use of the policy advantage in state management is an important measure to solve the lack of law. The systematic protection of intangible cultural heritage not only requires a sound institutional mechanism to support it, but also needs comprehensive, whole-process, and overall top-level design from multiple aspects such as improving the system, perfecting the framework, controlling the quality, and following laws and regulations[6].The administration's publicity and education on the laws and regulations related to the protection of the intangible cultural heritage of martial arts in Anhui Province as well as the importance of protection is an important way to raise the social awareness of heritage protection. The formulation of regulations for the protection of the intangible cultural heritage of martial arts in Anhui Province is not only a response to the national call for strengthening the protection of intangible cultural heritage, but also based on the profound knowledge of the deep heritage and unique value of the intangible cultural heritage of martial arts in Anhui Province. The development of laws for the protection of intangible cultural heritage in China started at the local level. Some provinces have introduced intangible cultural protection regulations to provide a legal basis for the protection of intangible cultural heritage in the region, so the administration should formulate regulations for the protection of intangible cultural heritage of martial arts in Anhui Province as soon as possible. In short, the development of Anhui Province, martial arts intangible cultural protection regulations, is to fill the legal gaps, improve the protection system is an important measure to promote the prosperity of Anhui Province, martial arts intangible cultural heritage, and promote the protection of cultural diversity is of great significance. The administration should attach great importance to speeding up the legislative process to ensure the early introduction and effective implementation of the regulations.

4.3 Strengthening Public Awareness and Education

As an important part of regional culture, the public can be informed of the historical origin, development and unique value of the intangible cultural heritage of martial arts through publicity and education. As the public learns about the intangible cultural heritage of martial arts, they will develop a stronger sense of identity and belonging to the culture of their own region. For young people, publicity and education can break their stereotypes of traditional martial arts. It can make them realize that the intangible cultural heritage of wushu is not only a kind of sport, but also a kind of cultural form containing profound philosophical thoughts and moral concepts. Many people have a limited understanding of Wushu ICH, and publicity and education can popularize the public's knowledge of the types, characteristics, and techniques of Wushu ICH. For example, by organizing lectures, exhibitions and other activities to introduce the stylistic features and technical characteristics of different Wushu ICH items, the public can form a more intuitive understanding of Wushu ICH. At the same time, the public's interest in Wushu ICH can be stimulated through exciting performances and interactive experiential activities. Organize wushu ICH experience activities, invite the public to participate in wushu training and feel the charm of

wushu ICH. This kind of hands-on experience can encourage the public to have a more in-depth understanding of the Wushu ICH, and then cultivate their awareness of the protection of the Wushu ICH.

4.4 Increased Funding

The importance of strengthening financial investment for the protection of the intangible cultural heritage of wushu is self-evident, and it is a solid backing to ensure the inheritance and development of the intangible cultural heritage of wushu. Strengthening capital investment can also be used to improve the infrastructure conditions for the protection of the intangible cultural heritage of wushu, such as the construction of wushu museums, wushu inheritance bases, wushu training venues, etc., to provide the necessary material protection for the inheritance and development of the intangible cultural heritage of wushu. At the same time, it can also support the cultivation and introduction of wushu talents, such as setting up scholarships, subsidizing wushu students to study abroad, and introducing outstanding wushu coaches and scholars from home and abroad. These measures play an important role in enhancing the overall level and influence of wushu culture. The central administration should actively allocate special funds for protection in accordance with this provision' and administrations at all levels should also actively implement the funds in place. In addition to direct investment by the administration, it can also utilize the advantages of administration to raise funds through multiple channels. For example, enterprises and consortia investing in heritage protection can be exempted from tax; make full use of the publicity of mass media to report on the endangered status of the intangible cultural heritage of wushu, the inheritors and donors, etc. To summarize, the importance of strengthening financial investment for the protection of the intangible cultural heritage of wushu is indisputable. It is the material foundation to guarantee the inheritance and development of the intangible cultural heritage of wushu, and an important guarantee to promote the prosperity and development of wushu culture.

5 CONCLUDING REMARKS

Anhui Wushu Intangible Cultural Heritage, as an important part of the intangible cultural heritage, carries the long history and heavy culture of the children of China, which is rich in historical information, martial arts techniques and national spirit. Through the protection and inheritance of these heritages, it enables future generations to understand and learn from the wisdom and skills of their ancestors, and enables the continuation and development of Chinese martial arts culture. This heritage is not only a respect for history, but also an inheritance and promotion of Chinese history and culture, which helps to enhance national cultural confidence and cultural identity. Wushu intangible cultural heritage of Anhui Province not only enjoys a great reputation at home, but also has a very high international influence in the international arena. Through the carrier of Wushu, Anhui Province can carry out cultural exchanges with other countries in the world and show the unique charm and profound heritage of Chinese culture. Such exchanges help to enhance international understanding and friendship, and promote the diversity and inclusive development of world culture. It is not only an important carrier for us to inherit and promote traditional culture, but also a bridge to enhance national cohesion and promote international cultural exchange. Therefore, we have the responsibility and obligation to jointly safeguard and pass on this valuable cultural heritage to ensure that it will live on and blossom, and make positive contributions to the diversity of world civilizations and the prosperity of human civilization.

COMPETING INTERESTS

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REFERENCES

[1] WANG Xin, YIN Qi, YE Weiwen. Current situation of Meishan Wushu cultural heritage protection and its influencing factors in Hunan Province. Contemporary Sports Science and Technology, 2024, 14(02): 124-126.
[2] WANG Ping, MAN Fangyu. Analysis on the Protection Status of National-level Traditional Sports Non-legacy Representative Programs. Contemporary Sports Science and Technology, 2023, 13(34): 98-100.
[3] Law of the People's Republic of China on Intangible Cultural Heritage. http://www.gov.cn/flfg/2011-02/25/content_1857449. htm.
[4] Xie Na, Wan Changlin, Du Xuemei. Cultural and ecological protection path of Yuezhou kiln under the perspective of rural revitalization. China Ceramic Industry, 1-5 [2024-09-23].
[5] Guo Xiaoying. Research on Digital Protection of Intangible Cultural Heritage--Taking Henan Province as an Example. Identification and Appreciation of Cultural Relics, 2022(04): 155-157.

[6] Meng Tao. Research on the Existing Problems and Countermeasures of the Development of Traditional Wushu Intangible Cultural Heritage Projects in the New Era [J]. Journal of Beijing Sport University, 2024, 47(06): 50 - 59.

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THE INFLUENCE OF SCHEMA ACTIVATION IN RECALL OF MEMORIES IN ADOLESCENTS: AN EXPERIMENTAL PSYCHOLOGICAL INVESTIGATION

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Abstract: Schema attracts increasing highlights among scholars due to its impacts on memories in adolescents. This study aims to examine the accuracy of short-term memory of Chinese adolescents and whether students receiving an activation of the schema and students without activation have similar performance in recalling a story. With a series of objective test items in the psychological experiment of schema activation, it is found that visual aids display strongly positive influence on the recall although its effectiveness is not totally acceptable. This research contributes to the improvement of memorization methods and accuracy of adolescents.
Keywords: Schema; Adolescent; Recall of short-term memory; Experimental psychology

1 INTRODUCTION

Schema refers human mental categorization of information due to previous experience, which can be can be used to deal with the present situation [1]. Specifically, schema helps people explain the new information on the basis of existing knowledge; it also implies the mechanism of how stereotype affects people's behavior; additionally, schema explains what people are likely to recall or forget in daily issues [2].
Schema can be activated by connecting old mental representation to new information which facilitates to effectively deal with the upcoming tasks. Research has found that once the schema is activated, humans are more likely to recall the consistent information [3].
In the previous study, four different experiments were completed from different gender to try to demonstrate which factors (e.g. context, repetition, topics) affected people's encoding and recall of memory [4]. They listed about three to five possible factors and created different conditions and grouping for each test, resulting in ranking of degree of impact for each study [4]. The first experiment tested for two items: comprehension rating and recall. Divided to 5 groups, 50 participants of male and female from high school were asked to retell a story recorded in a radio after listening in 5 unique conditions and their extent of recalling accurately would be calculated. Two groups just simply heard the story; one was given a contextual picture before hearing and one given after; and the other was given only part of the context [4]. Based on these data, they got the results: firstly, comparing to given no context, receiving partial context before and context after and hearing the story for two times had weeny effect recall of the story; secondly, context before group do work as a medium that helps association and stimulation, leading to easier and more accurate recalling for participants [4]. In this experiment, gender shows little difference in results of recall of story.
Related to the study above, the contextual picture can be seen as a schema activation that might still be a reinforcement of memory. The original study of Bransford and Johnson was completed in 1972, which is about 50 years now. It means that the results are too outdated and might give out a distinct result in modern days even with the same procedure. Thus, the current research would like to replicate Bransford's study on modern youths and trying to figure out the relationship between activation of schema and memory. Moreover, many other confounding variables might also exist nowadays, such as gender and environment. In the past, it was hypothesized that students receiving an activation of the schema perform better in recalling the story (memorize more details and more accurately) than students without activation. Currently, the hypothesis in this study is that students receiving an activation of the schema and students without activation have similar performance in recalling the story (material).

2 METHODOLOGY

An experiment was conducted in this study. The researcher used independent measures design which meant that each group of participants only underwent the experiment once with different conditions. To be specific, the participants were divided into two different conditions, one with and one without activation before the story, and each group of participants only completed the task once. The researcher also tried to reduce the participants variability between the two conditions to try to avoid fatigue. Under this research design, the practice effect could be avoided, meaning that the participants became familiar of a certain task by repeating and therefore did better in the task. After the getting enough participants from the population, participants were allocated into two different conditions by drawing the lots. One condition is that participants were showed a picture about the story as an activation before listening to the recording of the story, and the other condition was participants without the activation.

This experiment employed volunteer sampling which means that all participants volunteer to attend in the experiment. The researcher made posters about the experiment and showed them on school walls or public bulletin board. Moreover, the researcher assigned a letter to invite participants and sent it to social network in school and group chats. The participants might spread in the social network of existed participants. Thus, the progress would be simple and convenient, leading to a relatively large number of participants.

This research recruited a sample of 22 participants from diverse backgrounds, including individuals aged 14-18 (seen in Figure 1), with a relatively balanced representation of genders (seen in Figure 2). Participants should have no known history of memory-related disorders or significant cognitive impairments.

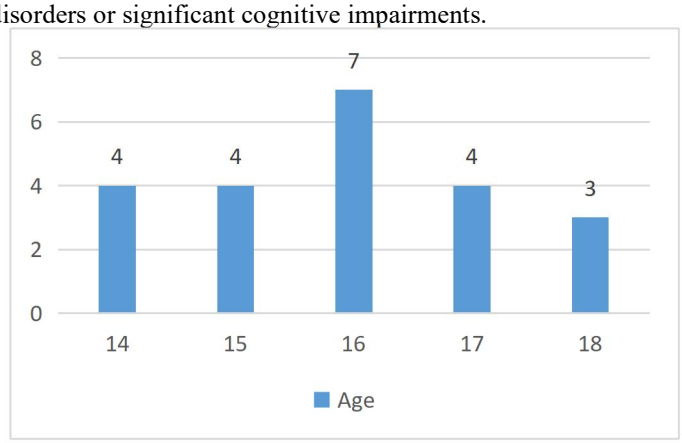

Figure 1 The age of participants

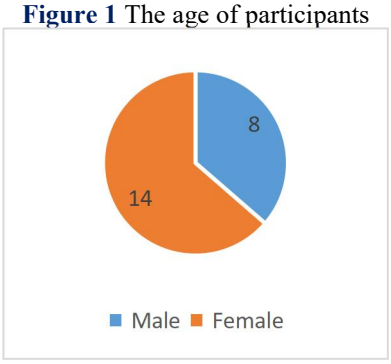

Figure 2 The gender of participants

Possible confounding variables were controlled in this experiment. To begin with, the physical environment of the experiment might influence the memory of participants. The participants in a noisy environment might do worse in memorizing and recalling the story than participants in a quite environment. Thus, the two groups of participants were arranged in two similar quiet classrooms with least distraction. Additionally, the extent of understanding the instructions may also affect their performance in memorizing. To solve this issue, the experimenter double checked with the participants whether they fully understand the instructions. Lastly, the two groups of participants were allotted to do the experiment at same time of the day to assure the similar energy level of participants.

In the study, the researcher prepared stimuli (a picture about the literal material the researcher gave to participants) that were relevant to the neutral stimuli for Group 1 which is the control group. It ensures that the stimuli were carefully designed to activate or not activate the specific schema of interest in the story. In addition, the researcher developed memory tasks that were appropriate for assessing memory accuracy and false memory creation. These tasks would only include multiple choices question and true-or-false questions that involved reconstructing events or details from the recording story. The accuracy of participants answering these questions represented the extent of recalling accuracy.

At the first states of the experiment, considering possible ethical issues, the researcher provided informed consent prior to the experiment and minimized the harm and stress that participants might receive. In the selection of activated visual materials to be used in the experiment, the researcher avoided bloody violence or material that was likely to cause participants to receive strong stimulation. Then, the participants were assigned randomly to two conditions just as described above. The experiment group (hereafter Group 2)-the group of participants that were provided an activation-were shown a picture for a few minutes. After the picture were well hidden, the same recording was played about a certain daily story. The participants received a paper including the questions then and had 8 minutes to answer all the questions. Lastly, the experimenter collected all the papers and explained the purpose of experiment to all the participants (debriefing). The same progress was done with the control group except that the participants in the control group did not have the chance to see the picture (visual activation). The researcher analyzed all results from the papers using statistics methods after the experiment.

3 RESULTS

The Group 1 mentioned below includes participants who did not see the schema picture, with 13 participants in total. Besides, the Group 2 are those who saw the schema picture and there are 9 participants in this group.

3.1 Directions in Space

The study's spatial recall component focused on three questions (Q1, Q5, and Q10) that required participants to recall directions within the described space. For Q1, which asked about the location of the Smith family's house, Group 1 had a 54% accuracy rate, with 7 out of 13 participants providing the correct answer. In contrast, Group 2 demonstrated a significantly higher accuracy rate of 89%, with 8 out of 9 participants correctly identifying the house's location.

The next question (Q5) in this category inquired about the position of the street relative to the living room. Group 1's accuracy rate was markedly lower at 18%, with only 2 out of 13 participants answering correctly. Group 2, however, showed a substantial improvement, with 67% accuracy (6 out of 9 participants).

The final spatial recall question (Q10) was a multiple-choice question about who usually occupies the left corner of the living room. Group 1's accuracy rate was 18%, with 2 out of 13 participants providing the complete correct answer. Group 2 again outperformed, with 56% accuracy (5 out of 9 participants).

These results suggest that the presence of a schema picture enhances participants' ability to recall spatial directions significantly and consistently, as evidenced by the higher accuracy rates in Group 2.

3.2 Numerical Recall

The numerical recall component of the study included questions that tested participants' ability to extract and recall numerical information from the narrative. In brief, this experiment designed seven items (Q3, Q6, Q7, Q12, Q13, Q14 and Q15) to test the effects on the numerical recall.

Based on the data of four items, Group 2 performs better than Group 1 more or less. For Q3, which asked about the number of people in the family portrait, Group 1 had a 62% accuracy rate (8 out of 13 participants), while Group 2 had a 67% accuracy rate (6 out of 9 participants). Q6, which inquired about the position of the study room on the second floor, saw Group 1 with a 54% accuracy rate (7 out of 13 participants) and Group 2 with a 67% accuracy rate (6 out of 9 participants). Q7 and Q13, which tested participants' recall of specific details about the living room's ceiling height and the floor number of the Smiths' bedroom, respectively, showed Group 1 with accuracy rates of 85% and 38%, while Group 2 had rates of 89% and 67%. These results indicate that Group 2 participants were generally more accurate in recalling numerical details.

However, when it comes to a true/false question about the number of guest rooms (Q12), it resulted in a 92% accuracy rate for Group 1 (12 out of 13 participants) and a 67% accuracy rate for Group 2 (6 out of 9 participants). The sharp gap is found and Group 2 becomes worse than Group 1.

Furthermore, Q14 and 15, which involved more complex recall and summarization of numerical information about the number of tables and chairs in the living room, saw Group 1 with accuracy rates of 69% and 77%, respectively. However, Group 2 had a higher rate at 78% (Q14) but much lower accuracy at 44% (Q15). The result of both groups in these questions suggests that the complexity of summarizing and recalling numerical details presented a challenge, and even with the aid of a schema picture, the improvement is not stable.

In numerical recall, Group 2 generally outperformed Group 1, indicating that schema pictures aid in the recall of numerical information. However, the effectiveness varied with the complexity of the task, although the differences were less pronounced than in the spatial recall category.

3.3 Adjectives

The study also examined the recall of descriptive adjectives via the test of three questions, namely Q2, Q18 and Q21.

For Q2, which asked about the material of the coffee table in the Smith family's living room, both Group 1 and Group 2 achieved a 100% accuracy rate, indicating that this detail was easily recalled regardless of the schema picture.

Q18, which inquired about the type of staircase leading to the second floor, had Group 1 with a 77% accuracy rate (10 out of 13 participants) and Group 2 with a perfect score. This indicates that the schema picture provided a clear visual cue, enhancing memory recall.

Q21, concerning the short or long length of the corridor leading to the kitchen, saw Group 1 with a 54% accuracy rate (7 out of 13 participants) and Group 2 with a 33% accuracy rate (3 out of 9 participants). This suggests that the absence of a schema picture may have hindered participants' ability to recall this specific detail.

To sum up, the positive impacts of a schema is not very obvious in terms of descriptive adjectives. The possible explanation is adjectives are not explicit in the schema picture and the young reader are not skilled at receiving this implicit information.

3.4 Inclusion of Details

The study looked at the recall of included details through two multiple-choice questions.

The first one is Q8, which asked about the contents of the basement, none of the participants in Group 1 answered fully correctly, while 44.4% (4 out of 9 participants) in Group 2 did. This significant difference highlights the beneficial effect of schema pictures in recalling a comprehensive list of items.

The other one is Q9, concerning potential food items on the coffee table, saw 15.4% (2 out of 13 participants) in Group 1 and 44.4% (4 out of 9 participants) in Group 2 answer fully correctly. The higher rate in Group 2 suggests that schema pictures can aid in recalling a variety of detailed items.
Hence, it can be seen that the image schema helps the young remember inclusion of details a lot. The stable progress in recalling in the two items above approves the employment of schema in the young people's learning.

3.5 Personal Preferences

The study also examined the recall of preferences via the test of several questions (Q4, 11, 16, 17, 19, 20, 22, 23, 24, 25).
For question 11, which asked about Mr. Smith's preference for tea, Group 1 had a 61.5% accuracy rate (8 out of 13 participants) and Group 2 had a 55.6% accuracy rate (5 out of 9 participants). The complexity of the information and susceptibility to interference seem to have led to a lack of attention to detail in checking.
Question 17, inquiring about Sarah's love for listening to pure music and doing homework, saw Group 1 with a 69.2% accuracy rate (9 out of 13 participants) and Group 2 with a significantly lower 33.3% accuracy rate (3 out of 9 participants). This suggests that the schema picture may have helped Group 1 to a slight extent.
For question 19, regarding the youngest daughter's love for economic magazines, Group 1 had a 61.5% accuracy rate (8 out of 13 participants) and Group 2 had a slightly higher 66.7% accuracy rate (6 out of 9 participants). Question 20, about the children's preference for staying home, saw Group 1 with a 53.8% accuracy rate (7 out of 13 participants) and Group 2 with a 55.6% accuracy rate (5 out of 9 participants). Question 23, concerning Mrs. Smith watching sunsets, had Group 1 with a 30.8% accuracy rate (4 out of 13 participants) and Group 2 with a 33.3% accuracy rate (3 out of 9 participants). These results indicate a slightly better performance for Group 2, suggesting that the schema picture provided some assistance.
In stark contrast, question 4, a single-choice question about who likes playing the piano the most, had Group 1 with a 69.2% accuracy rate (4 out of 13 participants) and Group 2 with an impressive 88.9% accuracy rate (only 1 out of 9 participants made an error). Question 16, about Mrs. Smith's liking for makeup, saw Group 1 with a 76.9% accuracy rate (10 out of 13 participants) and Group 2 with a perfect score. Question 22, inquiring about Mr. Smith's preference for sitting in an armchair and reading newspapers, had Group 1 with a 76.9% accuracy rate (10 out of 13 participants) and Group 2 with an 88.9% accuracy rate (1 was wrong). Question 24, concerning Timmy's fondness for watching documentaries, saw Group 1 with a 69.2% accuracy rate (9 out of 13 participants) and Group 2 with a 77.8% accuracy rate (7 out of 9 participants). Lastly, question 25, about the youngest daughter reading novels in the study room, had Group 1 with a 53.8% accuracy rate (7 out of 13 participants) and Group 2 with a significantly higher 77.8% accuracy rate (7 out of 9 participants).
In summary, the schema appears to have a positive impact on the recall of preferences, particularly when the information is reinforced by visual cues in the schema picture. The length of the sentence seems to interfere with memory, but overall, the schema picture aids in enhancing memory recall.

4 DISCUSSION

The study's findings underscore the significant role of schema pictures in enhancing memory recall, particularly in spatial directions and numerical details. Group 2, exposed to schema pictures, performed better than Group 1 across most questions, suggesting that the schema (visual aids) substantially improve recall accuracy. This finding is consistent with a previous study which found that schema is helpful in memorizing complex information's details and accuracy [5]. Similarly, another empirical research also approved the effectiveness of schema in memory [6].
However, the effectiveness of schema pictures was less consistent in recalling descriptive adjectives and personal preferences, indicating that the complexity and nature of information impact the utility of visual cues. This limitation of effectiveness is also reflected in the processing social information is easy to be disturbed in memory although the visual aid exists [7]. This result also testifies the argument that personally relevant descriptive information is not always enhanced by schema in memory [8].
Specifically, in this study, Group 2's performance declined in questions requiring complex numerical counting and operating, highlighting the need for further exploration into how schema pictures can be optimized for various types of memory tasks. This result is in line with the research which suggests the impact of schema on memory for non-schematic information in the young is variable and depends on the specific category of test items [9]. Moreover, the narrative language, driven by ID3 algorithm and node optimization, becomes crucial in recalling the information [10]. Generally, the memory behaviour is positively related to schema [11]. In brief, this study suggests that schema pictures are a valuable tool in memory enhancement but their impact varies with the intricacy of the information being recalled.

5 CONCLUSION

This empirical research carried out an experiment to test the instant recall performance of Chinese adolescents in memorizing the detailed description of the home scenario with the help of static schema. Based on the participants' data, this research quantitatively analyzed five types of memory information, including space directions, numbers, adjectives, inclusion of details and each individuals' interests. To be conclude, the hypothesis mentioned in the introduction is supported. The schema is obviously beneficial in the young's memory, and improves the accuracy of some details.

This research is limited in the scope of sample size due to the time limit and location. However, the findings provide insights into the psychological studies and adolescent development with the first-hand data. For future work, it is recommended to conduct more exact experiments with dynamic images and continue to explore the long-term memory performance.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

REFERENCES

[1] Bern S L. Gender Schema Theory and Its Implications for Child Development: Raising Gender-Aschematic Children in a Gender-Schematic Society. Signs, 1983, 8(4): 598-616.
[2] Armbruster B. Schema Theory and the design of content-area textbooks. Educational Psychologist, 1996, 21: 253-276.
[3] Tse D, Rosamund F, Langston, MK, et al. Schemas and memory consolidation. Science, 2007, 316(5821): 76-82.
[4] Bransford J D, Johnson, M K. Contextual prerequisites for understanding: Some investigations of comprehension and recall. Journal of verbal learning and verbal behavior, 1972, 11(6): 717-726.
[5] Brady T F, Konkle T, Alvarez, G A. A review of visual memory capacity: Beyond individual items and toward structured representations. Journal of vision, 2011, 11(5): 4.
[6] Hastie R. Schematic principles in human memory. In E. Tory Higgins, C. Peter Herman, Mark P. Zanna (eds.), Social cognition, Routledge, 2022, 39-88.
[7] Lord C G. Schemas and images as memory aids: Two modes of processing social information. Journal of Personality and Social Psychology, 1980, 38(2): 257-269. DOI: https://doi.org/10.1037/0022-3514.38.2.257.
[8] Ferguson T J, Rule B G, Carlson D. Memory for personally relevant information. Journal of Personality and Social Psychology, 1983, 44(2): 251-261. DOI: https://doi.org/10.1037/0022-3514.44.2.251.
[9] Webb C E, Dennis N A. Memory for the usual: the influence of schemas on memory for non-schematic information in younger and older adults. Cognitive Neuropsychology, 2020, 37(1-2): 58-74.
[10] Jiang Wangmeng, Ma Qiang. English teaching system design based on ID3 algorithm and node optimization. PeerJ Computer Science. 2023, 9: e1486. DOI: https://doi.org/10.7717/peerj-cs.1486.
[11] Cockcroft J P, Berens S C, Gaskell M G, et al. Schematic information influences memory and generalisation behaviour for schema-relevant and-irrelevant information. Cognition, 2022, 227: 105203.

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DEEP LEARNING FOR CLIMATE-ECONOMIC MODELING

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Abstract: Climate change poses one of the most significant challenges to humanity, with profound implications for ecosystems, societies, and economies. This paper explores the integration of deep learning techniques into climate-economic modeling, aiming to enhance predictive accuracy and inform policy decisions in the face of escalating climate-related risks. Traditional climate-economic models, such as Integrated Assessment Models (IAMs), have been foundational in understanding the interplay between climate change and economic systems. However, they often rely on linear assumptions and simplified relationships that fail to capture the complex, non-linear dynamics of climate-economics interactions. This paper underscores the urgent need for continued research into the integration of deep learning techniques in climate-economic modeling. Policymakers are encouraged to invest in data infrastructure, foster interdisciplinary collaborations, and prioritize the ethical use of deep learning tools in decision-making processes. By harnessing the power of deep learning, we can enhance our understanding of climate change impacts and develop more effective strategies for resilience and adaptation, ultimately paving the way for a more sustainable future.
Keywords: Deep Learning; Climate-Economic modeling; Policy decisions

1 INTRODUCTION

Climate change represents one of the most significant challenges facing humanity today, with far-reaching implications for ecosystems, societies, and economies. Rising global temperatures, shifting precipitation patterns, and increasing frequency of extreme weather events are not merely environmental issues; they are economic challenges that threaten the stability and growth of nations. According to the Intergovernmental Panel on Climate Change (IPCC), the economic costs associated with climate change could reach trillions of dollars by the end of the century if current trends continue unchecked[1]. These costs arise from various factors, including damage to infrastructure, loss of productivity in agriculture, increased healthcare costs due to climate-related illnesses, and the need for significant investments in adaptation and mitigation strategies[2].

The importance of accurate modeling in understanding and forecasting these impacts cannot be overstated. Policymakers rely on models to simulate potential future scenarios, evaluate the effectiveness of different intervention strategies, and allocate resources efficiently. Traditional climate-economic models, such as Integrated Assessment Models, have been instrumental in this regard[3]. However, they often fall short in capturing the complexity and non-linearities inherent in climate-economics interactions. As such, there is a pressing need for innovative approaches that can enhance the predictive accuracy and robustness of these models[4].

Deep learning, a subset of machine learning, has gained prominence in recent years due to its remarkable success in various domains, including computer vision, natural language processing, and speech recognition. At its core, deep learning involves the use of neural networks with multiple layers that can learn complex patterns from large datasets[5]. This capability makes deep learning particularly well-suited for tackling the multifaceted challenges associated with climate-economic modeling.

The evolution of machine learning has been characterized by rapid advancements in algorithms, computational power, and the availability of vast amounts of data. These advancements have opened new avenues for integrating deep learning into climate-economic modeling, enabling researchers to leverage high-dimensional data to uncover intricate relationships between climate variables and economic outcomes, such as carbon tax prediction [6]. By harnessing deep learning techniques, it is possible to improve the accuracy of predictions, facilitate real-time data analysis, and enhance the interpretability of model outputs [7].

This paper aims to explore the integration of deep learning into climate-economic models, addressing the limitations of traditional modeling approaches while capitalizing on the strengths of modern machine learning techniques[8]. The primary objectives of this research are twofold: first, to evaluate the current state of climate-economic modeling and identify opportunities for improvement through deep learning; and second, to present case studies that demonstrate the practical applications of deep learning in this context[9-11]. Through this exploration, the paper seeks to answer the following research questions:

1. How can deep learning techniques enhance the predictive capabilities of climate-economic models?
2. What are the challenges and limitations associated with integrating deep learning into existing modeling frameworks?
3. What implications do these advancements have for policymakers and stakeholders in the climate-economics domain?

By addressing these questions, the paper aims to contribute to the growing body of literature at the intersection of climate science, economics, and machine learning, offering insights that can inform future research and policymaking efforts.

2 LITERATURE REVIEW

Traditional climate-economic models, such as Integrated Assessment Models, have been foundational in understanding the interplay between climate change and economic systems. IAMs combine climate science and economic theory to evaluate the impacts of climate change on economic growth and the effectiveness of various mitigation strategies[12-15]. These models typically use a set of equations to describe the relationships between carbon emissions, temperature increases, and economic variables such as GDP, consumption, and investment.

Despite their utility, traditional models face significant limitations. One major drawback is their reliance on linear assumptions, which often oversimplify the complex and non-linear interactions between climate and economic systems[16]. For instance, IAMs may struggle to accurately capture feedback loops, tipping points, and the adaptive capacity of economies in response to climate change[17]. Additionally, the static nature of many traditional models can hinder their ability to incorporate real-time data and adapt to rapidly changing circumstances. As a result, there is an urgent need for innovative modeling approaches that can address these shortcomings and provide more nuanced insights into climate-economic dynamics.

In recent years, deep learning has emerged as a powerful tool in environmental science, offering new methodologies for data analysis and prediction[18-20]. Researchers have successfully applied deep learning techniques to various aspects of climate science, including climate modeling, remote sensing, and environmental monitoring[21]. For example, convolutional neural networks have been employed to analyze satellite imagery for land cover classification and deforestation detection, while recurrent neural networks have been used to model time-series data related to climate variables[22].

Several success stories illustrate the potential of deep learning in environmental applications. One notable example is the use of deep learning algorithms to improve weather forecasting accuracy[23]. By analyzing historical weather data and incorporating real-time satellite observations, researchers have developed models that can predict weather patterns with greater precision than traditional methods[24]. Another example is the application of deep learning to assess the impacts of climate change on biodiversity, where neural networks have been used to analyze species distribution data and predict shifts in habitats due to changing climatic conditions[25].

These advancements highlight the versatility of deep learning in tackling complex environmental challenges and underscore its potential for enhancing climate-economic modeling.

The intersection of deep learning and economic modeling is an emerging area of research that holds promise for improving the understanding of climate-economics interactions[26]. While traditional economic models have primarily relied on linear regression and econometric techniques, the integration of deep learning can facilitate the analysis of high-dimensional data and uncover hidden patterns that may not be evident through conventional methods.

Current research at this intersection has begun to explore various applications of deep learning for economic forecasting in the context of climate change. For instance, studies have demonstrated the effectiveness of deep learning models in predicting economic indicators such as GDP growth and employment rates under different climate scenarios[27]. Additionally, researchers are investigating the use of generative adversarial networks to simulate potential economic outcomes based on varying climate policies, providing valuable insights for policymakers[28].

Despite these advancements, there remain significant gaps in the literature regarding the systematic integration of deep learning into climate-economic models. Many existing studies focus on isolated applications rather than comprehensive frameworks that encompass both climate and economic variables[29]. Furthermore, challenges related to data quality, model interpretability, and ethical considerations in deploying deep learning models in policy contexts persist[30-32].

In summary, while traditional climate-economic models have laid the groundwork for understanding the impacts of climate change on economies, the integration of deep learning offers exciting opportunities for enhancing predictive accuracy and addressing the complexities of climate-economics interactions. This paper aims to build on this foundation by exploring the potential of deep learning to revolutionize climate-economic modeling and inform more effective policy responses to the challenges posed by climate change.

3 METHODOLOGY

3.1 Data Collection and Preparation

3.1.1 Types of data needed

To develop a robust climate-economic model using deep learning, a diverse range of data types is essential. This includes Climate Data, Economic Indicators, Socioeconomic Data, and Policy Data.

Climate Data refers to historical and projected climate variables such as temperature, precipitation, humidity, and extreme weather events. These data points can be sourced from meteorological stations, climate models, and satellite observations. For instance, the National Oceanic and Atmospheric Administration (NOAA) and the Intergovernmental Panel on Climate Change (IPCC) provide extensive datasets that can be utilized for this purpose. The incorporation of both historical data and future climate projections allows for a comprehensive analysis of potential climate scenarios and their implications.

Economic Indicators encompass data on GDP, unemployment rates, industrial output, and investment in renewable energy. These indicators help assess the economic impact of climate change and the effectiveness of mitigation strategies. For example, understanding the correlation between rising temperatures and shifts in agricultural productivity

can provide insights into economic vulnerabilities and opportunities for adaptation. Additionally, data on energy consumption and production can shed light on the transition towards a low-carbon economy.

Socioeconomic Data includes information on population demographics, urbanization rates, and social vulnerability indices, which can influence both climate impacts and economic resilience. This data is crucial for understanding how different communities may be affected by climate change and the economic implications thereof. For instance, urban areas may experience more severe heatwaves due to the urban heat island effect, necessitating targeted adaptation measures. Furthermore, socioeconomic factors such as income levels and access to resources can significantly affect a community's ability to respond to climate-related challenges.

Policy Data comprises information on existing climate policies, regulations, and their historical effectiveness, which can be critical for understanding the economic implications of various policy scenarios. This data can be sourced from government publications, international organizations, and academic research. Analyzing past policy outcomes can inform future decision-making and help identify best practices for climate mitigation and adaptation.

3.1.2 Data preprocessing techniques

Data preprocessing is crucial for ensuring the quality and usability of the datasets. Data cleaning involves removing duplicates, addressing missing values, and correcting inconsistencies in the dataset. Techniques such as interpolation can be used for missing climate data, while imputation methods can be applied to economic indicators. For example, mean imputation or k-nearest neighbors (KNN) imputation can be employed to fill in gaps in the data, ensuring a more complete dataset for analysis.

Normalization is another important step, which involves scaling the data to a uniform range to improve the performance of deep learning models. Min-max scaling or z-score normalization are common techniques used to achieve this. Normalization helps in reducing biases that may arise due to differences in the scales of various features, thus allowing the model to learn more effectively.

Feature engineering is the process of creating new features that may enhance model performance, such as interaction terms between climate variables and economic indicators or lagged variables to capture temporal dependencies. For instance, creating a feature that combines temperature and GDP growth could reveal insights into how economic productivity is affected by climate conditions over time. Data splitting is another essential preprocessing step, which involves dividing the dataset into training, validation, and test sets to facilitate model training and evaluation. This ensures that the model can generalize well to unseen data, thereby improving its predictive capabilities.

3.2 Deep Learning Frameworks

3.2.1 Overview of popular deep learning frameworks

Several deep learning frameworks are widely used for developing machine learning models. The most prominent include TensorFlow and PyTorch. TensorFlow, which is an open-source framework developed by Google, is known for its flexibility and scalability, making it suitable for large-scale deep learning applications. Its extensive ecosystem includes tools for model deployment and production, such as TensorFlow Serving, which can be advantageous for organizations looking to implement models in real-world scenarios.

PyTorch, developed by Facebook, is favored for its dynamic computation graph and ease of use, especially in research settings. It allows for intuitive model building and debugging, which can significantly accelerate the prototyping phase of model development. The ability to modify the computational graph on-the-fly enables researchers to experiment with novel architectures and training techniques.

3.2.2 Selection criteria for frameworks based on modeling needs

When selecting a deep learning framework for climate-economic modeling, several criteria should be considered. Ease of Use is paramount; the framework should provide a user-friendly interface to facilitate model development and experimentation. This includes intuitive APIs and comprehensive documentation that can guide users through the model-building process.

Community Support is another critical factor. A strong community and extensive documentation can significantly ease the learning curve and troubleshooting process. Frameworks with active user forums, GitHub repositories, and regular updates are often preferred, as they provide a wealth of resources and shared knowledge.

Performance is essential, particularly in handling large datasets efficiently. The ability to support advanced features like GPU acceleration is crucial for training complex models within a reasonable timeframe. Frameworks that optimize computational resources can lead to faster training and improved model performance.

Flexibility is also a key consideration. The framework should allow for customization of model architectures to suit specific research needs. This includes the ability to implement novel algorithms, integrate various data types, and adjust hyperparameters seamlessly. The adaptability of the framework can significantly impact the success of the modeling efforts and the insights derived from the analysis.

In conclusion, the methodology outlined above lays the groundwork for developing a climate-economic model using deep learning. By carefully selecting and preprocessing data, and choosing an appropriate deep learning framework, researchers can create models that provide valuable insights into the complex interplay between climate change and economic dynamics. This approach not only enhances our understanding of these critical issues but also supports informed decision-making for sustainable development and climate resilience.

3.3 Model Architecture

Convolutional Neural Networks particularly useful for spatial data, CNNs can analyze climate data from satellite images to identify patterns and trends in land use, vegetation cover, and temperature changes. Recurrent Neural Networks are well-suited for time-series data, making them ideal for modeling temporal dependencies in climate and economic indicators. Long Short-Term Memory networks, a type of RNN, can capture long-range dependencies and are particularly effective for forecasting. Generative Adversarial Networks can be used to simulate potential economic outcomes based on varying climate scenarios, providing insights into the impacts of different policy interventions.

Meanwhile, the choice of architecture depends on the specific research questions and the nature of the data. CNNs are justified when analyzing spatially distributed climate data, such as satellite imagery, as they can effectively capture local features and patterns. LSTMs are preferred for economic forecasting tasks that rely on historical time-series data, as they can model the sequential nature of economic indicators. GANs are beneficial for generating synthetic data or simulating future scenarios, particularly when historical data is scarce or when exploring the effects of hypothetical policy changes.

Supervised learning is used when labeled data is available, allowing the model to learn from input-output pairs. For example, using historical climate data to predict future economic outcomes. We can also use unsupervised learning which employed when labeled data is not available, this technique can help identify patterns and clusters within the data. For instance, clustering regions based on their climate vulnerability and economic resilience.

As for reinforcement learning, this approach can be applied to optimize decision-making processes in economic modeling, where the model learns to make decisions based on feedback from its environment.

4 CASE STUDIES

4.1 Application of Deep Learning in Climate Modeling

A deep learning model was developed to predict the impacts of climate change on agricultural yields. The model utilized historical climate data, including temperature and precipitation patterns, alongside agricultural output data from various regions (Figure 1).

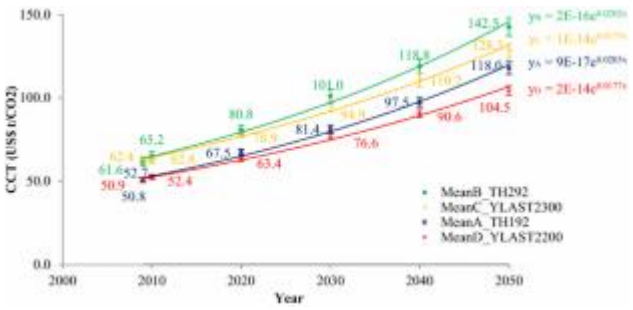

Figure 1 Output Data from Various Regions

Data Sources model incorporated data from the Food and Agriculture Organization, NOAA, and local agricultural departments. An LSTM network was employed due to its ability to capture temporal dependencies in climate and yield data. This model demonstrated a significant improvement in predictive accuracy compared to traditional regression models, providing valuable insights into how changing climate conditions could affect crop yields in different regions.

Another case study focused on forecasting energy consumption based on climate variables. The model aimed to predict electricity demand during extreme weather events, such as heatwaves or cold snaps. The data set included historical energy consumption data from utility companies, alongside climate data from NOAA and local meteorological stations. A CNN was utilized to analyze spatially distributed climate data, while an RNN was employed for time-series forecasting of energy demand. The integrated model outperformed traditional forecasting methods, allowing utility companies to optimize energy supply and improve grid management during peak demand periods.

4.2 Application of Deep Learning in Economic Modeling

There is a learning model was developed to forecast economic indicators under various climate scenarios, such as increased flooding or drought conditions. Economic data was sourced from the World Bank and local statistical agencies, while climate scenarios were derived from climate models provided by the IPCC. A combination of LSTMs and feed forward neural networks was employed to capture both temporal and non-temporal relationships in the data. The model provided insights into how different climate scenarios could impact GDP growth and employment rates, enabling policymakers to develop more informed strategies for economic resilience.

Another case study examined the economic impacts of specific climate policies, such as carbon pricing and renewable energy incentives (Figure 2). The goal was to evaluate the effectiveness of these policies in achieving emissions reduction targets while maintaining economic growth. Policy data was collected from government reports and academic studies, while economic indicators were sourced from the IMF and national statistical agencies. A GAN was used to simulate potential economic outcomes based on different policy scenarios, allowing for the generation of synthetic data

that could be used for further analysis. The model provided valuable insights into the trade-offs associated with various policy options, highlighting the importance of considering both environmental and economic factors in decision-making.

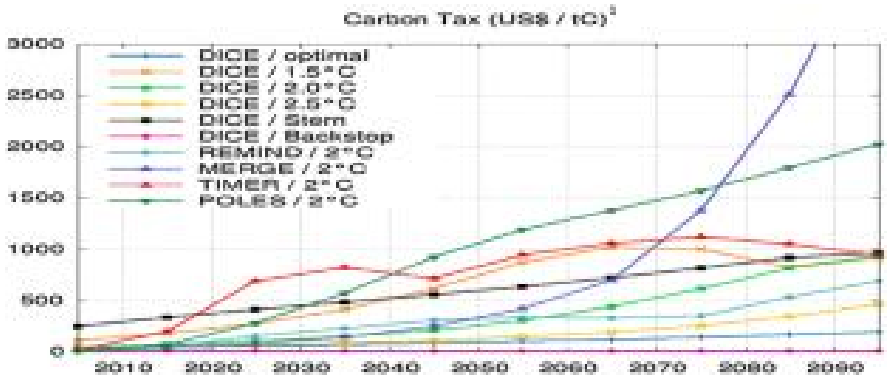

Figure 2 Model Effects

4.3 Integration of Climate and Economic Models

A case study on combined modes focused on developing an integrated model that combines climate and economic variables to assess the overall impacts of climate change on economic systems. The model utilized a comprehensive data set that included climate data, economic indicators, and policy information from various sources. A multi-input deep learning architecture was employed, allowing for the simultaneous analysis of climate and economic data. And the integrated model demonstrated improved predictive capabilities, providing insights into the complex interactions between climate change and economic performance.

5 RESULTS AND DISCUSSION

5.1 Findings from Case Studies

The case studies revealed several key findings regarding the performance of deep learning models compared to traditional modeling approaches. Deep learning models consistently outperformed traditional models in terms of predictive accuracy. For instance, the LSTM model used for agricultural yield prediction achieved a 20% improvement in MAE compared to traditional regression models. Deep learning models demonstrated a greater capacity to handle the complexity and non-linearity of climate-economic interactions. The integrated model, for example, was able to capture intricate relationships that traditional models often overlooked. The flexibility of deep learning architectures allowed for the incorporation of diverse data sources and the ability to adapt to new information, enhancing the robustness of the models.

5.2 Performance Metrics and Outcomes

The LSTM model for agricultural yield prediction achieved an MAE of 0.15 tons per hectare, significantly lower than the 0.19 tons per hectare achieved by traditional models. The integrated climate-economic model yielded an R-squared value of 0.85, indicating a strong correlation between predicted and actual economic outcomes. The GAN used for policy assessment successfully generated synthetic economic data that closely mirrored real-world trends, validating its effectiveness for scenario analysis (Figure 3).

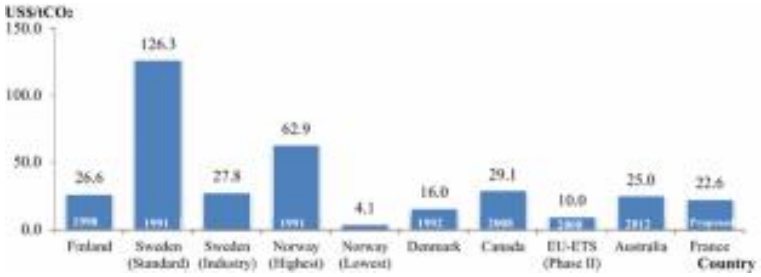

Figure 3 Scenario Analysis Results

Policymakers can leverage deep learning models to obtain more accurate forecasts of economic impacts under varying climate scenarios, enabling proactive decision-making. The ability to simulate different policy options using GANs allows for a more comprehensive evaluation of potential outcomes, facilitating informed discussions around climate policy. Improved predictive capabilities can help governments allocate resources more effectively, targeting

interventions that yield the greatest benefits for both climate resilience and economic stability.

The findings suggest that deep learning models can significantly enhance forecasting and risk assessment in the context of climate change. The ability to incorporate real-time data into models allows for timely assessments of emerging risks and opportunities, enabling adaptive management strategies. Policymakers can utilize insights from deep learning models to develop targeted risk mitigation strategies, enhancing the resilience of economies to climate impacts.

6 CONCLUSION

This paper has explored the integration of deep learning into climate-economic modeling, shedding light on its transformative potential to enhance predictive accuracy and inform effective policy decisions. As the urgency of addressing climate change intensifies, the intersection of climate science and economics becomes increasingly critical. The findings presented here underscore the necessity for innovative modeling approaches that can grapple with the complexities of climate-economics interactions, ultimately leading to more resilient and adaptive strategies.

One of the primary findings of this research is that deep learning models consistently outperform traditional modeling approaches in terms of predictive accuracy and adaptability. Traditional climate-economic models, such as Integrated Assessment Models, have served as foundational tools for understanding the impacts of climate change on economic systems. However, they often rely on linear assumptions and simplified relationships that can obscure the intricate dynamics at play. In contrast, deep learning models, with their ability to process vast amounts of high-dimensional data, offer a more nuanced understanding of the interactions between climate variables and economic indicators.

For instance, the application of Long Short-Term Memory networks for time-series forecasting has demonstrated remarkable success in capturing temporal dependencies and non-linear relationships within climate and economic data. This capability allows for more accurate predictions of how climate change will affect agricultural yields, energy consumption, and other critical economic factors over time. Moreover, the adaptability of deep learning models enables them to incorporate real-time data, thereby enhancing their responsiveness to rapidly changing conditions. This flexibility is particularly crucial in the context of climate change, where new data and emerging trends can significantly impact decision-making.

The research also highlights the value of integrated models that combine climate and economic variables. By bridging the gap between these two domains, integrated models provide a holistic perspective on the complex interactions between climate change and economic performance. For example, the integration of climate data with economic indicators allows for a more comprehensive assessment of how extreme weather events or gradual climate shifts can influence economic outcomes such as GDP growth, employment rates, and investment patterns.

These integrated models can offer policymakers valuable insights into the potential trade-offs associated with different climate policies. For instance, by simulating various policy scenarios, deep learning models can help assess the economic implications of implementing carbon pricing or investing in renewable energy technologies. Such insights are instrumental in guiding policymakers as they navigate the challenges of balancing economic growth with environmental sustainability.

The use of deep learning in climate-economic modeling significantly improves forecasting and risk assessment capabilities. Traditional models often struggle to account for the uncertainties and complexities inherent in climate systems and economic responses. In contrast, deep learning models can leverage large datasets to identify patterns and correlations that may not be immediately apparent. This capability is particularly valuable in risk assessment, where understanding the likelihood and potential impacts of various climate-related risks is essential for effective planning and response.

For example, deep learning models can enhance the accuracy of predicting the economic impacts of extreme weather events, such as hurricanes or droughts. By analyzing historical data on weather patterns, economic performance, and recovery efforts, these models can provide more reliable forecasts that inform disaster preparedness and response strategies. As a result, policymakers can make more informed decisions about resource allocation and risk mitigation measures, ultimately enhancing community resilience in the face of climate-related challenges.

As climate change continues to pose significant challenges to economies worldwide, the need for innovative modeling approaches has never been greater. The integration of deep learning into climate-economic modeling represents a promising avenue for advancing our understanding of these complex interactions. However, there is an urgent need for continued research in this area to fully realize the potential of deep learning techniques.

Policymakers are encouraged to invest in data infrastructure that supports the collection and management of high-quality climate and economic data. Robust data systems are essential for training deep learning models and ensuring that they produce reliable and actionable insights. Furthermore, fostering interdisciplinary collaborations between climate scientists, economists, and data scientists can enhance the development of integrated models that address the multifaceted challenges posed by climate change.

In addition to research and investment, it is crucial to prioritize the responsible use of deep learning tools in decision-making processes. As deep learning models become more prevalent in policy making, ensuring their transparency and interpretability is essential. Policymakers must understand how these models generate insights and be able to communicate the results effectively to stakeholders. This transparency will help build trust in the models and their outputs, facilitating their acceptance and use in policy development.

Moreover, ethical considerations must be at the forefront of deploying deep learning models in climate-economic contexts. Addressing issues of bias, fairness, and accountability is critical to ensuring that the benefits of these models

are equitably distributed and do not disproportionately impact vulnerable populations. Policymakers should establish clear frameworks for the ethical use of deep learning tools, promoting inclusivity and social responsibility in decision-making processes.

By leveraging the power of deep learning, we can enhance our understanding of climate change impacts and develop more effective solutions for a sustainable future. The integration of deep learning into climate-economic modeling not only provides valuable insights for policymakers but also empowers communities to adapt to the challenges posed by climate change. As we move forward, embracing the potential of deep learning will be essential for fostering resilience, promoting sustainable development, and ensuring a more equitable and prosperous future for all.

In conclusion, the integration of deep learning techniques into climate-economic modeling represents a significant advancement in our ability to understand and respond to the challenges of climate change. By harnessing the power of these innovative tools, we can pave the way for more informed decision-making, improved forecasting, and ultimately, a more sustainable and resilient world. The time for action is now, and the insights gained from this research can serve as a catalyst for meaningful change in the face of one of the most pressing issues of our time.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

REFERENCES

[1] Intergovernmental Panel on Climate Change (IPCC). Climate Change 2021: The Physical Science Basis. Cambridge University Press, 2021.
[2] Nordhaus W D. The Climate Casino: Risk, Uncertainty, and Economics for a Warming World. Yale University Press, 2017.
[3] Stern N. The Economics of Climate Change: The Stern Review. Cambridge University Press, 2007.
[4] Pindyck R S. Climate Change Policy: What Do the Models Tell Us? Journal of Economic Literature, 2013, 51(3): 860-872.
[5] Van Vuuren, DP Edmonds, J Kainuma M, et al . The representative concentration pathways: An overview. Climatic Change, 2011, 109(1): 5-31.
[6] Chen J, Cui Y, Zhang X, et al. Temporal Convolutional Network for Carbon Tax Projection: A Data-Driven Approach. Applied Sciences, 2024, 14(20): 9213.
[7] Zhang X. Deep Learning in Climate Science: A Review. Journal of Climate, 2018, 31(21): 8441-8460.
[8] Le Cun, Y Bengio, Y Haffner P. Gradient-based learning applied to document recognition. Proceedings of the IEEE, 1998, 86(11): 2278-2324.
[9] Goodfellow I, Pouget-Abadie J, Mirza M Xu B, et al. Generative Adversarial Nets. Advances in Neural Information Processing Systems, 2014, 27.
[10] Hochreiter S, Schmidhuber J. Long Short-Term Memory. Neural Computation, 1997, 9(8): 1735-1780.
[11] Poncelet K. Deep Learning for Climate Science: A Review of Applications and Future Directions. Earth-Science Reviews, 2021, 215: 103518.
[12] Koster R D. The Role of Land Surface in Climate Variability and Change. Nature Climate Change, 2016, 6(1): 1-9.
[13] Rojas C, Kauffman J. Deep Learning for Climate Change: A Review of Applications and Challenges. Environmental Research Letters, 2019, 14(12): 123006.
[14] Liu J. Machine Learning for Climate Change: A Review of Applications and Future Directions. Environmental Science & Policy, 2020, 109: 1-12.
[15] Bhatia S. Forecasting Climate Impacts on Agriculture Using Deep Learning. Agricultural Systems, 2020, 184, 102923.
[16] Chen Y. Deep Learning for Energy Consumption Forecasting: A Review. Renewable and Sustainable Energy Reviews, 2021, 135: 110116.
[17] Wang Y, Zhan Y. The Role of Deep Learning in Climate Change Research: A Review. Environmental Modelling & Software, 2020, 126: 104651.
[18] He K, Zhang X, Ren S, et al. Deep Residual Learning for Image Recognition. Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition, 2016: 770-778.
[19] Geyer R, Lenzen M. Climate Change Mitigation: A Review of Current Models and Future Directions. Environmental Science & Policy, 2010, 13(5): 385-396.
[20] Hsiang S M, Jina A S. The Causal Effect of Environmental Catastrophe on Long-Run Economic Growth: Evidence from 6,700 Cyclones. NBER Working Paper, 2014: 20352.
[21] Kahn M E, Zivin J G. The Impact of Climate Change on Human Health: A Review of the Evidence. Health Affairs, 2018, 37(9): 1409-1416.
[22] Daron J D, Stainforth D A. Machine Learning for Climate Science: A Review of the Current State of the Art. Climate Dynamics, 2019, 53(9): 5607-5627.
[23] Mastrorillo M. The Role of Machine Learning in Climate Change Research: A Review. Environmental Research Letters, 2016, 11(12): 123006.

[24] Ritchie H, Roser M. Climate Change. Our World in Data. 2020. Retrieved from [ourworldindata.org]. https://ourworldindata.org/climate-change.
[25] Kwiatkowski D, Phillips P C B, Schmidt P, et al. Testing the null hypothesis of stationarity against the alternative of a unit root. Journal of Econometrics, 1992, 54(1-3): 159-178.
[26] Rojas C, Kauffman J. Deep Learning for Climate Change: A Review of Applications and Challenges. Environmental Research Letters, 2019, 14(12): 123006.
[27] Duflo E, Pande R Dams. The Quarterly Journal of Economics, 2007, 122(2): 601-646.
[28] Ranjan R, Sinha S. A Review on Deep Learning and Its Applications in Climate Change. Environmental Science and Pollution Research, 2021, 28(12): 148-182.
[29] Wang X, Zhang X, Hoo V, et al. LegalReasoner: A Multi-Stage Framework for Legal Judgment Prediction via Large Language Models and Knowledge Integration. IEEE Access, 2024.
[30] Wei Z, Sun T, Zhou M. LIRL: Latent Imagination-Based Reinforcement Learning for Efficient Coverage Path Planning. Symmetry, 2024, 16(11): 1537.
[31] Wang X, Hoo V, Liu M Li J, et al. Advancing legal recommendation system with enhanced Bayesian network machine learning. Artificial Intelligence and Law, 2024: 1-18.
[32] Wang X, Wu Y C. Empowering legal justice with AI: A reinforcement learning SAC-VAE framework for advanced legal text summarization. PloS one, 2024, 19(10): e0312623.

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FACTORS AFFECTING PARITY MANAGEMENT IN ACADEMIC STREAMING OF STUDENTS AT FEDERAL SCIENCE AND TECHNICAL COLLEGE, TUNGBO, BAYELSA STATE, NIGERIA

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Abstract: This study examined factors influencing parity management in the academic streaming of students at the Federal Science and Technical College (FSTC) Tungbo, Bayelsa State, Nigeria. The study adopted a descriptive survey design. The population of the study comprised 43 junior teachers and 14 senior teachers, resulting in a total of 57 educators. A stratified total census sampling technique was applied to ensure comprehensive representation. Data were collected using a self-structured instrument, titled 'Parity Management in Students' Academic Streaming at Tungbo Unity College Questionnaire' (PMSASTUCQ), which underwent face and content validation by three experts. The PMSASTUCQ comprised fifteen items divided into three sections and demonstrated a reliability coefficient of 0.79, as determined through Cronbach Alpha analysis. Of the copies of questionnaire distributed, 45 were completed and returned, yielding an overall response rate of 78.95%. Research questions were answered using mean and standard deviation, while hypotheses were tested through z-tests. Findings indicated that maintaining appropriate pupil-teacher ratios in all the academic streams is crucial for effective parity management, promoting both academic achievement and personal growth at FSTC Tungbo. Nevertheless, the implementation of federal character principles, coupled with resource constraints, negatively impacts student diversity and performance management. The study concluded and recommended that for effective parity management in academic streaming of students in FSTCs in Nigeria, educational disparities require urgent reforms and better resource allocation.
Keywords: Parity management; Academic streaming; Ethnocentrism; Pupil-teacher ratios; Resource allocation

1 INTRODUCTION

The educational landscape in Nigeria is characterized by a diverse array of institutions dedicated to fostering academic excellence and contributing to national development. Among these, the Federal Science and Technical Colleges (FSTCs), often referred to as Unity Colleges, are crucial in equipping students with vital technical skills that drive progress within the nation. Strategically situated across various regions, these colleges strive to enhance technical education and provide equitable access to quality learning opportunities for students from varied backgrounds [1]. The significance of technical education in Unity Colleges extends beyond individual employability; it plays an essential role in promoting economic sustainability and nurturing innovation within the country. A key principle underlying the educational framework of these institutions is parity management, particularly in the context of academic streaming. Parity management ensures that all students, regardless of their backgrounds, have equitable access to educational opportunities, which can significantly influence their academic journeys [2,3]. While academic streaming organizes students based on perceived abilities, it carries the risk of perpetuating inequalities if not managed equitably, potentially creating systemic barriers that disadvantage certain groups [4]. Thus, evaluating factors affecting parity management in relation to academic streaming is vital for unlocking the full potential of every student [5].

Federal Science and Technical College in Tungbo, Bayelsa State, plays an instrumental role in delivering technical education within Nigeria's south-south region. The college's location within an inland community presents challenges related to access to educational resources and the overall quality of education. Socio-economic conditions in this area further complicate equitable access to educational opportunities [6]. The diverse student demographic at FSTC Tungbo, ranging from ages 12 to 18, represents various socio-economic and cultural backgrounds, many hailing from modest means. This highlights the college's dedication to nurturing an inclusive educational environment. However, despite these commendable efforts, systemic barriers persist [7]. Hence, this study sought to ascertain these complexities, focusing on the contextual factors and institutional dynamics that affect parity management in academic streaming at FSTC Tungbo, Bayelsa State, Nigeria.

2 STATEMENT OF THE PROBLEM

Parents and guardians have raised significant concerns about the management of academic streaming in Federal Government Colleges (FGCs). Their grievances highlight issues such as unequal resource distribution, which negatively

impacts educational quality, and a decline in academic standards to accommodate various streams. Factors such as ethnocentrism and elitism further intensify these disparities, along with inconsistent cut-off marks and state quotas. Additionally, high pupil-teacher ratios and decrepit infrastructure limit personalized support for students. However, these challenges are not uniform across all FGCs, particularly those with specialized focuses like FSTC, Tungbo. Consequently, this study was carried out to enhance technical education in Unity Colleges in Nigeria.

3 AIM AND OBJECTIVES OF THE STUDY

This study examined factors affecting parity management in academic streaming of students at federal science and technical college, Tungbo, Bayelsa State, Nigeria. Specifically, the study sought to:
1. analyze the effect of resource distribution on parity management in academic streaming of students in FSTC, Tungbo, Bayelsa State, Nigeria.
2. examine the impact of ethnocentrism on parity management in academic streaming of students in FSTC, Tungbo, Bayelsa State, Nigeria.
3. ascertain the influence of pupil-teacher ratios on parity management in academic streaming of students in FSTC, Tungbo, Bayelsa State, Nigeria.

4 RESEARCH QUESTIONS

1. What is the effect of resource distribution on parity management in academic streaming of students in FSTC, Tungbo, Bayelsa State, Nigeria?
2. What is the impact of ethnocentrism on parity management in academic streaming of students in FSTC, Tungbo, Bayelsa State, Nigeria?
3. What is the influence of pupil-teacher ratios on parity management in academic streaming of students in FSTC, Tungbo, Bayelsa State, Nigeria?

4.1 Hypotheses

The following three (3) null hypotheses were tested at 0.05 alpha level.
1. There is no significant difference in mean scores between the junior and senior teachers' opinion regarding resource distribution's effect on parity management in academic streaming of students in FSTC, Tungbo, Bayelsa State, Nigeria.
2. There is no significant difference in mean scores between the junior and senior teachers' opinion regarding ethnocentrism's effect on parity management in academic streaming of students in FSTC, Tungbo, Bayelsa State, Nigeria.
3. There is no significant difference in mean scores between the junior and senior teachers' opinion regarding pupil-teacher ratios' effect on parity management in academic streaming of students in FSTC, Tungbo, Bayelsa State, Nigeria.

4.2 Conceptual Framework

The study's framework focuses on factors influencing parity management in academic streaming for students at Federal Science and Technical College, illustrated in Figure 1.

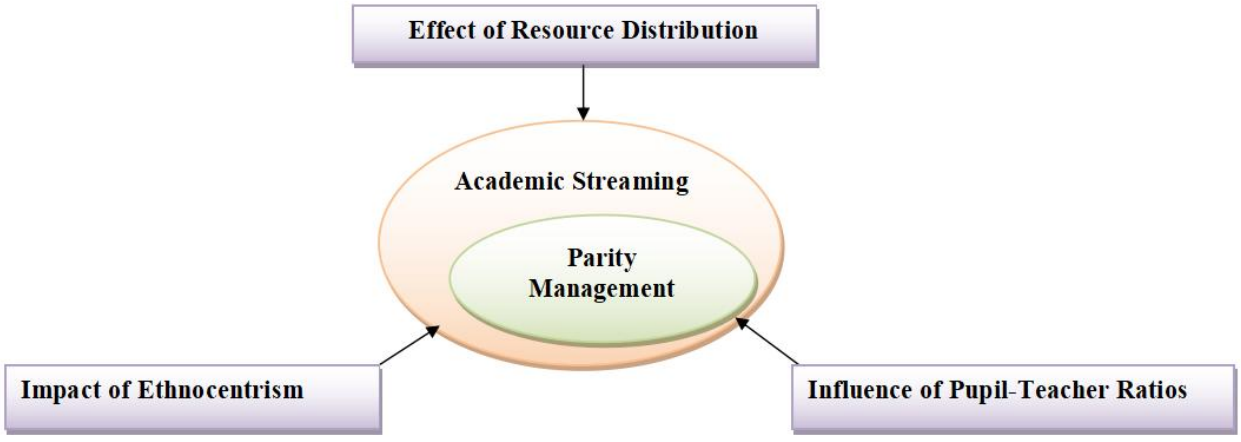

Figure 1 Conceptual Framework Showing the Relationship between Variables
Source: Researchers' conceptualization (2024).

4.3 Literature Review

The management of student parity within academic streaming systems represents a complex challenge for educational institutions worldwide, with particular relevance in Nigeria's Unity Colleges, especially FSTCs. Streaming is designed to provide tailored educational experiences that enhance learners' academic performance at varying levels [8]. However, the resulting diversity in tribal affiliations, genders, and learner capacities—including high achievers, slow learners, gifted students, and those with special needs—complicates this landscape, particularly in middle- and low-income nations [9,10]. Ethnocentrism exacerbates these disparities, as biased perceptions of student abilities based on their backgrounds often emerge in educational settings [11]. Further complicating equity, scholars such as Kamil [12] and Igbokwe [13] argue that elitism and segregation entrench inequalities, thus hindering effective parity management. The allocation of educational resources significantly influences streaming practices. Research indicates that inequities in resource distribution yield disparities in educational outcomes [10]. Lawal et al. [14] observe that inadequate teacher competency often results from skewed resource allocations, directly impacting the effectiveness of streaming. Smith supports this view, noting that high pupil-teacher ratios can compromise educational quality[15], resulting in inequitable learning experiences.

In the context of Nigeria's Unity Colleges, the quota system, the federal character principle, and catchment area policies impose systemic barriers to equitable education. Abiogu contends that these policies favour specific groups[16], undermining the essential aim of national unity. This is validated by Joshua et al. [17], who highlight how emerging inequities breed frustration and mistrust among parents and communities. Saharareporters further illustrates these concerns[18], reporting that parents often falsify their children's state of origin to secure admission, revealing deeper systemic inequities in the educational landscape. Ogeh and Alfred add that while the federal character principle is intended to enhance national unity[1], it often fosters divisiveness, reflecting systemic imbalances that degrade equity's core values. These inconsistencies become particularly pronounced in FSTCs, such as the one in Tungbo, Bayelsa State.

Current discourse emphasizes the need for effective parity management strategies among school administrators, educators, and parents by identifying specific factors affecting the management of parity in each institution [19]. Stakeholders—including the Ministry of Education—are expected to prioritize inclusive management practices, shifting focus from simply achieving demographic representation to ensuring equitable learning environments. As Fajana suggests[20], slow progress toward abolishing unjustifiable quota systems perpetuates societal disparities, resulting in a damaging "double standard" in educational achievement. Maharaj and Zareey underscore that the consequences of inappropriate streaming stretch beyond academic performance[5], affecting student interactions and relationships. The link between effective parity management in education and broader societal equity is explicit [21,22]; as Sibanda notes[23], successful equitable practices could serve as a foundation for addressing larger societal disparities, thereby seamlessly fostering unity and cohesion. The clustering of students based on ethnicity and gender emphasizes the urgent need for administrative finesse that engenders diverse, inclusive educational practices within Unity Colleges.

4.4 Theoretical Framework

Equity theory, established by John Stacey Adams in 1963, asserts that individuals evaluate their input-output ratios in relation to those of others. When they perceive imbalances, feelings of inequity can arise, leading to behavioural changes aimed at restoring fairness. This theory focuses on "inputs," which are the contributions individuals make, and "outputs," the rewards they receive. People inherently seek equity in their relationships and may adjust their efforts based on their perceptions of fairness. At the Federal Science and Technical College in Tungbo, Bayelsa State, Nigeria, equity theory provides a vital framework for assessing the fairness of academic streaming concerning performance recognition and access to appropriate resources. If students' achievements are not appropriately acknowledged, their motivation may suffer, underscoring the necessity of addressing factors that impact parity management within the institution.

5 METHODOLOGY

This study employed a descriptive survey design, targeting a population of 43 junior teachers and 14 senior teachers, totaling 57 educators. A stratified total census sampling technique was utilized to ensure comprehensive representation of the entire population. Data collection was facilitated using a self-structured instrument, the 'Parity Management in Students' Academic Streaming at Tungbo Unity College Questionnaire' (PMSASTUCQ), which underwent rigorous face and content validation by three experts. The PMSASTUCQ consisted of fifteen items divided into three sections, with responses captured on a four-point Likert scale: Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD), assigned weighted values of 4, 3, 2, and 1, respectively. The instrument demonstrated a reliability coefficient of 0.79, determined via Cronbach Alpha analysis. Out of the distributed questionnaires, 45 were completed and returned—33 from junior teachers (33/43 x 100 = 81.40% return rate) and 12 from senior teachers (12/14 x 100 = 85.71% return rate), resulting in an overall return rate of 78.95% (45/57 x 100). The study addressed the research questions using mean and standard deviation, while hypotheses were tested through z-tests.

6 RESULTS

6.1 Answer to Research Questions

Research Question 1: What is the effect of resource distribution on parity management in academic streaming of students in FSTC, Tungbo, Bayelsa State, Nigeria?

Table 1 Mean and Standard Deviation Scores on the Effect of Resource Distribution on Parity Management in Academic Streaming of Students in FSTC, Tungbo, Bayelsa State, Nigeria

S/N	Test Items- Resource Distribution	Junior Teachers (N = 33)		Senior Teachers (N = 12)		Mean Set (xx)	Remarks
		$\bar{x}$	sd	$\bar{x}$	sd		
1.	Insufficient allocation of laboratory equipment in science classes hinders parity in academic streaming for the students.	2.65	0.62	2.73	0.65	2.69	Agreed
2.	Limited access to up-to-date textbooks in technical subjects contributes to disparities in student performance in our college.	2.94	0.72	2.88	0.70	2.91	Agreed
3.	Inadequate staff strength in certain streams negatively impacts our students' academic performance and creates disparities in learning outcomes.	2.71	0.65	3.00	0.73	2.86	Agreed
4.	I am of the opinion that our students are mostly from modest background as such could not afford certain digital resources essential to assist the school administration in effective parity management.	2.60	0.61	2.77	0.66	2.69	Agreed
5	There is a noticeable inconsistent availability of science kits for hands-on experiments across the different streams in the school.	2.75	0.66	3.00	0.73	2.88	Agreed
	Cluster Mean/SD	**2.73**	**0.65**	**2.88**	**0.69**	**2.65**	**Agreed**

Criterion mean score = 2.5

Results in Table 1 indicate mean and standard deviation scores regarding the effect of resource distribution on parity management in academic streaming at FSTC, Tungbo, Bayelsa State, Nigeria. Both junior (N = 33) and senior (N = 12) teachers agreed that insufficient laboratory equipment, outdated textbooks, inadequate staffing, and inconsistent availability of science kits hinder equitable student performance. All mean scores exceed the criterion score of 2.5, with an overall cluster mean of 2.65, underscoring the urgent need for improved resources in the institution.

Research Question 2: What is the impact of ethnocentrism on parity management in academic streaming of students in FSTC, Tungbo, Bayelsa State, Nigeria?

Table 2 Mean and Standard Deviation Scores on the Impact of Ethnocentrism on Parity Management in Academic Streaming of Students in FSTC, Tungbo, Bayelsa State, Nigeria

S/N	Test Items- Ethnocentrism	Junior Teachers (N = 33)		Senior Teachers (N = 12)		Mean Set (xx)	Remarks
		$\bar{x}$	sd	$\bar{x}$	sd		
6.	The admission process at FSTC, Tungbo, prioritizes ethnocentric factors, shaping the student body's diversity.	2.50	0.58	2.51	0.58	2.51	Agreed
7.	Ethnocentric considerations subtly influence the cultural richness and inclusivity within FSTC, Tungbo's school environment.	2.61	0.62	2.58	0.61	2.60	Agreed
8.	Grouping students by academic ability at FSTC, Tungbo, ensures equal opportunities, unaffected by ethnocentric influences.	2.53	0.59	2.50	0.58	2.52	Agreed
9.	Continuous assessment methods across all academic streams at FSTC, Tungbo, maintain	2.55	0.60	2.79	0.67	2.67	Agreed

	impartiality, free from ethnocentric biases.						
10	The application of the federal character principle in student academic streaming has detracted from the *pro unitate* ethos of Unity College at FSTC, Tungbo.	2.33	0.53	2.49	0.58	2.41	Disagreed
	Cluster Mean/SD	**2.50**	**0.60**	**2.57**	**0.60**	**2.54**	**Agreed**

Criterion mean score = 2.5

Results in Table 2 present mean and standard deviation scores regarding the impact of ethnocentrism on parity management in academic streaming at FSTC, Tungbo, Bayelsa State, Nigeria. Both junior (N=33) and senior (N=12) teachers generally agreed on the influence of ethnocentric factors on student diversity and inclusivity, scoring above the criterion mean of 2.5. However, disagreement exists concerning the federal character principle's effect on unity, with a mean set score of 2.41.

Research Question 3: What is the influence of pupil-teacher ratios on parity management in academic streaming of students in FSTC, Tungbo, Bayelsa State, Nigeria?

Table 3 Mean and Standard Deviation Scores on the Influence of Pupil-Teacher Ratios on Parity Management in Academic Streaming of Students in FSTC, Tungbo, Bayelsa State, Nigeria

S/N	Test Items- Pupil-Teacher Ratios	Junior Teachers (N = 33)		Senior Teachers (N = 12)		Mean Set (xx)	Remarks
		$\bar{x}$	sd	$\bar{x}$	sd		
11.	The differences in pupil-teacher ratios across various academic streams significantly influence the development of soft skills among students at FSTC, Tungbo.	2.90	0.70	2.82	0.68	2.86	Agreed
12.	Variations in pupil-teacher ratios across different academic streams impact the quality of individualized support received by students in FSTC, Tungbo.	2.47	0.57	2.52	0.59	2.50	Agreed
13.	Teachers at FSTC, Tungbo, find it challenging to provide personalized feedback in classrooms with high pupil-teacher ratios, impacting student development.	2.46	0.57	2.50	0.58	2.48	Disagreed
14.	The allocation of teachers in FSTC, Tungbo, based on pupil-teacher ratios is crucial for maintaining balance in academic streaming across various disciplines.	2.77	0.66	2.91	0.71	2.84	Agreed
15	Increasing teacher training and support in response to pupil-teacher ratios may mitigate perceived disparities in academic streaming at FSTC, Tungbo.	2.58	0.61	2.64	0.63	2.61	Agreed
	Cluster Mean/SD	**2.64**	**0.62**	**2.68**	**0.64**	**2.66**	**Agreed**

Criterion mean score = 2.5

Results in Table 3 outline mean and standard deviation scores regarding how pupil-teacher ratios impact academic streaming at FSTC, Tungbo, Bayelsa State, Nigeria. Both junior (N = 33) and senior (N = 12) teachers largely agreed that pupil-teacher ratios significantly influence students' soft skills development and the quality of individualized support received among others. While there is some disagreement on the challenge of providing personalized feedback in overcrowded classrooms, all mean scores exceed the criterion mean of 2.5. The overall cluster mean is 2.66, indicating a consensus on the importance of implementing the pupil-teacher ratios as enshrined in the national policy on education (FRN, 2014) for effective parity management in students academic streaming in Nigeria's Unity Colleges.

6.2 Test of Hypotheses

Hypothesis 1: There is no significant difference in mean scores between the junior and senior teachers' opinion regarding resource distribution's effect on parity management in academic streaming of students in FSTC, Tungbo, Bayelsa State, Nigeria.

Table 4 Z-test Analysis on the Mean Differences in Junior and Senior Teachers' Responses Regarding Resource Distribution's Effect on Managing Academic Streaming Parity Among the Students

Status	n	$\bar{x}$	Sd	df	z-cal	z-crit value	Sig.	Level of significance	Decision
Junior Teachers	33	2.73	0.65						
				43	2.81	1. 96	0.00	0.05	Significant
Senior Teachers	12	2.88	0.69						

Results in Table 4 indicated that a z-test analysis was conducted to examine mean differences in junior and senior teachers' responses regarding the impact of resource distribution on managing academic streaming parity among students. The calculated z-value (2.81) exceeds the critical value (1.96), and the p-value (0.00) is below the significance level (0.05), indicating a significant difference..Therefore, the null hypothesis was not retained.

Hypothesis 2: There is no significant difference in mean scores between the junior and senior teachers' opinion regarding ethnocentrism's effect on parity management in academic streaming of students in FSTC, Tungbo, Bayelsa State, Nigeria.

Table 5 Z-test Analysis on the Mean Differences in Junior and Senior Teachers' Responses Regarding Ethnocentrism's Effect on Managing Academic Streaming Parity Among the Students

Status	n	$\bar{x}$	Sd	df	z-cal	z-crit value	Sig.	Level of significance	Decision
Junior Teachers	33	2.50	0.60						
				43	1.44	1. 96	0.07	0.05	Not Significant
Senior Teachers	12	2.57	0.60						

Results in Table 5 indicated that a z-test analysis was conducted to ascertain mean differences between junior and senior teachers' responses regarding the impact of ethnocentrism on managing academic streaming parity among students. The calculated z-value (1.44) is below the critical value (1.96), and the p-value (0.07) exceeds the significance level (0.05), leading to a conclusion of not significant. Therefore, the null hypothesis was retained.

Hypothesis 3: There is no significant difference in mean scores between the junior and senior teachers' opinion regarding pupil-teacher ratios' effect on parity management in academic streaming of students in FSTC, Tungbo, Bayelsa State, Nigeria.

Table 6 Z-test Analysis on the Mean Differences in Junior and Senior Teachers' Responses Regarding Pupil-Teacher Ratios' Effect on Managing Academic Streaming Parity Among the Students

Status	n	$\bar{x}$	Sd	df	z-cal	z-crit value	Sig.	Level of significance	Decision
Junior Teachers	33	2.64	0.62						
				43	3.17	1. 96	0.00	0.05	Significant
Senior Teachers	12	2.68	0.64						

Results in Table 6 indicated that a z-test analysis was performed to evaluate the mean differences in junior and senior teachers' responses regarding the effect of pupil-teacher ratios on managing academic streaming parity among students. The calculated z-value (3.17) exceeds the critical value (1.96), and the p-value (0.00) is below the significance level (0.05), confirming a significant difference. Therefore, the null hypothesis was not retained.

7 DISCUSSION OF FINDINGS

The findings regarding resource distribution's impact on parity management in academic streaming at FSTC, Tungbo, Bayelsa State, Nigeria in this study highlight significant barriers to equitable education, echoing concerns raised in previous

studies. Teachers identified insufficient laboratory equipment and outdated textbooks as critical impediments, aligning with the findings of Local Burden of Disease Educational Attainment Collaborators [10], who noted that educational disparities are prevalent in low- and middle-income nations. This indicates a clear concurrence that inadequate resources hinder academic parity, a notion that resonates with Chikpanim [9], who emphasizes the need for focused resource management in Unity Colleges. Moreover, while there is an acknowledgment of ethnocentric factors affecting diversity and inclusivity in this study, there is disagreement on the federal character principle's role in fostering unity, akin to the discussions by Obasanjo [11]as well as Okeke and Obidimma [24] on the challenges surrounding this principle. This ambiguity complicates the educational landscape, much like the findings of Smith regarding ability grouping[15], where equitable practices remain elusive.

Furthermore, teachers' consensus that pupil-teacher ratios affect soft skills and individualized support in this study, as acknowledged by Kpee and Umeghalu[25], Tyessi [19] as well as Umeghalu and Oluwuo [26], emphasizes the necessity of adhering to the national policy maximum of 1:40. This is particularly pertinent as Taylor et al. [27]and Tyessi [19] contend that equitable student allocation is hindered by systemic challenges. However, the disagreement on providing personalized feedback due to overcrowding demonstrates a divergence from Mani [3]as well as Tanggaard et al. [28], who advocate for universally accessible educational practices in streaming students based on their abilities for academic performance. Overall, the findings of this study underscore an urgent need to confront the resource limitations that obstruct academic equality and effective parity management in Nigeria's Unity Colleges, reflecting a broader imperative for systemic educational reforms as acknowledged by Lynch [8] in tandem with Magableh and Abdullah [29].

8 CONCLUSION

Based on the findings, it was concluded that factors affecting parity management in academic streaming of students at FSTC, Tungbo, Bayelsa State, Nigeria reveal substantial challenges rooted in resource distribution. Insufficient laboratory equipment and textbooks not reflecting the current global demand for scientific knowledge in middle schools such as FSTC, Tungbo emerge as major barriers, corroborating existing research that highlights educational inequities in lower-income settings. Also, this study aligns with calls for improved resource management in Unity Colleges, emphasizing the need for systemic reforms. In addition, the significant impact of pupil-teacher ratios on soft skills and individual support reaffirms the necessity to adhere to national policies on class sizes. Notably, the ambiguity surrounding the federal character principle complicates efforts at unity, indicating a need for deeper dialogue by stakeholders in Unity Colleges in Nigeria on the contemporary approach to the management of parity.

9 RECOMMENDATIONS

Based on these findings, the following recommendations were made:

1. To address the issue of resource distribution for effective academic streaming, it is essential for federal and state education authorities to conduct a comprehensive audit of resource allocation in academic institutions, particularly focusing on Unity Colleges, and implement a transparent plan to make contemporary instructional materials available and accessible to teachers and students.
2. In order to manage class sizes for effective academic streaming, Unity Colleges administrators and policymakers in education should enforce the national policy on pupil-teacher ratios by hiring additional educators and optimizing classroom sizes to maintain a maximum ratio of 1:40s.
3. The school administrator should liaise with the state education board to implement teacher training programmes that address classroom challenges in this 21st century, benefiting students needing individualized support and enhancing teachers' educational effectiveness

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

REFERENCES

[1] Ogeh, O W, Alfred, D O. Unity schools and national integration in Nigeria: Issues challenges and the way forward. GPH-International Journal of Educational Research, 2023, 6(04): 20-25.
[2] Ossai, D A. Managing secondary education in Nigeria for national cohesion. Journal of Educational Research and Practice, 2023, 2(2). https://berkeleypublications.com/bjerp/article/view/116
[3] Mani, M C. Parity and inclusive education: intensity towards universality. International Journal of Social Science & Management Studies, 2021, 7(3): 58-62.
[4] Vardardottir, A. The impact of classroom peers in a streaming system. Economics of Education Review, 2015, 49, 110 -128.

[5] Maharaj, S, Zareey, S. The other side of the tracks: How academic streaming impacts student relationships. Education Policy Analysis Archives, 2022, 30, 118.
[6] Agbese, A. How admission into unity schools is skewed- Minister. Daily Trust. 2019. https://dailytrust.com/how-admission-into-unity-schools-is-skewed-minister/
[7] Yassin, N H M, Shahrill, M, Jaidin, J H, et al. The effects of streaming on secondary school students' achievements in additional mathematics. European Journal of Social Sciences, 2015, 46(2): 148-158.
[8] Lynch, M. Advantages of streaming in schools. 2021. https://www.theedadvocate.org/advantages-of-streaming-in-schools/
[9] Chikpanim, N. Contributors to effective management of streaming for academic performance of unity college students in Rivers and Bayelsa states of Nigeria. Doctoral thesis, University of Port Harcourt. 2024.
[10] Local Burden of Disease Educational Attainment Collaborators. Mapping disparities in education across low- and middle-income countries. Nature, 2020, 577, 235-238. DOI: https://doi.org/10.1038/s41586-019-1872-1.
[11] Obasanjo, O. The quest for unity in Nigeria and the role of unity schools. Business Day. 2023. https://businessday.ng/backpage/article/the-quest-for-unity-in-nigeria-and-the-role-of-unity-schools/
[12] Kamil, Y A. Streaming students in school is a long-standing practice, but is it effective? 2019. https://www.studyinternational.com/news/streaming-students-in-school-is-a-long-standing-practice-but-is-it-effective/
[13] Igbokwe, C. Unity schools: Nigeria's symbol of double standard. The Free Library. The Sun. 2022. https://www.sunnewsonline.com/unity-schools-nigerias-symbol-of-double-standard/
[14] Lawal, I, Njoku, L, Ogugbuaja, O, et al. Education Nigeria's unity schools, from glory to ordinary. 2021. https://guardian.ng/features/education/nigerias-unity-schools-from-glory-to-ordinary/
[15] Smith, A. (2020). Reassessing 'ability' grouping: Improving practice for equity and attainment: By Becky Francis, Becky Taylor and Antonia Tereshchenko. London: Routledge. 2020, 190. ISBN 978-1138348837 (pbk). British Journal of Educational Studies, 2019, 68(4): 513-515. DOI: https://doi.org/10.1080/00071005.2020.1750240.
[16] Abiogu, G C. Analysis of quota system of admission (QSA) and the challenge of sustainable national unity in Nigeria. Journal of Education and Practice, 2020, 11(30): 24-27.
[17] Joshua, S, Loromeke, R E, Olanrewaju, I P. Quota system, federal character principle and admission to federal unity schools: Barriers to learning in Nigeria. International Journal of Interdisciplinary and Multidisciplinary Studies, 2014, 2(2): 1-10. http://www.ijims.com
[18] Saharareporters. Southern Nigerian parents give reasons for falsifying state of origin of their children to beat discriminatory admission cut-off into Nigerian unity schools. 2020. saharareporters.com/2020/09/11/southern-nigerian-parents-give-reasons-falsifying-state-origin-their-children-beat
[19] Tyessi, K. 110 Unity Colleges: Stick to 1:40 teachers/students ratio, minister tells principals. This Day Live. 2022. https://www.thisdaylive.com/index.php/2022/07/05/110-unity-colleges-stick-to-140-teachers-students-ratio-minister-tells-principals/
[20] Fajana, A. Multicultural education practices in Nigeria. International Perspectives on Teacher Education. Routledge. 2020, 33-42.
[21] Tolu-Kolawole, D. Minister demands fairness in unity schools' admission. 2022. https://punchng.com/minister-demands-fairness-in-unity-schools-admission/
[22] Ogona, I K. Educational leadership and equality of indigenship education in Rivers state. International Journal of Institutional Leadership, Policy and Management, 2021, 2(2): 653-678.
[23] Sibanda, L. Strategies for achieving equity-based education: Towards an equitable education system. Social justice and culturally-affirming education in K-12 settings. IGI Global, 2023, 133-152. DOI:10.4018/978-1-6684-6386-4.ch007.
[24] Okeke, O E, Obidimma, E O C. The federal character of Nigeria: A delicate bedrock for national unity and loyalty. Nnamdi Azikiwe University Journal of International Law and Jurisprudence, 2021, 12(2): 9-17.
[25] Kpee, G G, Umeghalu, E O. New teachers' soft skills and productivity in secondary schools in Rivers state. American Journal of Humanities and Social Sciences Research (AJHSSR), 2019, 3(3): 224-235.
[26] Umeghalu, E O, Oluwuo, S O. Management of teachers' soft skills development and flexible learning environment as a correlate of teachers' effectiveness in unity schools in south-eastern states, Nigeria. European Journal of Innovation in Nonformal Education, 2022, 2(1): 5-19.
[27] Taylor, B, Francis, B, Craig, N, et al. Why is it difficult for schools to establish equitable practices in allocating students to attainment 'sets'? British Journal of Educational Studies, 2019, 67(1): 5-24.
[28] Tanggaard, L, Nielsen, K, Jørgensen, C H. Students' experiences of ability-based streaming in vocational education. Education+ Training, 2015, 57(7): 723-737.
[29] Magableh, I S I, Abdullah, A. (2020). The effectiveness of differentiated instruction by streaming: A preliminary study of current practices in the UAE. International Journal of Learning, Teaching and Educational Research, 2020, 19(6): 95-110.

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INDIVIDUALISED RETIREMENT PATHWAYS AND PENSION REFORM IN POSTMODERN URBAN CHINA: A GROUNDED THEORY STUDY

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Abstract: Focusing on urban areas of contemporary China, this paper interrogates the interactions between the pension and retirement policy and the pathways of middle-aged citizens to retirement. At present, the pension regime in China is in the transition process, and the future direction of the pension reform is yet to be decided. The existing research mainly focuses on the pension systems and pension reforms in China from a macro-level and financial perspective. However, the experiences, expectations, and perspectives of the individuals are largely ignored. Notably, the application of qualitative research methods is relatively deficient in China. As a Grounded Theory study, this research project applies semi-structured interviews to fill in this gap. Thirty-six interviews were conducted. Through researching the opinions on the pension reform and experiences of the transitions from employment to retirement, this research identifies a gap between the choices made by the individuals and the current pension regime. The retirement pathways are increasingly individualised in urban China at present, which is in tandem with the characteristics of a postmodern society. However, the choices of older workers on work/retirement are still influenced by structural factors, such as the pension and retirement policy.
Keywords: Retirement; Pension; Postmodern; China

1 INTRODUCTION

Imitating other communist countries, China constructed a communist pension system after 1949. The working units (such as enterprises) were entirely responsible for the pensions of workers in that system. Working units contributed 3 per cent of the payroll, but this form of welfare only covered a few sectors [1]. In the "Cultural Revolution" between 1966 and 1976, this pension policy was interrupted. Finally, the Soviet trial proved to be failed, and the economic reform began under that context. The pension reforms started in that context.

The pension reforms in China started from the 1980s. They tended to be aligned with economic reforms towards a market-oriented economy [2]. The pension reforms after 1978 were moving away from a traditional communist model. The employers and employees were required to make contributions to the pension system from the 1980s. The employers were required to contribute 15% of the pre-tax payrolls, whereas the employees only needed to hand in 3% of their payment [3]. Targeting at decreasing the burdens of enterprises and improving the effectiveness of the pension systems, the reform in the 1980s formed a basis for the following changes. Afterwards, the proportions of the contributions increased, especially the percentage of the employees' contribution. The portions are now 20% for enterprises and 8% for employees after a few adjustments [3]. Besides, the coverage of pension systems expanded dramatically with the creation of pension schemes for rural peasants as well as urban residents (those who are not covered by pension schemes for workers, mostly unemployed). As a result, most of the individuals in China are now covered by the pension systems. However, the pensions for rural peasants and urban unemployed citizens are extremely low, with basic amounts around nine dollars per month [4].

In addition to the pension scheme for enterprise workers, rural residents and urban dwellers who do not work in the working units, there were still two independent systems for public officials and the members of public institutions. Federal officials refer to the working staff of the authorities while members of the public institutions refer to those who work for the establishment but not the parts of the authority systems. These public institutions include schools, colleges, hospitals, media and other agencies that are controlled by the CCP. In sum, there used to be five independent pension schemes in China. However, the reform in 2015 has abolished the separate pension systems for public officials and state institutions [4]. These two types of pension were considered to be unfair because the members did not need to contribute to the systems while they could receive pensions that had higher replacement rates than the pensions for enterprise workers. After the reform, the public officials and the working staff of public institutions had to make contributions on terms similar to the workers in businesses.

From a global perspective, the pension reform in China is a part of the bigger picture of the worldwide level. The changes in China's pension systems are responding to the spread of neoliberalism [5]. The reform of pension schemes in China is the transformation from the "pay-as-you-go" (PAYG) model (by contributing to the pension funds, current workers pay for the pensions of current retirees) proposed by the International Labour Organisation (ILO) to the multi-pillar model proposed by the World Bank which is a common trend among many countries. The game to influence the pension reform between the World Bank and the ILO was also the game between the National Economic System Reform Commission (ESRC) and the Ministry of Labour in China which held different ideologies respectively. The

ESRC is a reform-oriented organisation which was in favour of the neo-liberal ideology of the World Bank while the conservative Ministry of Labour supported the more left-wing ILO [5].
The box below contains a timeline of the most important reforms of pensions in China since 1978 (Table 1).

Table 1 Timeline for Critical Reforms after 1978

1978 Reestablishment of the retirement system; working units pay for the pensions depending on the length of working
1980s Workers began to contribute 3% of the wages; enterprises contribute 15% of pre-tax payrolls
1989-1995 Learning from the Singapore model to strengthen the power of the state in promoting the market economy
1997 Introduction of the three-part pension system; the enterprises no longer in charge of the pension entitlements.
The first part (basic pension plan): enterprises contribute 22% of the payroll of all the workers
The second part (individual accounts): companies and employees provide 11% of employees' wages
The third part: enterprise annuity schemes, commercial insurances, etc.
2006 Enterprises no longer contribute to the individual accounts while employees contribute 8% of the wages
2009 Introduction of the Rural Pension Scheme
2011 Introduction of the Urban Resident Pension Scheme
2015 Abolition of the separate pension systems for public officials and the members of public institutions (such as teachers, doctors and journalists)

Esping-Andersen examined the welfare systems of 18 OECD countries and outlined his typology of welfare states. Based on the principles of decommodification, social stratification, and private-public mix, categorising the 18 welfare states into three campuses, namely Liberal (Australia, Canada, Ireland, New Zealand, the UK, and the US), Conservative (Finland, France, Germany, Japan, Italy, and Switzerland), and Social Democratic (Austria, Belgium, the Netherlands, Denmark, Norway, and Sweden). The Liberal welfare states typically have modest welfare provisions, and entitlements usually have strict criteria. The Conservative regime usually works towards retaining contemporary social structure, and benefits are generally related to incomes. Social Democratic welfare states tend to provide generous and universal welfare [6]. Although the typology of Esping-Andersen is influential, it has been challenged by many scholars [7]. One of the shortcomings of this typology is the scale of its study. Many European countries are not included in this typology, such as some Southern European countries like Spain, Portugal, and Greece. Also, East Asian countries are excluded from this typology except for Japan which is listed as a Conservative welfare state. To fill in this gap, Jones proposed the notion of 'Confucian welfare state' to describe East Asian welfare states which include South Korea, Hong Kong, Taiwan, and Singapore [8]. According to Abrahamson, this notion of the Confucian welfare state should also be applied to China. Although the research on East Asian welfare systems partly abandoned the Confucian label in the 2000s, there is a revival of discussions on the Confucian welfare state in recent years [9].
The main character of the Confucian welfare state is the vital importance of family in providing social care, and the low level of policy involvement in welfare provision [7]. This particular character makes the Confucian welfare states independent of the three campuses above. The reason behind this character is usually considered to be the distinctive Confucian culture in East Asia. East Asian families usually view children as private assets and consider family affairs to be private matters [10]. This culture gives grounds for the state to reduce its interventions. For instance, in China, the care provision is primarily delivered by family, and the role of the state in care provision is limited [11]. Also, Abrahamson suggested that there is a revival of Confucianism in East Asia. For example, Based on Confucianism, the Chinese authority proposed the target to construct a harmonious socialist society in 2006 when making the 11th 5-year plan. The harmonious socialist society aims to expand welfare policies [12]. This plan illustrated the intention of the Chinese authority to construct a universal welfare state, although the implementations are to be improved [9]. This target is similar to the Social Democratic welfare states mentioned above.
Some scholars focus on the influences of Confucianism on social welfare. For instance, in South Korea, the care policy is primarily based on family responsibility instead of state responsibility due to its Confucian tradition. Eldercare in Korea predominantly relies on the family; therefore, funding from the authority is very limited since the family plays a major part in elder care [13]. Also, Confucianism puts an emphasis on the responsibilities and interdependence of human beings, especially family members, which may decrease the liberal view individualism. However, a main limitation of Confucianism is that most of the care responsibilities are carried out by women, which makes the problem of gender inequality more significant. Meanwhile, Confucianism and the responsibilities of family members give grounds for the lack of state intervention [14].
Instead of the notion of 'Confucian welfare state', there are some alternative descriptions of East Asian welfare states. For instance, Holiday focused on the productivist character of the East Asian welfare regime [15], and Kwon proposed the description of 'developmental welfare state' [16]. Both studies argue that social welfare serves the purpose of economic development, therefore results in the relatively modest welfare provision in East Asian countries [9]. In addition, Fisher et al. disagree with the Confucian model. Fisher et al. researched the aged care services in Shanghai and found that Shanghai has developed aged care services which are similar to Western developed countries. Therefore, they argue that the differences in systems should be attributed to development stage instead of Confucianism [17]. Also, some literature noticed the changes of familism in East Asia in recent years. For instance, Lee argues for a transformation from Confucian familism towards Neo-familism. The Neo-familism is a combination of conventional Confucianism and a new trend of more equal relations between family members [18].
In terms of the pension regime of China, it is hard to classify and position it among pension regimes in the world. OECD outlined the major characters of the pension regime in China. According to OECD, China has a minimum

contribution-based pension scheme as the first tier, and a public Funded defined contribution/Notional defined contribution pension as the second tier. Within OECD countries, Latvia has similar policy design according to the outline of OECD. However, it does not mean that China and Latvia should be classified as the same campus because such classification is overly simplified and would ignore the complexity of pension regimes. For instance, the coverage of pension and fragmentation of pension systems cannot be reflected. As the report argued, classifying pension regimes is extremely difficult since pension regimes are various and usually include different pension projects [19].

2 LITERATURE REVIEW

There are some studies regarding the transitions of workers to retirement. Although most of these studies are about other countries, they can still provide some references with this research from different sides. It is noteworthy that, for the individuals who face the transition to retirement, work/retirement and family relationships are not entirely separate issues. Instead, these two angles are related to each other. The life-course perspective, which is applied in the research across the life span contributed to the research on this connection. "The life course perspective directs attention to the connection between individual's lives and the historical and socio-economic context within which these lives unfold" [20]. Instructed by this theory, Bovenberg interrogated the two ambitions of people that are investing more in their families and also pursuing a successful career which they can keep learning from. Having a longer and more flexible working life, they can combine these two ambitions better. However, it would be necessary for the policymakers to provide them with more flexibility regarding their work, and also prolong the working lives if necessary. This piece of research illustrates the connection between the life-course perspective and social policy. Also, the balance between work and family not only includes child care as well as parental leave but also relates to the entire life course [21] [22]. In China, the retirement ages are still rather low, especially for women. Thus, a longer and more flexible working life might help older workers to combine their family obligations and longer working lives.

Compared with relatively young workers, older workers have their advantages. The study of Johnson et al. illustrated that older workers are more engaged than young workers, using emotional regulation skills. Also, older workers have fewer burnouts compared with the young ones [23]. De Wind et al. researched the phenomenon of working beyond retirement in the Netherlands. They found that "the motivation to work, physical health and the financial situation were the most relevant aspects with regard to working beyond retirement" [24]. This finding in their quantitative research programme can also help to understand the workers who work beyond retirement in China. In fact, contemporary Chinese workers may also be affected by these factors when deciding whether to continue working after reaching their retirement ages.

Tarkar et al. found a link between the intention of working after retirement and workers' satisfaction in their current jobs. The willingness to continue working post-retirement is primarily related to workers' satisfaction with their positions, and also their passions, commitment, as well as personal relationships with their colleagues [25]. The systematic review conducted by Browne et al. supported this statement [26]. Browne et al. found strong evidence that job satisfaction is related to the willingness to work beyond retirement. Moreover, higher job resources (including job control and opportunities to develop one’s career) encourage workers to postpone retirement [26]. It means that the more satisfied with her/his work, the more working resources she/he has, the more likely the worker is to postpone retirement. This finding may also apply to contemporary China.

In addition to the findings above, Sulander et al. argue that organisational justice (whether the organisation treats the workers justly), as well as job involvement, are also significant factors which influence workers' work/retirement intentions [27]. Similarly, Oakman and Wells conclude that the person-environment relationship is an essential factor in the plans to work/retire [28]. These findings illustrated the importance of working units on the decisions to work/retire. Hence, creating a suitable working environment for the workers is essential if the policymakers or enterprises would like to prolong working lives.

There has also been some literature concerning the early retirement of workers. For instance, Schreurs et al. argue that both job demands and job resources can affect working intentions [29]. While recovery needs are not associated with early retirement intention, job demands and job resources can both influence work enjoyment, hence affect the early retirement intention [29]. However, according to the systematic review of Browne et al., the evidence to illustrate the association between job demands as well as retirement intentions is limited and not consistent [26]. Also, Bennett and Mohring claimed that workers who have consistent careers are more likely to retire early. However, this phenomenon can only happen in nations where early retirement incomes are generous [30]. In China, retirement incomes, including the early retirement benefits, can be highly uneven among individuals. Also, some workers did retire very early and obtained generous early retirement pension entitlements. So, the finding of Bennett and Mohring may be able to be applied in China. Concerning the early retirement of the working population, Visser et al. focus on the influence of education on retirement. In the Netherlands, those with lower education are more likely to retire before 65 years old. Also, older workers with less education or low working skills may not be able to prolong their working lives. This problem may deepen inequality among older adults [31].

In sum, this part has reviewed the literature on the factors that affect the willingness of the workers to prolong their working lives or have an early retirement. Also, the influences of retirement and powerlessness on later lives are discussed in this part. Although many of the studies are on other regions, the factors interrogated above probably can also be applied in China. Among the existing literature, there is little research on the opinions, expectations and oppositions of the individuals in the pension reform in China. Although there has been some research on the later lives

of pensioners in China, the research on the expectations of the public is primarily focused on the West. In other words, the ideas of the ordinary people have been largely ignored, and the expectations of the ordinary people on pension reforms do not get enough attention from the policymakers and scholars.

3 RESEARCH METHOD

Grounded Theory is a qualitative research method. Initially, this approach was developed by two American scholars, Glaser and Strauss in the 1960s. Notably, the contribution of Charmaz on the invention of constructivist Grounded Theory considerably changed the landscape of Grounded Theory. Instructed by the constructivist Grounded Theory, semi-structured interviews were applied in this research programme. Considering the retirement ages in China, 45 to 65 would be rather high in the Chinese context. So, the respondents were sampled from the people who are to face the transitions from employment to retirement at present or in the near future. Most of the participants were expected to be between 40 and 60 years old at the time of the interview (see table below for final sample composition).

Regarding the differences between men and women, middle class and working class, and the eastern and western part of China, these factors were considered when sampling, in that the initial sampling was oriented by seeking a degree of heterogeneity among the participants. Additionally, the types of employment were another important element considered when choosing individuals to be interviewed. The inequalities between men and women have been widely noticed, not only because of the gender stereotypes and the socially constructed differences in men' and women's lives, but also the rise of feminism. Although China is on its way to a postmodern society, it is still marked by the influence of the traditional East Asian culture, which assigns males and females with different social roles and obligations. Thus, it is interesting to discover the similarities and differences between men and women in family relations and the transitions to retirement in a context that is different from the West. The differences between various parts of China reflect mainly the economic development stage and social policy. The research participants of this research project were recruited from cities and regions that share a commonality in that they are predominantly urban and around the average or somewhat above average in terms of the level of economic development.

Also, pension policy differs between cities and the countryside in China, and the gaps in pension entitlements are evident. Considering the huge gap between urban and rural areas in economic development stages as well as pension arrangements, I decided to focus on urban areas. Urban areas are closer to a postmodern society while the countryside is more traditional. Furthermore, the pension entitlements for rural residents are very modest. This issue makes the research questions less relevant to the rural residents as they are not very likely to live on pensions alone and have to rely on other resources.

Initially, I focused on two types of employment, including the employees of private companies and the working staff of the higher education who are members of the public institutions. These considerations were the starting point of the data collection process. As the data began to emerge, the sampling process became more guided by theoretical sampling principles, as per the Grounded Theory method. In other words, additional participants were chosen on the basis of their potential contribution to the development of theoretical constructs. The table below shows the basic characteristics of the interviewees who participated in this research project (Table 2).

Table 2 Sample composition and characteristics

interview number	gender	place of residence	employment status	age	interview setting
1	F	Hebei	teacher in primary school	50	my living room
2	F	Hebei	teacher in college	55	my living room
3	F	Hebei	teacher in college	55	my living room
4	F	Hebei	retired enterprise worker	48	my living room
5	F	Hebei	teacher in college	53	my living room
6	F	Hebei	manager in medical enterprise	38	meeting room of the enterprise
7	M	Hebei	shop owner	43	shop (quiet, no customers)
8	M	Hebei	doctor	53	participant's living room
9	M	Hebei	public official (retired but went back to work)	63	office
10	M	Hebei	public official (retired but went back to work)	64	office
11	M	Hebei	public official (retired but went back to work)	64	office
12	M	Shanghai	retired enterprise worker	55	Starbucks
13	F	Jiangsu	administrative worker of a hospital	54	café
14	M	Jiangsu	professor	48	audio talk online

15	M	Hubei	security staff (coming back to work)	65	office
16	M	Hubei	security staff	58	home of the participant
17	F	Hebei	shop owner	47	café
18	M	Shandong	manager of an enterprise	49	a personal house
19	M	Shandong	manager of an enterprise	45	a personal house
20	F	Hebei	shop owner	53	café
21	F	Hebei	retired enterprise worker	63	neighbourhood garden
22	F	Hebei	retired teacher	63	neighbourhood garden
23	M	Hebei	baker	50	road, under a tree
24	M	Hebei	safety supervision	58	neighbourhood garden
25	F	Hebei	housewife	53	participant's living room
26	M	Hebei	driver	60	office
27	M	Hebei	warehouse keeper	68	warehouse
28	F	Hebei	shop owner	40	tea shop
29	F	Hebei	chef	44	café
30	see 17				café
31	see 23				café
32	M	Hebei	cleaner	63	empty dance studio
33	M	Sichuan	teacher in secondary school	51	participant's living room
34	F	Sichuan	statistician	40	participant's living room
35	F	Sichuan	housewife	50	participant's living room
36	F	Sichuan	retired factory worker	53	tea room

Targeting the middle-aged employed or formerly employed urban population in China, there were no obvious marginalised populations among the participants of this research programme in the areas and groups that were targeted (if the sampling had included impoverished rural populations or highly insecure internal migrants, this would, of course, have been different). However, there were some ethical issues such as anonymity, confidentiality, and informed consent, which were taken into consideration. Ethical approval for this research was obtained from the Research Ethics Approval Committee of [anonymised for review].

During the data analysis process, the Grounded Theory (GT) coding strategy was employed. Grounded Theory encompasses distinct coding strategies [32]. The first stage involved open coding, during which the data was broken down into smaller parts. Open coding was carried out using the gerund forms of relevant verbs and guided by constant questioning, such as: What is happening here? What is the participant communicating? What actions and experiences is the participant describing? How does this data relate to the central inquiry? The next step was axial coding, which involves reorganizing the data, previously broken down during open coding, by identifying and establishing connections between categories and their subcategories. Finally, selective coding was used to construct a conceptual and theoretical framework. In summary, categories, concepts, and theory were developed incrementally throughout the data analysis process. "All coding procedures in GT fundamentally share a common process that results in categories and concepts, and which in turn drives sampling in pursuit of theory" [32].

The example below shows the process of open coding (Table 3).

Table 3 Example of open coding

Why the pensions are in debt in China? At first, the massive public officials army, isn't it? The massive altogether more than 20 million public officials… They used to receive the so called relatively low payrolls in the past, the salaries of the public officials are indeed not high. Afterwards, the state would be responsible for their retirement security. But when it is time for the state to pay for their later lives, the state eats its words. Making them receive from the pension funds. So, the people who did not contribute, they still get high salaries [pensions], right? Many people, such as a secretary general of a city-level work unit or some other officials, it is common that they get ten or eight thousand, right? They nearly have never handed in, but receive the pensions higher than all the people. Well, the enterprise workers hand in, but receive very low, don't they? Many staff, the ordinary workers, he handed in for more than 20 years, at last he may only get 1800 or 2000 per month. Ah, the senior leaders of the authorities, there are many of them receiving five or six thousand, seven or eight thousand, how do you say that? This is a thing, unreasonable in terms of policy design.	Complaining about too many public officials Admitting the low payrolls of them Complaining about the state that eats its words Giving the example of an official Stating that the enterprise workers have low pension entitlements Expressing his dissatisfactions on pension arrangements

4 FINDINGS

A significant phenomenon in China is the early retirement of the middle-aged population. Interestingly, this paper found that the phenomenon of early retirement is not rare in the current context. Due to the inertia of the planned economy and the social and economic situations of the past few decades, the actual retirement could be quite early for some employees. The early retirement can happen in different situations whereas the retirement ages may be low for some special workers with heavy labour and/or the enterprises provided some workers with an early retirement although they have not reached their official retirement ages.

The early retirement can have different impacts on the welfare of the employees. It improved the welfare of some workers dramatically while it can also increase the uncertainty of some workers at the same time. For some participants, receiving adequate incomes, the early retirement gave them massive leisure time and the opportunities to spend time with families and friends. For example, enjoying the time of being retired, Lianyu spent most of his time at home:

In 2007, the old enterprise was to transform, so I was moved to a liquid crystal company. The enterprise was transformed to make liquid crystal. So I had to work at night. I did not go to work since then. So, in other words, after 2008, I kept staying at home until retirement. It has been ten years. So then I retired in October 2017 ……I was unhealthy, so I kept staying at home, taking care of my wife and my child. Also, my mum… my mum was more than 80 years old; she is 91 this year. She was already 81 when I went back [from his working unit]. At home, there is nothing important to do, in fact. There is an advantage for people from Shanghai, that is doing housework at home. Buying vegetables and cooking, that is what I do. It is because in Shanghai, normally the men do the housework at home.

4.1 Lianyu, Male, 55, Retired

In contrast to those who are happy with their early retirement at present, more respondents are not fully satisfied with their current situations after early retirement. This paper discovered two reasons for this to happen. Contrary to the mode mentioned above, some people do not think too much free time is an improvement of wellbeing, and they have to find other ways to make use of free time. Another challenge is the low level of some pensions. These two factors influence whether early retirement is an improvement of wellbeing. The case of Liyan showed the situation that too much free time after early retirement pushed her to engage in other work:

My age that is recorded in the archives is older than my real age. Actually, I was born in 1971, so if I retire now I cannot have nothing to do. I always would like to find something to do. I am only in my 40s.

(Researcher: why the age recorded is older than your real age?)

The age recorded in the archives, when I went to work I was too young, might be. It was because my families filled in some form or certificate; I cannot remember what it was. Now the working loads in a bank are relatively heavy, lots of pressure. For me, when the working loads get heavy, I do not want to, to be frank, I never want to be constrained by the job which requires me to work from 9 am to 5 pm regularly every day. I do not want to live that kind of life. So when I got the opportunity, I retired early…

… My character is that I can't stay relaxed and do nothing. If you have nothing to do, it will be too boring to stay at home every day…

4.2 Liyan, Female, 47, Shop Owner

It is evident that some middle-aged workers decided to look for another job after obtaining an early retirement. This action illustrates the disharmony between the individuals' working behaviours and the pension and retirement policy of the establishment. In fact, not only the early retired, those who have already reached the official retirement ages could also choose to remain working. Different reasons may contribute to the phenomenon of working after retirement, such as the special character of some jobs, the request from their colleagues, their passion for their job, and the needs for income to avoid poverty.

An important reason for some workers to remain working after reaching their retirement age is that the head or director of the department would like them to stay. Compared to the young employees, the senior workers may be relatively weak in physical strength. Yet, they can have advantages in many aspects, such as expertise in professional knowledge, more working experiences, familiarity with the working team and working circumstance, and better ability of cooperation with various groups of people. Their advantages in work make them valuable in their working positions. As has been argued by Johnson and colleagues, work engagement would increase, and exhaustion and cynicism would decrease with the increase in workers' ages [23]. So, for them, on the one hand, their working units or colleagues may not wish them to leave their working positions. On the other hand, they may wish to keep taking advantage of their careers. The case of Qinglin showed this situation. As a public official, he retired at 60 and remained at his working position for three years after his official retirement. Working for the public sector, his pension belongs to the urban pension system for public officials though he works in a town:

Actually, I retired… March 2014. For now, I was requested to come back to work. Anyway, my main work is to remain the stability of Complaint Letter and Visit [an office that receives and deals with letters of complaint from the public]. Currently, we have a few old guys, including me. We have four old workers in charge of the reception of complaint letter and visit. This town is a big town; the conflicts of people and lands are significant. So the damned problem of complaint letter and visit is relatively severe. So, we old workers, I retired in 2014, our director did not let us go. I did not expect that in 2015, this town established a reception centre of complaint letter and visit. The reception centre arranged this job for us, old guys. We are now in charge of receiving the complaints. A consideration is that from the perspective of our manager, we are older and more experienced. So it is not very likely that we have conflicts with the coming people. So they arrange us all to be in our positions. From the perspective of individuals, establishing this reception, I think it is very important, isn't it? Additionally, the citizens are normally content with us, aren't they? Anyway, they come to us after arriving, at least, someone can receive them, someone is in charge of their problems. So, they generally recognise us.

4.3 Qinglin, Male, 63, Public Official

For the individuals who have been or are currently in working positions, the transitions from a pension contributor to a pensioner would happen eventually. However, retirement (quitting job) may never happen to some people. This type includes the employer, the shop owners, the self-employed, and so on. Xian is the owner of a jade shop. He can work until he does not want to. In that way, there is no real retirement for him. Covered by the urban resident pension system, he will get a small amount of pension monthly when he comes to the age to receive the pension. However, the pension he may get in the future will have little or no influence on his quality of life:

My job does not have the limitations on ages; I can do some work in this career as long as my body is still able to move. Maybe when I become 80, if my body is still very well, I can still do some things etc. So economically, I may mainly focus on leisure and not put so many efforts into the operation of this shop. But in this aspect, I can still see some profits. As other people said, the later lives require some money. This thing still should have some via incomes. So running this shop, why I chose to do this in my middle age, this career, because this career does not have limitations on ages for me, unlike the jobs that require heavy labour, if I was really old, definitely I cannot do those kinds of work. This job requires judgements and experiences, so when I get older, I will get more experiences and better judgement. Also, the older I get, the more advantages I get. It will be, some things, the things that matter will be different. It is because this time… You run this shop, you focus on finance, making money sometimes. It is because this thing has to make money to feed the families. When I get older, without these economic burdens, the point will be satisfying myself. In addition to some small incomes, it will be all right.

4.4 Xian, Male, 43, Shop Owner

As a shop owner, he can choose his own steps to retirement freely. He does not need to face the first dimension of retirement. Although he will receive some pensions in the future, it will not be a significant influence on his life. As for when will he stop running his jade shop, he has got his own plan which will be a kind of gradual retirement. Since his pension will be small, his pace of life will be largely based on his own willingness. In addition to pensions, another factor that will constrain the ability of the middle-aged to decide the retirement ages is family obligations. As Xian mentioned at the end of the quote above, free from the obligation to make money for the family, he can have more control over his retirement based on his own willingness. Besides, having no plan on getting involved in grandparenting activities, he can have more freedom to decide whether to retire or not. Therefore, the family obligation is also an important factor which can influence the retirement of those without a fixed retirement age, such as shop owners like Xian.

In sum, this part reveals the diverse retirement options and pathways in a postmodern society. Due to the retirement policy in present-day China, some middle-aged informants retired rather early and enjoyed their retirement time at a relatively young age. In contrast, driven by some pressure or motivations, some people chose to work beyond their retirement ages. Also, without an official retirement age, some workers such as the self-employed can be rather flexible in their working and retirement. There is not a unified retirement pathway for all or even the majority of the citizens in present-day urban China, which is already a postmodern society.

Notwithstanding the postmodern retirement mode in contemporary China, there are some structural factors regarding individuals' freedom on deciding their own retirement ages. The economic situation is an essential factor in influencing the freedom of individuals in making decisions on their retirement timings. In contemporary China, it is reflected as the difference between enterprises and the public sector. Having different scenarios of pension contributions and pension entitlements, the working staff of public institutions and public officials have obvious and direct advantages over enterprise workers concerning the economic situations after retirement. Therefore, having a better economic situation, the staff of the public sector have more freedom in their retirement lives. In other words, policies oriented the economic status of individuals, and therefore influence the freedom of individuals on work/retirement, which is a direct consequence of the problem of unequal pension policy.

To be specific, for the employees of the public sector, although the economic situations vary among individuals, this study does not find any of them who are under poverty. Although some public sector employees chose to work beyond retirement, non-financial factors such as commitment and bonds with the working units are the primary reason for the postponement of retirement. Nevertheless, free from financial pressure, some staff of public institutions expressed willingness to retire early. Constrained by the fixed official retirement ages, the employees of public institutions cannot decide to retire early even if they have strong preferences for retirement. For them, the fixed retirement ages are the most significant factor in affecting their freedom of retirement. Different from the public sector, the freedom of enterprise workers is more affected by their financial situations. Economic inequality exists not only between the public sector and the private sector but also within enterprise workers. Unlike public institutions employees, financial situations vary significantly among enterprise workers. For enterprise workers, although their work/retirement is influenced by the retirement policy, financial situations appear to be the primary factor in affecting their freedom. It is because their work/retirement is more negotiable with their managers or employers, and their pension entitlements are relatively modest, and therefore have less influence on their choices on work/retirement.

5 DISCUSSION AND CONCLUSION

The citizens in contemporary China are less and less constrained by the official retirement ages of the state. Instead, the lives of citizens are more and more diverse based on their personal situations as well as their own willingness to work/retire. The existence of this phenomenon suggests that the urban areas of contemporary China may have stepped into a postmodern society. In a postmodern society, life-course transitions become individualised. The present-day modes of transitions to retirement correspond to this character of the postmodern society.

This study points to a significant leeway between the official retirement ages, which are regulated by the authority and the actual retirement ages of individuals. Although the retirement ages in present-day China are relatively low, there are still many workers who retire much earlier than the official retirement ages, through negotiations with their working units. Meanwhile, many workers chose to continue working in the previous working units, or even look for other jobs after reaching their official retirement ages. In addition, without a working unit, many citizens do not have a fixed retirement age, and their pathways to retirement are not regulated by the authority. All these pathways illustrate the disparity between the public policy as well as the behaviours of individuals. Also, the transitions to retirement have become individualised instead of collective or unified. Such a phenomenon is decided by the interactions between individuals, working units, as well as the postmodern urban context in present-day China.

Retiring in their 40s or 50s, some workers enjoy their retired lives whilst the early retirement can also be unsatisfactory for some other workers. As displayed in the findings, adequate pension entitlements, as well as the preference for retirement, are the key factors that contribute to a contented early retirement. Those who retire early with abundant retirement incomes, can have a flexible lifestyle without the constraints from working units. Especially, as argued by Oakman and Wells, those who do not have a suitable working environment are eager to leave their working units and become pensioners, such as some professors of local colleges who call themselves “little professors” [28]. However, without sufficient pension entitlements, many enterprise workers have to struggle with poverty if they retire early. Besides, having got used to working lives, some workers are not satisfied with a retirement lifestyle. Therefore, many workers pursue other jobs after taking early retirement.

The phenomenon of working beyond retirement is also noteworthy. Unable to get used to retirement lives, many older workers seek to work beyond retirement in order to occupy themselves. In addition, as the data shows, due to the commitment to their working units, some senior workers decide to remain working beyond official retirement ages under the requests of their managers, reflecting the argument of Tarkar et al. that commitment to organisations and personal relationships with colleagues contribute to the willingness of working post-retirement. Besides, poverty is also a significant reason for this phenomenon [25]. Suffering from poverty, some older workers are under pressure of maintaining an acceptable living standard for themselves as well as their families. In sum, the leeway between the fixed retirement ages as well as the choices of individuals illustrates that unified and fixed retirement ages have been less and less able to influence the behaviours of individuals in an urban postmodern context at present. Based on the individualised situations and preferences, workers have to make their own choices regarding their actual retirement timing.

In addition to the phenomena mentioned above, the existence of workers who do not have fixed retirement plans (mostly owners and employees of shops or small businesses) also corresponds to the character of a postmodern society. For the workers with fixed retirement ages, although their choices can vary with their situations, they are more or less affected by the pension and retirement policy. In contrast, for the workers without fixed retirement ages, the pension or

retirement policy has little or even no influence on their lives. Although these workers can obtain very low pension entitlements, the influence of pension policy on their decision making is negligible. For them, the timing and processes of retirement are independent of the retirement policy or regulations from the establishment. In other words, their decisions concerning retirement are wholly controlled by themselves whilst the policymakers have lost leverages to manipulate or influence them. This illustrates the absence of authority's influence in this area, and also the trend of individualisation of retirement in a postmodern context.

The postmodern retirement mode is also a reflection of the inequality in later lives in present-day China. While the collective and fixed transitions to retirement have weakened in postmodern urban areas of contemporary China, the disparity in later lives is related to this transformation of society. In other words, the inequality in later lives contributes to the diversity of transitions to retirement. To be specific, the disparity between workers/pensioners under different pension systems and the variation within workers/pensioners under the same pension systems both add to the variety of retirement modes. Driven by the discriminative pension policy, those inside the establishment and those outside the establishment have totally different situations and considerations regarding their transitions to retirement.

For instance, although many workers in the public sector also intend to work beyond retirement, most of them are not under pressure to make more money. Occupying themselves, as well as the commitment to the working units, are the primary motivations for them to continue working beyond official retirement. They choose to work because they are willing to instead of having to. For the relatively well-off workers with adequate retirement incomes, early retirement can also be a release. According to Bennett and Mohring, an early retirement is an attractive and feasible option for those with an excellent and consistent working history. It is because those with good jobs are more likely to accumulate enough retirement incomes and consider early retirement as a release [30]. This argument is also supported by this piece of research. Some people are satisfied to be less occupied by their jobs due to generous pension entitlements or other forms of accumulated savings or assets. Other older workers who are in a worse economic situation, instead, have to look for other jobs after retirement.

Having stepped into a postmodern epoch, the rigidly fixed retirement policy has become more and more unable to serve the diverse and individualised needs of urban workers in contemporary China. Perhaps, the rigidly fixed retirement policy may have been suitable in an old context. Nonetheless, the postmodern context of urban China requires a more flexible retirement policy which would be able to cooperate with individualised needs of middle-aged and older workers and retirees. A governance system which is able to fit in a postmodern context would also be needed in the future.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

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REFERENCES

[1] Zhang X. Enterprise pensions in China: history and challenges. Public Finance and Management, 2009, 9(1): 76-96.

[2] West L. Pension reform in China: preparing for the future. Journal of Development Studies, 1999, 35(3): 153-183. DOI: 10.1080/00220389908422578.

[3] Salditt F, Whiteford P, Adema W. Pension reform in China. International Social Security Review, 2008, 61(3): 47 –71. DOI: 10.1111/j.1468-246X.2008.00316.x.

[4] Liu T, Sun L. Pension reform in China. Journal of Aging & Social Policy, 2016, 28(1): 15–28. DOI: 10.1080/08959420.2016.1111724.

[5] Hu A. The global spread of neoliberalism and China's pension reform since 1978. Journal of World History, 2012, 23(3): 609-638. DOI: 10.1353/jwh.2012.0075.

[6] Esping-Andersen G. The Three Worlds of Welfare Capitalism. London: Polity, 1990.

[7] Bambra C. Going beyond the three worlds of welfare capitalism: regime theory and public health research. Journal of Epidemiology & Community Health, 2007, 61(12): 1098-1102. DOI: 10.1136/jech.2007.064915.

[8] Jones C. The Pacific challenge: Confucian welfare states. In: Jones C, ed. New Perspectives on the Welfare State in Europe. London: Routledge, 1993: 198–217.

[9] Abrahamson P. East Asian welfare regime: obsolete ideal-type or diversified reality. Journal of Asian Public Policy, 2017, 10(1): 90-103.

[10] Lin K, Rantalaiho M. Family policy and social order: comparing the dynamics of family policy-making in Scandinavia and Confucian Asia. International Journal of Social Welfare, 2003, 12(1): 2–13. DOI: 10.1111/1468-2397.00241.

[11] Zhu H, Walker A. The gap in social care provision for older people in China. Asian Social Work and Policy Review, 2017, 12(1): 17–28. DOI: 10.1111/aswp.12139.

[12] Fan C. China's Eleventh Five-Year Plan (2006-2010): From "Getting Rich First" to "Common Prosperity". Eurasian Geography and Economics, 2006, 47(6): 708-723. DOI: 10.2747/1538-7216.47.6.708.
[13] Sung S. Women reconciling paid and unpaid work in a Confucian welfare state: the case of South Korea. Social Policy and Administration, 2003, 37(4): 342-360.
[14] Kim H. A caring welfare state in South Korea: challenges and prospects. International Journal of Care and Caring, 2018, 2(3): 333-348. DOI: 10.1332/239788218X15321005704571.
[15] Holiday I. Productivist Welfare Capitalism: Social Policy in East Asia. Political Studies, 2000, 48(4): 706-723. DOI: 10.1111/1467-9248.00279.
[16] Kwon H. An overview of study, the developmental welfare state and policy reforms in East Asia. In: Kwon H, ed. Transforming the Developmental Welfare State in East Asia. New York: Palgrave Macmillan, 2005: 1–23. DOI: 10.1057/9780230523661_1.
[17] Fisher K, Zhang X, Alston M. Shanghai aged care and Confucian welfare. International Journal of Sociology and Social Policy, 2018, 38(9/10): 722-735. DOI: 10.1108/IJSSP-04-2018-0059.
[18] Lee D. The evolution of family policy in South Korea: from Confucian familism to neo-familism. Asian Social Work and Policy Review, 2018, 12(1): 46-53. DOI: 10.1111/aswp.12145.
[19] OECD. Pensions at a Glance 2017: OECD and G20 Indicators. OECD Publishing, 2017. DOI: 10.1787/pension_glance-2017-en.
[20] Pierce M, Timonen V. A discussion paper on theories of ageing and approaches to welfare in Ireland, north and south. Dublin: Centre for Ageing Research and Development in Ireland, 2010: 1-52.
[21] Deleuze G. Postscript on the societies of control. 1992, 59: 3–7.
[22] Bovenberg A. The life-course perspective and social policies: an overview of the issues. CESifo Economic Studies, 2008, 54(4): 593-641. DOI: 10.1093/cesifo/ifn033.
[23] Johnson S, Machowski S, Holdsworth L, et al. Age, emotion regulation strategies, burnout, and engagement in the service sector: advantages of older workers. Revista de Psicología del Trabajo y de las Organizaciones, 2017, 33(3): 205–216. DOI: 10.1016/j.rpto.2017.07.001.
[24] De Wind A, van der Pas S, Blatter B, et al. A life-course perspective on working beyond retirement—results from a longitudinal study in the Netherlands. BMC Public Health, 2016, 16(1): 499. DOI: 10.1186/s12889-016-3174-5.
[25] Tarkar P, Dhamija S, Singh P. Post-retirement work: among academics. Journal of Indian Management, 2017: 67–78.
[26] Browne P, Carr E, Fleischmann M, et al. The relationship between workplace psychosocial environment and retirement intentions and actual retirement: a systematic review. European Journal of Ageing, 2018, 16(1): 73–82. DOI: 10.1007/s10433-018-0498-7.
[27] Sulander J, Sinervo T, Elovainio M, et al. Does organizational justice modify the association between job involvement and retirement intentions of nurses in Finland? Research in Nursing & Health, 2016, 39(5): 364–374.
[28] Oakman J, Wells Y. Working longer: what is the relationship between person-environment fit and retirement intentions? Asia Pacific Journal of Human Resources, 2015, 54(2): 207–229. DOI: 10.1111/1744-7941.12096.
[29] Schreurs B, De Cuyper N, Van Emmerik I, et al. Job demands and resources and their associations with early retirement intentions through recovery need and work enjoyment. SA Journal of Industrial Psychology, 2011, 37(2): 63–73.
[30] [30] Bennett J, Mohring K. Cumulative (dis)advantage? The impact of labour market policies on late career employment from a life course perspective. Journal of Social Policy, 2015, 44(2): 213–233. DOI: 10.1017/S0047279414000715.
[31] Visser M, Gesthuizen M, Kraaykamp G, et al. Inequality among older workers in the Netherlands: a life-course and social stratification perspective on early retirement. European Sociological Review, 2016, 32(3): 370–382.
[32] Timonen V, Foley G, Conlon C. Challenges when using grounded theory. International Journal of Qualitative Methods, 2018, 17(1): 1–10. DOI: 10.1177/1609406918758086.

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AN EMPIRICAL STUDY ON THE INFLUENCE OF KNOWLEDGE SHARING NETWORK AND WORKPLACE FRIENDSHIP NETWORK ON INDIVIDUAL CREATIVITY

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Abstract: The internal social network has great influence on individual creativity. Individual innovation behavior includes two specific stages: creative production and creative implementation. In this paper, data were collected by questionnaire survey, Harman single factor method was used to conduct common method bias test on the topics involved, and finally STATA software was used for regression analysis, and least square method (OLS) was used for estimation, and statistical test was performed on the hypotheses proposed. The empirical results show that the knowledge sharing relationship has a significant positive impact on individual creativity in the initial stage of the project; In the project implementation stage, emotional friendship relationship has a significant positive impact on individual creative implementation.
Keywords: Knowledge sharing network; Workplace friendship networks; Individual creativity; Empirical research

1 INTRODUCTION

In the early 21st century, after the process of individual innovation was segmented into two stages of idea generation and idea implementation, the academic community began to gradually pay attention to the influencing factors of idea generation, idea implementation and their respective differences. At the individual level, scholars mainly focus on the influence of factors such as individual thinking ability, learning ability, motivation and trust on the creation and implementation of creativity. Clegg et al. believe that individual intuitive thinking mode is conducive to the generation of creativity, but not conducive to the implementation of creativity[1]. In contrast, the impact of systematic thinking on creativity is not obvious, but it will also have an obvious hindrance to the implementation of creativity. From the perspective of organizational learning, both exploratory learning and exploitative learning are conducive to the generation and implementation of creativity, but only through the intermediary of creative implementation can the two organizational learning styles bring about substantial improvement in organizational innovation performance. In terms of individual motivation, Some authors pointed out that internal motivation can promote both the generation and implementation of innovative ideas, while external motivation can only have a positive effect on the implementation of innovative ideas[2]. In terms of trust, Clegg et al. divided trust within organizations into two dimensions: trust in revenue and trust in listening, and pointed out that trust in revenue makes employees believe that managers will share the benefits of innovation with them, and such trust mainly has a positive impact on creativity[1]. In contrast, trust in listening makes employees believe that managers will listen carefully to their innovative ideas, and this trust mainly has a positive impact on the implementation of ideas. In the organizational dimension, the organizational structure, the matching degree between individuals and organizations, the innovation atmosphere and the cooperation mode are the organizational influencing factors of individual specific innovation stage. Subramanian and Nilakanta pointed out that decentralized organizational structure can promote organizational innovation more, and this positive effect is more concentrated on the generation of ideas[2], but this study did not further explore the relationship between organizational structure and creative implementation. In terms of the matching degree between individuals and organizations, when individuals and organizations are highly consistent in values, the level of creativity generation will be improved, but it will not have a substantial impact on the specific implementation of creativity[3]. In fact, not only will the matching degree of values between individuals and organizations have an effect on the specific stage of individual innovation, but the improvement of matching between supply and demand, capacity and requirements will also have a positive impact on the generation and implementation of creativity. In terms of organizational innovation climate, Some authors pointed out that organizational innovation climate can improve employees' creativity generation through the intermediary path of innovation self-efficacy[4], but it may not have a positive impact on the implementation of creativity. In terms of cooperation mode, compared with the vertical cooperation mode of cooperation with supply chain related parties, the horizontal cooperation mode of school-enterprise cooperation has a stronger promotion effect on the generation of creativity. As vertical cooperation can collect more market information and promote the commercialization and marketization of innovation results, vertical cooperation has greater advantages in creative implementation[5]. This conclusion is similar to the findings of Rothaermel and Deeds based on exploratory alliances and development alliances[6].

Since innovation activities need a large number of non-redundant knowledge resources as the basis, and social network is an important source for individuals to obtain heterogeneous knowledge resources, the influence of social network on

individual creativity has been a major focus of academic attention for a long time. Social networks are divided into internal social networks and external social networks. The former mainly involves the social connections between employees within an organization, while the latter mainly involves the connections between an organization and external stakeholders such as customers, suppliers, and communities. In view of the research theme of this paper, we mainly comb the research on the influence of social networks within organizations on individual creativity. Through internal social networks, organization members can have close social interaction with other members, and obtain real and valuable innovative information from trusted individuals or departments at a lower cost through various internal interpersonal networks[7].

Although the academic community has carried out a lot of exploration on the relationship between social networks, especially internal social networks in organizations, and individual creativity, the research on the influence of internal informal networks on individual creativity is still relatively scarce. At the same time, with the deepening of the research on innovation process, the heterogeneity of internal factors on the creation and implementation of ideas has been emphasized. Since there is a great difference in the demand for resources in the two different stages of innovation, the creation and implementation of ideas, it is necessary to judge the different impact of different social network resources on the creation and implementation of ideas. Only by clarifying the characteristic social network resources required for different stages of innovation can we ensure that individual creativity can be effectively generated, and at the same time, we can ensure that creativity can be effectively implemented and truly transformed into innovative results. Therefore, in the next section, we will focus on the specific effects of knowledge sharing and workplace friendship, two distinct internal network resources, on individual creativity during a specific stage of innovation.

2 THEORETICAL BACKGROUND AND RESEARCH HYPOTHESIS

2.1 The impact of Knowledge Sharing on Creativity

The internal social network of a team has many characteristics. In this paper, two kinds of interpersonal relationships, knowledge sharing relationship and workplace friendship relationship with research gap, which are paid more attention by the research community, are selected as the measurement indicators of social network to investigate the impact of internal social network of a team on individual creativity. The classification of knowledge sharing relationship is mainly based on the purpose of obtaining resources, so the role of such personal network relationship is more reflected in how to obtain key resources through knowledge sharing relationship, so the research focus is often focused on the heterogeneity, diversity and intensity of knowledge sharing relationship. As an important source of innovation resource acquisition, knowledge sharing relationship plays an important role in the process of team creativity. In the process of knowledge sharing, the team can strengthen the communication among members and improve the efficiency of research and development; It is also conducive to the collision of ideas and thinking of team members, rubbing out new sparks, improving individual creativity, and promoting creativity and innovation of the team; In addition, knowledge sharing behavior can also strengthen the adaptability to the environment and effectively avoid the negative impact of organizational inertia factors such as innovation stagnation and closed thinking in the process of technological innovation[8]. In addition, knowledge sharing behavior can effectively transform and spread knowledge within the team, and promote the accumulation of knowledge in the whole team. It plays an important role in stimulating innovation for both excellent employees who share knowledge and new employees who have just emerged, and it will encourage team members to rethink their existing work and improve their creativity.

In the creative generation stage, individual employees need to explore various aspects of knowledge and technology through extensive divergent thinking, and establish the connection between old and new knowledge on this basis, so as to propose various solutions to problems and form a creative library[9]. On this basis, employees should use convergent thinking to conduct in-depth analysis and sorting of the creative library, evaluate the innovation and feasibility of each idea, and select a small number of high-quality creative ideas from it. Therefore, in order to ensure the effective generation of creativity, individual employees must conduct professional search for multiple knowledge types, such as scientific knowledge, market knowledge and supply chain knowledge, so as to build a rich creative database and provide a solid heterogeneous knowledge resource foundation for creative generation.

The improvement of knowledge sharing level provides great convenience for employees to search professional knowledge. As a necessary process of knowledge integration and sharing, employees can enhance knowledge reserves in the process of knowledge sharing and generate creative sparks with other individual knowledge resources[10]. At the same time, through the knowledge integration stage in knowledge sharing, individuals can fully integrate heterogeneous knowledge resources and think about the innovation and practicality of creativity based on a system perspective, thus improving the probability of creativity generation. Moreover, knowledge exchange among employees is not one-way, and the knowledge acquired by one party will also be transferred to a third party, which will further increase the possibility of the expansion of individual creativity database and provide a wider range of knowledge choices for the development of individual creativity. From the perspective of trust, due to the different professional knowledge of different employees, the uncertainty about the benefits from the future implementation of creative ideas hinders the birth of their innovative ideas[1]. Knowledge exchange among employees helps enhance trust and reduce the perception of income uncertainty, thus stimulating innovative thinking[14]. Therefore, the following hypothesis is proposed in this study:

H1: Other conditions being equal, knowledge sharing is conducive to promoting individual creativity of employees.

2.2 The Influence of Workplace Friendship on Creative Implementation

Creative generation is the result of knowledge sharing and exchange by employees, while creative implementation is the performance of employees applying the knowledge shared and exchanged. Compared with the creative generation process which requires a large number of heterogeneous resources and non-redundant information as support, the resource base required in the creative implementation stage has undergone fundamental changes. In the creative implementation stage, the structure of creativity is relatively perfect, and the demand for heterogeneous knowledge resources is greatly reduced. In this process, the key to the effective implementation of creativity lies in the pressure of norms. Only when organization members work together to form a highly consistent creative understanding and belief in a closed network can innovative thinking be promoted to the final implementation[11]. This makes workplace friendships with strong connections especially important during the creative implementation phase.

Workplace friendships are often established through the process of long-term work contacts, which are based on mutual interests or mutual trust. Once this kind of emotional friendship is established between such team members, the relationship is very stable, not only in the stability of the working relationship, but also in the "close personal relationship", which further strengthens the stable relationship between each other[3]. Because people's actual behavior is embedded in a specific social relationship network, and such relationship embeddedness will affect people's specific behavior, workplace friendship, as a high-quality interpersonal relationship between team members, will inevitably have an important impact on people's behavior.

In the creative implementation stage, due to the constraints of working environment, resources and other factors, individuals' enthusiasm for work tends to weaken, and their internal motivation also declines, resulting in a corresponding negative impact on individual creative implementation[4]. With the improvement of the level of workplace friendship, the possibility of interaction and cooperation among employees will rise, and individual employees can not only get the technical support needed for creative implementation from other colleagues, but also get hard-won emotional support, thus improving the internal motivation of employees in the creative implementation stage. In this process, close workplace friendships can also help employees get more substantive and constructive feedback, thus promoting the implementation of ideas[15]. On the contrary, when the intensity of workplace friendship within the organization is low, individual employees not only cannot get the dual support of technology and emotion in the creative implementation stage, but also the poor communication between members may further consume the enthusiasm and time of employees, thus further crowding out the resources required for creative implementation[14]. Based on the above analysis, this study proposes the following hypotheses:

H2: Other things being equal, workplace friendship is conducive to promoting individual creative implementation.

3 RESEARCH METHOD DESIGN

3.1 Data Collection Procedures

This study adopts the method of questionnaire survey to collect data, and the time of questionnaire distribution and recovery is between July and September 2024. The research specifically adopts snowball sampling. Five teachers who teach in MBA colleges of universities in Guangdong Province are selected as the subjects to issue questionnaires, and the sampling criteria are made clear to them: the target subjects should come from organizations or industries that emphasize innovation process and innovation intensity, work full-time in their current units for more than half a year, and be over 20 years old. Make full use of the student network of these 5 college teachers to issue online questionnaires. Based on the research objectives, it is a progressive process to clarify individual innovation behavior to the respondents in the questionnaire design, which includes two stages of creative generation and creative implementation. Among them, idea generation refers to the formation of novel and valuable ideas or technologies. This process can help and guide enterprises to survive and develop in the fierce competition, and can be regarded as the first stage of the innovation process. Creative implementation is the process of transforming the ideas formed in the creative generation stage into new products, services or processes, and successfully introducing them into the market.

Due to the potential interference of common methodology bias on data collection and research results, we adopted a three-point survey method for phased collection by referring to existing practices[12]. In the first stage of the questionnaire survey, the respondents were asked to report on workplace friendships and control variables in their organizations; In the second round of questionnaire survey, respondents were asked to report on knowledge sharing in their organizations; In the second round of questionnaire survey, respondents were asked to report on the specific situation of creative generation and creative implementation. In the end, 276 questionnaires were recovered, and 249 valid questionnaires were obtained, with an effective answering rate of 90.22%, excluding ineffective questionnaires with too short filling time and too high consistency of answers. As for the distribution of demographic characteristics of the samples, 40.16% were males in the valid questionnaire. In the age of 31-40, 120 people, accounting for 48.2%; The number of non-state-owned organizations was 191, accounting for 76.7%. Compared with state-owned enterprises, non-state-owned enterprises tend to have a higher innovation level due to profit needs. Therefore, the higher proportion of non-state-owned enterprises in the questionnaire is conducive to the research to explore individual innovation behaviors. The number of employees who worked in the current unit for less than 3 years was 70, accounting for 28.11%; The working life of 3 to 5 years is 32 people, accounting for 12.85%; The working life of 5 to 10 years is 44 people, accounting for 17.67%; The number of people who worked for more than 10 years was 103, accounting for

41.37%. All respondents in this study were from different organizations, and there was no nesting between data levels, so all analyses were conducted on an individual basis.

3.2 Questionnaire Measurement Tools

The constructs used in this study are all derived from mature and widely recognized scales, and the original English scales involved also follow a rigorous translation and back-translation process. Specifically, the original English title was first translated into Chinese by a member of the research team, and then translated back into English by another author. Finally, the research team discussed and resolved the differences between the original scale and the translated version, so as to determine the final Chinese version of the scale. It should be noted that the scales used in each original scale are not the same. In order to ensure the consistency of dimensions, all scales in this paper were measured using 5-level Likert scale (1= very inconsistent, 5= very consistent). At the same time, considering that the research in this chapter focuses on the impact of social networks within organizations on the employee innovation stage, this issue is more based on the perspective of information recipients, so all variable measurements are carried out from the employee level.

Core explanatory variable 1: workplace friendships. Referring to the practice of Nielsen et al.[13], we used six items to measure the friendship atmosphere of employees in the workplace, including: "In my work, I have the opportunity to get to know my colleagues well," "I can solve problems together with my colleagues," "In my work, I have the opportunity to have informal conversations or informal contacts with others," "My company encourages emotional exchange among employees," "I have built strong friendships with others in my work," "As long as the work is done," "I have a strong relationship with others." Informal communication is allowed in my company." After test, Cronbach's α value of this scale was 0.8329.

Core explanatory variable 2: Knowledge sharing. At present, the academic circles have different views on the structural dimension division of knowledge sharing. Chiu et al.[14]mainly measured knowledge sharing from the quantity and quality of knowledge sharing. The quantity of knowledge sharing was represented by the specific frequency of knowledge sharing, while the quality of knowledge sharing was measured by scale items. Lin and Lee[4] believe that knowledge sharing behavior depends on knowledge sharing motivation, and the latter is jointly determined by sharing attitude, subjective norms of sharing and sense of behavioral control. It is worth mentioning that interpersonal interaction is a necessary condition for realizing knowledge sharing within an organization[2]. Considering the influence of interpersonal interaction differences on employees' knowledge sharing behaviors under specific cultural backgrounds, the above scale may not be suitable for the investigation of knowledge sharing in domestic organizations. To this end, the knowledge-sharing behavior scale developed by domestic scholars Yang Yuhao and Long Junwei[12] was used to measure the corresponding variables. The original scale above includes three dimensions: sharing quality, collaborative spirit and hands-on performance. However, considering that the research in this chapter is conducted from the perspective of information recipients, the hands-on performance dimension involves items such as "I try my best to create opportunities for mutual learning and communication among colleagues", which are more based on the perspective of information senders. Therefore, we mainly adopt the two dimensions of sharing quality and collaborative spirit in the scale. For items whose question mode is based on the perspective of the information sender, we also transform them into the perspective of the information recipient. Specific items include "In our company, colleagues can usually share work knowledge in a timely manner", "In our company, the work knowledge shared by colleagues is mostly reliable (not fabricated or deliberately deceived)", "the work knowledge shared by colleagues is mostly complete (will not be deleted or retained at will)", "The knowledge shared by colleagues is usually useful for work", "In our company," The work knowledge shared by colleagues is usually accurate (not ambiguous) "" The work knowledge shared by colleagues is usually expressed in a simple and understandable way" "In our company, it is normal for colleagues to share their knowledge with each other" "Colleagues learn something new and are happy to teach me" "When I ask colleagues for information, They would tell me, to the best of their knowledge, "When I ask my colleagues for technical help, they will teach me," a total of 10 items, of which the first six items belong to the category of knowledge sharing quality, and the last four items belong to the category of collaborative spirit. After testing, the Cronbach's α value of the knowledge sharing quality dimension was 0.9075, the Cronbach's α value of the collaborative spirit dimension was 0.8914, and the Cronbach's α value of the overall scale was 0.9420, which had good reliability.

Core explained variable: individual innovation behavior. The existing researches mainly focus on individual creativity and the results of innovation performance. In contrast, there are few studies that distinguish idea generation from idea implementation based on an innovation process perspective. Lu Xiaojun and Zhang Guoliang[15] re-measured the scale developed by Kleysen and Street[16], and subdivided it into two dimensions: the generation of innovative ideas and the execution of innovative ideas. Based on the scale developed by Kleysen and Street[16], Huang Zhikai also subdivides individual innovation behavior into two stages of creative generation and creative implementation and measures them respectively. Based on the scale developed by Huang Zhikai, Kleysen and Street[16], Gu Yuandong et al.[17] re-adjusted and measured the specific items involved in the creation and implementation of ideas. Considering that the scales used in domestic creative generation and creative implementation are all based on the measurement tools developed by Kleysen and Street[16], we adopted 8 and 4 items respectively to measure creative generation and creative implementation on the basis of the above research. Among them, the specific items of idea generation are: "I will explore opportunities to improve the company's (or department's, work's) processes, products, or services," "I will look for issues that are not routine in the work, department, organization, or market," "I will propose ideas or solutions

to problems," "I will look at work problems from different perspectives to gain deeper insights," "I will test new ideas or solutions to problems," To understand unmet needs "" I will evaluate the advantages and disadvantages of new ideas or solutions" "I will try to convince others of the importance of new ideas or solutions" "I will take the initiative to promote new ideas or solutions so that they have a chance to be implemented". The specific questions for creative implementation are: "I will take risks to support new ideas or solutions," "I will make changes that may produce benefits," "I will try to correct problems created by new working methods as they are applied to company processes, products or services," "I will apply new ideas that improve work processes, products or services to my daily routine." After testing, the Cronbach's α value of the creative generation dimension was 0.9282, the Cronbach's α value of the collaborative spirit dimension was 0.8914, and the Cronbach's α value of the whole scale was 0.7828, which had good reliability.

Control variables. Given that individual demographics and organizational nature may influence individual workplace friendships, knowledge sharing, and innovation behavior at specific stages, we control for gender, age, years of work, and education level at the individual level, for "belonging to a research team" at the team level, and for property rights at the firm level.

4 DATA ANALYSIS AND RESULTS

4.1 Common Method Deviation Test

Since the data are derived from individual self-reports, there may be common methodological biases. Therefore, referring to the practice of Zhou Hao and Long Lirong[18], this paper studies the use of Harman single factor method to carry out common method bias test for all related topics. The results showed that the explainable variance of the first factor obtained by the unrotated principal component analysis was 46.01%, which did not exceed the 50% threshold recommended by the social survey, so it could be considered that there was no common method bias problem in the data of this study[16].

4.2 Analysis of Empirical Results

In this study, STATA software was used for regression analysis, and the least square method (OLS) was used for estimation, and the hypothesis was statistically tested. Table 1 reports the baseline regression results.

As shown in column (1) of Table 1, when control variables are not included, the influence coefficient of knowledge sharing on employees' creativity is 0.5734, which is statistically significant at 1% level. (2) On the basis of column (1), the influence coefficient of knowledge sharing on employees' creativity is 0.5433, which is still significantly positive at the level of 1%, after the employee's gender, age, educational background, working years, team nature and organizational property nature are included. This indicates that the improvement of knowledge sharing within the organization is indeed conducive to significantly improving the level of employees' creative generation, so H1 is preliminarily verified.

As shown in column (3) of Table 1, when control variables are not included, the influence coefficient of workplace friendship on employees' creative implementation is 0.5273, which is statistically significant at 1%. (4) On the basis of column (3), the influence coefficient of workplace friendship on employees' creative implementation is 0.4882, which is still significantly positive at the level of 1%, after taking into account employees' gender, age, educational background, working years, team nature and organizational property nature. This indicates that the improvement of the level of workplace friendship within the organization is indeed conducive to significantly improving the level of creative implementation of employees, so H2 has been preliminarily verified.

Table 1 Results of Baseline Regression

	(1) Ideas Generate	(2) Ideas Generate	(3) Ideas Implement	(4) Ideas Implement
Knowledge Sharing	0.5734***	0.5433***		
	(11.1928)	(10.6992)		
Workplace Friendship			0.5273***	0.4882***
			(10.1692)	(9.2548)
Sex		0.0382		0.0235
		(0.5472)		(0.3427)
Age		0.0824**		0.0222
		(2.1223)		(0.5809)
Property Right Nature		0.2176***		0.2516***
		(2.7761)		(3.2967)
R&D Team		-0.2149**		-0.1347
		(-2.0239)		(-1.2937)
Working Years		0.0296		0.0351
		(1.0410)		(1.2628)
Educational Background		0.1370**		-0.0239
		(2.3494)		(-0.4194)
Constant Term	1.6277***	0.7841*	1.7512***	1.5734***

	(8.1755)	(1.8263)	(8.8054)	(3.8462)
Sample Size	249	249	249	249
Adjusted R^2	0.334	0.390	0.292	0.325

Note: The t value is in parentheses; * p < 0.10, ** p < 0.05, *** p < 0.01.

4.3 Robustness Test

In order to ensure the reliability of the baseline regression results, we adopted the following methods for robustness testing.

First, we changed the measures of independent variable knowledge sharing and workplace friendship. Specifically, we generate dummy variables for knowledge sharing and workplace friendships. If the knowledge sharing level is higher than the whole sample mean, the dummy variable of knowledge sharing is assigned 1, otherwise it is 0. If the level of workplace friendship is higher than the full sample mean, the workplace friendship dummy variable is assigned a value of 1, otherwise it is 0. After changing the measurement methods of independent variables knowledge sharing and workplace friendship, we re-conducted the regression analysis, and the results are shown in columns (1) - (2) of Table 2. The influence coefficient of dummy variable of knowledge sharing on employees' creativity is significantly positive at the level of 1%, and the influence coefficient of dummy variable of workplace friendship on employees' creativity implementation is also significantly positive at the level of 1%. This proves the robustness of the baseline regression results.

Table 2 Robustness Test: Change the Independent Variable Measure and Sub-Sample Estimation

	(1) Ideas Generate	(2) Ideas Generate	(3) Ideas Implement	(4) Ideas Implement
Knowledge Sharing Dummy Variable	0.4619***			
	(6.1861)			
Workplace Friendship Dummy Variable		0.4664***		
		(6.7477)		
Knowledge Sharing			0.5838***	
			(9.9310)	
Workplace Friendship				0.5488***
				(8.9431)
Sex	0.0145	0.0169	-0.0188	0.0599
	(0.1841)	(0.2301)	(-0.2286)	(0.7546)
Age	0.0831*	0.0348	0.0765*	0.0216
	(1.8951)	(0.8537)	(1.7338)	(0.5103)
Property Right Nature	0.2378***	0.2634***		
	(2.6730)	(3.2308)		
R&D Team	-0.3324***	-0.2367**	-0.1330	-0.1286
	(-2.7974)	(-2.1496)	(-1.0938)	(-1.1057)
Working Years	0.0260	0.0460	0.0217	0.0403
	(0.8084)	(1.5513)	(0.6576)	(1.2703)
Educational Background	0.0810	-0.0126	0.1566**	0.0046
	(1.2352)	(-0.2079)	(2.4185)	(0.0753)
Constant Term	3.0649***	3.2251***	0.9750**	1.6588***
	(7.5103)	(8.5115)	(1.9904)	(3.6506)
Sample Size	249	249	249	249
Adjusted R^2	0.223	0.230	0.382	0.335

Note: The t value is in parentheses; * p < 0.10, ** p < 0.05, *** p < 0.01.

Second, referring to the practice of Zeng Chuhong et al.[19], we use samples of non-state-owned enterprises to conduct regression again. The results are shown in columns (3) - (4) of Table 2. In the sample of non-state-owned enterprises, the influence coefficient corresponding to knowledge sharing and workplace friendship is still significantly positive, indicating that the improvement of knowledge sharing within the organization is indeed conducive to significantly improving the level of creativity generation of employees, while the improvement of workplace friendship is indeed conducive to promoting the implementation of employees' creativity.

5 CONCLUSION

The internal social network has great influence on individual creativity. Individual innovation behavior includes two specific stages: creative production and creative implementation. In this paper, data were collected by questionnaire survey, Harman single factor method was used to conduct common method bias test on the topics involved, and finally STATA software was used for regression analysis, and least square method (OLS) was used for estimation, and statistical test was performed on the hypotheses proposed. The empirical results show that the knowledge sharing relationship has a significant positive impact on individual creativity in the initial stage of the project; In the project

implementation stage, emotional friendship relationship has a significant positive impact on individual creative implementation. Through social network relationships, individuals can obtain knowledge supplement and spiritual comfort from different members, make up for their own shortcomings, further enrich their knowledge, enhance cognitive ability and stabilize the willpower to work, and thus enhance their creativity. This study further enriches the empirical research data in this field and provides management suggestions for stage decision making to enhance individual creativity in business practice. Due to the limitations of the research samples in this study, it is necessary to further expand the research samples in the future to improve the universality of the theoretical framework.

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REFERENCES

[1] Clegg, C, Unsworth, K, Epitropaki, O, et al. Implicating trust in the innovation process. Journal of Occupational and Organizational Psychology, 2002, 75(4): 409-422.
[2] Subramanian, A, Nilakanta, S. Organizational innovativeness: Exploring the relationship between organizational determinants of innovation, types of innovations, and measures of organizational performance. Omega, 1996, 24(6): 631-647.
[3] Casciaro, T, Lobo, M S. When competence is irrelevant: The role of interpersonal affect in task-related ties. Administrative Science Quarterly, 2008, 53(4): 655-684.
[4] Lin, H F, Lee, G G. Perceptions of senior managers toward knowledge‐sharing behaviour. Management Decision, 2004, 42(1): 108-125.
[5] Walsh, J P, Lee, Y N, Nagaoka, S. Openness and innovation in the US: Collaboration form, idea generation and implementation. Research Policy, 2016, 45(8): 1660-1671.
[6] Rothaermel, F T, Deeds, D L. Exploration and exploitation alliances in biotechnology: A system of new product development. Strategic Management Journal, 2004, 25(3): 201-221.
[7] Zander, U, Kogut, B. Knowledge and the speed of the transfer and imitation of organizational capabilities: An empirical test. Organization Science, 1995, 6(1): 76-92.
[8] Dalton, D R, Todor, W D. Turnover turned over:An expandedand positive perspective. Academy of Management Review, 1979, (4): 225-235.
[9] Ritter, S M, Van Baaren, R B, Dijksterhuis, A. Creativity: The role of unconscious processes in idea generation and idea selection. Thinking Skills and Creativity, 2012, 7(1): 21-27.
[10] Wei Jiangru. The degree of mean thinking, knowledge sharing and employee innovation behavior. Economic Management, 2019, 41(5): 88-104.
[11] Perry-Smith, J E, Mannucci, P V. From creativity to innovation: The social network drivers of the four phases of the idea journey. Academy of Management Review, 2017, 42(1): 53-79.
[12] Yang Yuhao, Long Junwei. Structure and measurement of employees' knowledge sharing behavior. Acta Psychologica Sinica, 2008, (3): 350-357.
[13] Nielsen, I K, Jex, S M, Adams, G A. Development and validation of scores on a two-dimensional workplace friendship scale. Educational and Psychological Measurement, 2000, 60(4): 628-643.
[14] Chiu, C M, Hsu, M H, Wang, E T. Understanding knowledge sharing in virtual communities: An integration of social capital and social cognitive theories. Decision support systems, 2006, 42(3): 1872-1888.
[15] Lu Xiaojun, Zhang Guoliang. Research on the influence of work motivation on individual innovation behavior. Soft Science, 2007, (6): 124-127.
[16] Kleysen, R F, Street, C T. Toward a multi-dimensional measure of individual innovative behavior. Journal of intellectual Capital, 2001, 2(3): 284-296.

[17] Gu Yuandong, Peng Jisheng. The influence of organizational innovation climate on employees' innovation behavior: the mediating role of innovation self-efficacy. Nankai Management Review, 2010, 13(1): 30-41.
[18] Zhou Hao, Long Lirong. Statistical test and control of common method bias. Advances in Psychological Science, 2004, (6): 942-950.
[19] Zeng Chuhong, Ren Lixia, Zhu Tengheng, et al. "Move fast and move well" : An empirical study on the relationship between entrepreneurial team heterogeneity, entrepreneurial decision-making and entrepreneurial performance. Science and Decision, 2024, (5): 166-184.