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EXPLORING THE ROLE OF PERSONALIZED BANKING SERVICES IN THE MARKETING STRATEGIES OF TRUST BANK LIMITED: INSIGHTS FROM BANGLADESH

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Abstract: This study explores the role of personalized banking services in enhancing the marketing strategies of Trust Bank Limited (TBL) in Bangladesh focusing on their impact on customer satisfaction, brand loyalty and competitive advantage. Utilizing a qualitative methodology, data were collected through semi-structured interviews with bank stakeholders and focus group discussions with customers. The findings reveal that personalized services such as tailored financial advice and dedicated relationship managers significantly enhance customer satisfaction by fostering trust and emotional connection. These services also strengthen brand loyalty with customers demonstrating a higher likelihood of retention and advocacy. Additionally, the research underscores the competitive edge gained through personalization particularly in delivering tailored credit offers and investment solutions. However, challenges were identified including the integration of customer data across platforms and the digital literacy gap among older customers. The study highlights the pivotal role of employee training in effective personalization and recommends strategies such as enhancing digital banking offerings, improving cross-departmental collaboration and maintaining a balance between traditional and digital services. These insights position TBL to further leverage personalized banking as a cornerstone of its customer-centric approach reinforcing its market presence and fostering sustainable growth.
Keywords: Personalized banking services; Marketing strategies; Trust Bank Limited (TBL); Digital banking; Customer satisfaction

1 INTRODUCTION

The banking industry is a cornerstone of any nation's economic infrastructure playing an essential role in fostering economic growth and stability. In the competitive landscape of the global banking industry, personalized banking services have emerged as a critical differentiator in enhancing customer satisfaction and loyalty [1]. Banking institutions worldwide have recognized the importance of tailoring services to meet the diverse needs of their clientele which is particularly relevant in developing economies like Bangladesh [2]. The banking industry in Bangladesh has evolved rapidly driven by technological advancements and changing customer expectations. In this competitive landscape, personalized banking services have emerged as a critical component of marketing strategies [3]. In an era marked by rapid digital transformation and shifting consumer expectations, the financial services industry faces increasing pressure to deliver value-added experiences tailored to individual needs. Personalized banking, characterized by the customization of products and services to align with customer preferences and behaviors, has emerged as a cornerstone in the marketing strategies of modern banks [4]. Trust Bank Limited a leading financial institution in Bangladesh has adopted customer-centric approaches to cater to the diverse needs of its clientele. It was established in 1999 as a private commercial bank in Bangladesh. Over the years, it has evolved into a full-service financial institution, offering a wide range of products and services, including retail banking, corporate banking, and SME financing. The bank is also a pioneer in promoting digital banking solutions such as mobile banking, internet banking, and real-time account management systems [5]. The banking sector in Bangladesh operates in a dynamic environment characterized by rapid technological advancements, regulatory changes and evolving customer expectations. In this context, TBL's emphasis on personalized banking services reflects a broader industry shift toward customer-centric approaches. By offering customized financial products and services, the bank aims to strengthen its competitive position, foster deeper customer relationships and drive sustainable growth [6]. In recent years, TBL has positioned itself as a customer-centric organization with personalized banking services playing a central role in its marketing efforts. This focus is evident in the bank's initiatives to use customer data for segmentation, develop tailored financial products and provide proactive support through dedicated relationship managers [7]. These efforts are complemented by the bank's investment in technology infrastructure, enabling seamless and personalized customer interactions across multiple touchpoints [8]. This research explores the role of personalized banking services in shaping the marketing strategies of Trust Bank Limited. It seeks to understand how these services influence customer acquisition and retention contribute to brand differentiation and align with the broader objectives of the bank. Therefore, the study outlines the following questions for exploration: How do

personalized banking services contribute to the effectiveness of the marketing strategies employed by Trust Bank Limited in Bangladesh? What challenges and opportunities arise from implementing personalized services in the Bangladeshi banking sector? This study aims to provide a comprehensive understanding of the effectiveness and challenges of implementing personalized banking in a developing economy like Bangladesh. By analyzing these aspects, the study offers valuable insights into the interplay between personalization and marketing strategies highlighting its implications for financial institutions operating in similar socio-economic contexts. The findings of this research are expected to contribute to the academic literature on banking marketing strategies while offering practical recommendations for financial institutions.

1.1 Research Objectives

1. To provide a comprehensive understanding of the effectiveness of personalized banking by analyzing its impact on customer satisfaction and loyalty
2. To identify the challenges in implementing personalized banking services at Trust Bank Limited.
3. To provide actionable recommendations for improving personalization strategies at Trust Bank Limited.

1.2 Significance of the Study

This research holds significance for multiple stakeholders including policymakers, banking professionals, and academics. For policymakers, the study provides insights into the potential of personalized banking to promote financial inclusion and economic development. For banking professionals, it offers practical recommendations for designing and implementing effective marketing strategies centered on personalization. For academics, the study contributes to the literature on banking marketing and customer relationship management with a specific focus on developing economies. By focusing on Trust Bank Limited, the study provides a case-specific perspective that highlights the unique challenges and opportunities associated with personalized banking in Bangladesh. The findings are expected to inform the development of best practices for financial institutions seeking to enhance their customer-centric strategies in similar socio-economic contexts.

2 LITERATURE REVIEW OF THE STUDY

According to Alam et al., [8] personalized banking services are rooted in theories of customer-centric marketing and relationship management. The Relationship Marketing Theory posits that long-term engagement with customers built on trust and mutual value fosters loyalty and profitability. In the context of banking this involves offering tailored financial products, proactive customer support and customized communication strategies to meet individual needs. The authors Ramayanti et al., [9] pointed out that the Customer Relationship Management (CRM) framework supports personalization by emphasizing the use of data analytics to understand customer preferences and behaviors. Advances in CRM technology have enabled banks to segment their customer base effectively and offer targeted solutions. This aligns with Behavioral Economics which highlights how tailored financial advice and product offerings can influence consumer decision-making and financial well-being, as narrated by Rysin et al., [10]. According to Hafez, M. [11] Trust Bank Limited (TBL) a prominent commercial bank in Bangladesh exemplifies this trend through its strategic focus on personalized banking as a key component of its marketing initiatives. The Bangladeshi banking sector characterized by rapid growth and increasing competition presents both opportunities and challenges for banks like TBL. The writers Sawhney et.al, [12] explored that the rising demand for financial services particularly among the younger population offers a vast market for expansion. They also showed that the sector faces challenges such as regulatory constraints, cybersecurity risks, and the need to build trust among underserved and unbanked populations. Personalized banking services can help address these challenges by fostering trust, enhancing customer engagement, and driving financial inclusion. Chowdhury & Hussain [13] observed that the concept of personalized banking has gained significant attention in recent years driven by technological advancements, changing consumer behaviors and the competitive dynamics of the financial services industry. Central to these theories is the idea that understanding and addressing individual customer needs can lead to increased satisfaction, loyalty and lifetime value. In the context of banking, personalization is often enabled by advanced technologies such as big data analytics, artificial intelligence (AI) and customer segmentation tools, as followed by Hoque et l., [14]. Previous research by Polas et al., [15] investigated that the adoption of personalized banking is shaped by socio-economic factors such as limited financial literacy, low trust in formal banking and regional disparities in developing economies like Bangladesh. These challenges also present opportunities for innovation and targeted solutions. Banks can bridge gaps by providing financial education, offering microfinance for underserved populations and expanding mobile banking to remote areas. Studies in similar contexts by Faraji et al,. [6] showed that digital technologies can enhance financial inclusion and customer engagement. For example, mobile money platforms in Africa have successfully transformed financial ecosystems. In addition, Nnaomah et al., [4] also found that banks are increasingly adopting personalization globally to enhance customer experiences with studies showing significant improvements in satisfaction, retention and cross-selling opportunities. Key elements of personalized banking include customer segmentation based on demographics and financial behaviors, customized products tailored to specific segments like millennials or SMEs and targeted communication through preferred channels such as

email and mobile apps. Proactive relationship management involving dedicated advisors further enhances personalized support. Digital banking platforms have revolutionized personalization enabling real-time interactions and seamless multi-channel integration. Customers now value digital tools offering convenience and personalized insights such as expense tracking, savings recommendations, and credit score monitoring, as stated by Cnaan et al.; [16]. Benjamin et al., [17] carried out a study and explored that personalized banking has become a vital element of modern marketing strategies in the financial services sector with the 4Ps of Marketing—Product, Price, Place and Promotion evolving to include personalization as a core theme. In terms of Product, banks now design tailored financial solutions like customized loan packages and investment portfolios to meet individual needs. Price strategies involve dynamic models based on customer profiles offering benefits such as loyalty discounts or preferential interest rates. Place focuses on omni-channel access enabling personalized services through mobile apps, online platforms and physical branches. The promotion has shifted towards targeted campaigns that resonate with specific customer segments. Furthermore, research by Sawhney et al., [12] highlighted that personalization not only enhances customer engagement but also serves as a key driver of brand differentiation helping financial institutions create unique value propositions and foster emotional connections in competitive markets. Despite its numerous advantages, implementing personalized banking services is fraught with challenges that banks must address to ensure success. One major concern is data privacy and security, as the collection and use of customer data for personalization can lead to risks of data breaches and ethical dilemmas followed by Banna, H. [18]. Technology integration poses another significant hurdle as banks need to invest heavily in developing advanced IT infrastructure capable of supporting data analytics and enabling real-time personalization as identified by Irfan et al., [19]. Additionally, Hasan et al., [20] mentioned that operational complexity complicates the process requiring seamless coordination between marketing, IT, and customer service teams to deliver personalized experiences effectively. Customer resistance is also a key issue with some individuals hesitant to share personal information due to privacy concerns or perceiving personalization efforts as overly intrusive. Overcoming these challenges requires robust data protection measures, strategic investments in technology, and transparent communication to build trust and acceptance among customers as narrated by Himel et al., [21]. The researcher Hafez, M. [22] conducted a study and revealed that Trust Bank Limited (TBL) has embraced personalization as a core element of its marketing strategies by developing customer-specific financial products such as salary loans for government employees and SME financing solutions. According to Khan et al., [23] Banks can use data analytics to segment their customer base and deliver targeted promotions while investing in digital platforms like Trust Mobile and Trust Internet Banking to provide personalized experiences. Additionally, TBL enhances customer support through dedicated relationship managers and 24/7 service channels. Although its approach aligns with global best practices, the bank tailors its implementation to the Bangladeshi market, reflecting the socio-economic and cultural nuances of its customer base followed by Bashir et al., [24].

2.1 Research Gaps and Future Directions

Although existing literature highlights the benefits of personalized banking there is limited research on its application in developing economies, particularly in the context of marketing strategies. Future studies could explore the role of personalization in promoting financial inclusion and economic development, the impact of cultural factors on customer perceptions of personalized banking and the effectiveness of digital banking tools in delivering personalized experiences.

3 METHODOLOGY

Research methodology is the systematic approach used by researchers to investigate and solve research problems. It encompasses various strategies and techniques to collect, analyze, and interpret data. A well-designed research methodology ensures that the study is reliable, valid, and ethical. This study utilized a qualitative research approach to examine the role of personalized banking services in the marketing strategies of Trust Bank Limited in Bangladesh. The qualitative approach is well-suited to this study as it allows for a deeper exploration of the perceptions, motivations and behaviors of the bank's customers and employees. Data were collected through semi-structured interviews with key stakeholders, including senior managers, marketing professionals and customer service representatives at the bank. Additionally, focus group discussions were conducted with customers who had used the bank's personalized services to capture their perceptions and experiences. Purposive sampling was employed to select participants who were directly involved in or had relevant knowledge about the personalized services offered by the bank. The sample consisted of approximately 10-12 interviewees and 2-3 focus groups, each with 6-8 customers. Thematic analysis was applied to the data to identify patterns and themes related to the impact of personalized banking on customer satisfaction, brand loyalty and the bank's marketing strategies. This approach provided valuable insights into how personalized services influenced the bank's competitive advantage and its ability to attract and retain customers. Ethical considerations, including informed consent, confidentiality, and participant anonymity, were strictly maintained throughout the study.

4 FINDINGS AND DISCUSSION

The research aimed to explore the role of personalized banking services in the marketing strategies of Trust Bank Limited (TBL) in Bangladesh. Through qualitative data collected from semi-structured interviews with key stakeholders and focus group discussions with customers, the study provides insights into the impact of personalized banking on customer satisfaction, brand loyalty, and the bank's overall marketing strategies.

4.1 Personalized Banking Services and Customer Satisfaction

A prominent finding of the study is the significant positive impact of personalized banking services on customer satisfaction. Through interviews with senior managers and marketing professionals, it was revealed that TBL's strategy of offering individualized financial solutions has effectively enhanced the customer experience. Customers who participated in the focus groups consistently highlighted the added value of personalized services such as bespoke financial advice, tailored product offerings and dedicated account managers. These services helped customers feel understood and valued which in turn led to increased satisfaction. Some customers shared, "Having a relationship manager who understands my financial goals makes me feel more secure and valued by the bank." This sentiment was echoed across several focus groups suggesting that personalized services have been integral in fostering positive customer experiences which is similar to the previous study conducted by Benjamin et al,.[25]. Thematic analysis of the data revealed that customers perceive personalized banking services as a distinguishing factor that elevates TBL above competitors, contributing to higher levels of satisfaction.

4.2 Personalized Banking and Brand Loyalty

The research also highlights the role of personalized banking services in fostering brand loyalty. Many interviewees and focus group participants emphasized that the personal touch in banking services strengthened their commitment to the bank. Relationship managers who actively engaged with clients and offered tailored financial advice were seen as a key factor in building trust and loyalty. This finding aligns with the theory that personalized interactions create a deeper emotional connection between the bank and its customers, thereby enhancing customer retention. One interviewee, a senior marketing professional at TBL, stated, "Our relationship managers are the cornerstone of our loyalty strategy. They don't just sell products; they build long-term relationships with clients." This finding is consistent with previous research by Levy, S. [26] that suggests personalized services in banking can lead to a higher level of customer trust and loyalty. The study found that customers who received personalized services were more likely to continue using the bank's services and recommend the bank to others which directly contributes to the bank's customer retention and acquisition strategies.

4.3 Impact of Personalized Services on Competitive Advantage

Another key finding of this research is that personalized banking services play a crucial role in enhancing TBL's competitive advantage in the Bangladesh banking sector. The focus group discussions revealed that customers are increasingly looking for banks that can cater to their individual needs, and TBL's ability to provide such services sets it apart from competitors. Several participants noted that TBL's ability to provide tailored credit card offers and investment opportunities based on individual financial profiles was highly valued. The data analysis revealed that personalized marketing, such as custom-tailored loan packages and exclusive financial products was perceived as a key factor in differentiating TBL from other financial institutions. Trust Bank's focus on offering personalized services has thus contributed to its ability to attract a more diverse customer base and solidify its position in a competitive market.

4.4 Challenges in Implementing Personalized Banking Services

While the findings demonstrate the positive outcomes of personalized banking, the research also identified several challenges in the implementation of such services. A recurring issue discussed by both employees and customers was the integration of customer data across various platforms. Employees noted that while there is a wealth of data available, the bank struggles with efficiently utilizing this data to create truly personalized experiences. Some senior managers explained, "While we collect a lot of data, ensuring it is effectively integrated across departments and systems remains a challenge." In addition, some customers, particularly those from older demographics expressed discomfort with digital personalization tools. Although younger customers appreciated the tailored mobile banking features, older clients were less familiar with digital platforms which led to a sense of exclusion from some of the more advanced personalized offerings. This gap in digital literacy suggests that Trust Bank needs to strike a balance between digital and traditional services to ensure inclusivity across all customer segments.

4.5 Role of Employee Training in Personalization

The role of employees in delivering personalized banking services emerged as a critical factor in the success of TBL's marketing strategy. Interviewees emphasized that relationship managers and customer service representatives are essential

in maintaining the high level of personalization that customers expect. It was found that employees who received specialized training in customer relationship management (CRM) were better equipped to deliver personalized services that meet customer needs. Thematic analysis of the interviews revealed that TBL's investment in employee training was linked to improved service delivery. One relationship manager shared, "We are trained to not just understand the financial products, but to understand the unique needs of each customer and suggest products that fit those needs." This finding underscores the importance of ongoing employee development in the effective delivery of personalized services which in turn supports customer satisfaction and loyalty.

4.6 Strategic Implications for Trust Bank's Marketing

The findings of this research suggest that personalized banking services have the potential to significantly enhance Trust Bank's marketing strategies. By offering tailored products and services, TBL not only meets the unique needs of its customers but also strengthens its brand image as a customer-centric institution. Thematic analysis revealed that customers see personalized services as a reflection of the bank's commitment to understanding and addressing their financial needs which fosters a positive brand perception. To further strengthen its competitive position, Trust Bank should consider expanding its personalized offerings, particularly in digital banking channels to cater to the growing demand for tech-driven financial services. Additionally, enhancing cross-departmental collaboration to fully integrate customer data would enable the bank to create more seamless and personalized customer experiences. In doing so, Trust Bank can build on its existing strengths and create a more sustainable competitive advantage in the evolving banking landscape in Bangladesh.

5 RECOMMENDATIONS

To improve personalization strategies, Trust Bank Limited Bangladesh should focus on leveraging advanced data analytics to understand customer behaviors and preferences enabling precise segmentation and tailored solutions. Expanding its product range such as microloans for rural entrepreneurs and digital savings tools for millennials can address diverse needs. Investing in AI and machine learning will facilitate real-time personalization on platforms like Trust Mobile and Trust Internet Banking enhancing customer engagement. Omnichannel integration should be strengthened to deliver seamless experiences across branches, online banking and mobile apps. Trust Bank must also prioritize data privacy and security ensuring compliance with regulations and building customer trust through transparent communication about data usage. Proactive engagement such as personalized financial advice via relationship managers and interactive tools for expense tracking and budgeting can boost customer loyalty. Regularly collecting feedback and using customer insights to refine services will ensure strategies remain customer-centric driving satisfaction and long-term growth. Regarding branding and communication, TBL should emphasize its differentiation strategy more prominently highlighting the unique benefits of its services and the Trust-Money app. Consistent and targeted marketing campaigns that reinforce the bank's commitment to customer satisfaction, innovation and security will help strengthen brand loyalty and attract new customers. Trust Bank should invest in advanced technology to deliver seamless and secure personalized services particularly in underserved areas ensuring inclusivity and improved customer experiences. Employee training is crucial to enable staff to effectively utilize data analytics tools and communicate personalized offerings enhancing service quality. Strengthening data privacy measures by implementing robust security protocols would address customer concerns and build trust in the bank's digital initiatives. Additionally, expanding outreach programs with targeted campaigns can educate customers especially in rural areas about the benefits and accessibility of digital banking promoting wider adoption and enhancing financial inclusion.

6 CONCLUSION

The banking industry in Bangladesh is undergoing significant changes with a focus on enhancing customer service and trust. The study highlights the significant role that personalized banking services play in enhancing customer satisfaction, fostering brand loyalty and giving Trust Bank Limited (TBL) a competitive edge in the dynamic Bangladeshi banking sector. Customer engagement and social media are being revisited as key components of marketing strategies. The significance of customer service in establishing trust and enhancing reputation is crucial for banks in Bangladesh. Artificial intelligence is reshaping the financial services industry allowing banks to deliver personalized services and solutions while maintaining trust and security. The research demonstrates that individualized services such as tailored financial advice, bespoke products, and dedicated relationship managers have created stronger customer relationships and higher levels of satisfaction. Moreover, personalized services contribute not only to improved customer retention but also to attracting new customers through positive word-of-mouth and brand advocacy. However, the implementation of personalized services presents challenges, particularly regarding the integration of customer data across various platforms and the digital divide between younger and older customers. Addressing these issues by investing in advanced data analytics, improving omnichannel integration, and ensuring inclusivity across customer segments will enable TBL to enhance the personalization of its offerings. Furthermore, employee training in customer relationship management is crucial in delivering consistent, high-quality service that meets customer expectations. A limitation of this study is its focus on qualitative data which may not

offer a comprehensive view of the broader impact of personalized banking services on the entire customer base. Additionally, the study does not assess the long-term effects of personalized services on customer retention, financial performance, or market share. Future research could investigate the role of emerging technologies like AI in enhancing personalized banking and explore how the digital divide influences the adoption of these services across different customer segments. With a continued focus on innovation, security and customer-centric strategies, TBL is poised to strengthen its market position, enhance customer satisfaction and drive long-term growth. Ultimately, personalized banking services are not just a tool for differentiation but a strategic imperative for TBL to sustain its competitive advantage and adapt to the evolving needs of its diverse customer base.

CONFLICT OF INTEREST

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

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ANALYSIS OF THE LEADING AUTOMOBILE'S MARKETING STRATEGY

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Abstract: Information marketing refers to a communication mode that uses modern communication equipment and information resources as marketing means to improve knowledge sharing, ability creation and measure the effect of target groups. In today's information age, information marketing is being accepted and adopted by more and more enterprises. Among them, SAIC Group, as a leading enterprise in China's automobile export industry, has been committed to exploring overseas markets in recent years. Up to now, SAIC is the first automobile enterprise in China with a cumulative overseas sales volume of more than 3 million vehicles, ranking first in the export volume of Chinese automobile enterprises for six consecutive years. However, the epidemic situation, instability and other factors have brought new challenges to SAIC Group's overseas marketing and further expansion of overseas markets. Therefore, this paper mainly analyzes the current export situation of SAIC Group and the existing problems in overseas marketing based on informationization and puts forward corresponding improvement measures and reference methods to improve the marketing efficiency.
Keywords: Information background; SAIC; Transnational marketing

1 INTRODUCTION

As a leading automotive company registered in China, SAIC strives to grasp the development trend of the industry, accelerate product and service innovation and transforming from a traditional manufacturing enterprise to a diversified high-end manufacturing enterprise. The main business of SAIC is the research and development, manufacturing and sales of whole vehicles. SAIC also actively supports the commercialization of new energy vehicles and Internet vehicles, and carries out the research and exploration of technology industrialization[1]. In addition, SAIC is responsible for auto finance, insurance investment, overseas business and international trade business, and has gradually stepped in the field of industrial big data and artificial intelligence with huge growth potential.

2 CHOSEN PRODUCT LINE

'SAIC MAXUS' is one of product lines of SAIC. It represents strong brand vision to go all the way forward. It sticks to the SAIC's "new four modernizations" strategy of "electrification, intelligence, connection and sharing" and "customization" to break the industry boundaries and realize an overall development. SUV D90 Tailored for You: Innovation Promotes Performance can be seen in Figure 1 (Data source: SAIC Motor net).

Figure 1 SUV D90 Tailored for You: Innovation Promotes Performance

3 SAIC GROUP TRANSNATIONAL MARKETING SITUATION SWOT ANALYSIS

3.1 Strengths

3.1.1 Economic advantages

First of all, in the face of the pressure from the automobile industry, SAIC focuses on strengthening financial management and investment management, creating joint credit, and issuing bonds to support funds. Among them, SAIC ranks first among auto enterprises with a bond issuance scale of 20 billion yuan. After deducting advertising expenses, all the funds will be invested in internal and external engineering, research and development innovation, construction and other activities allowed by regulations.

Secondly, SAIC will also use Zebra Network, Chexiang and other startups to raise funds in addition to the business model, accelerate the integration of all parties, and create new financing methods. By 2021, SAIC's net assets will reach 274.1 billion yuan, far exceeding BYD's market value of 83.8 billion yuan. After several years of integration and growth, SAIC has established the financing method of "self-research + raising". The company has raised enough money to support its core products through acquisitions and equity offerings[2].

3.1.2 Scale advantage

Whether SAIC can enter foreign markets and compete with foreign enterprises is also an important part of SAIC's achievements. After years of development, SAIC has about 108 subsidiaries, making it by now China's largest auto company. The business section of SAIC can be roughly divided into five sections: vehicle, parts, service travel, auto finance and international business.

In terms of international business, SAIC's international business mainly includes overseas production, overseas research and development, business marketing, network construction, after-sales service, new business design, etc. After years of development and continuous research and overseas business expansion, SAIC has now set up companies in many countries to promote product research and development and marketing. Among them, SAIC Zhengda Thailand, SAIC UK, SAIC-GM-Wuling Indonesia, SAIC India, SAIC International, etc., the overseas scale is growing[3].

3.1.3 Experience and technical advantage

After more than ten years of development, SAIC's production and overseas sales are increasingly perfect. SAIC has established a global automotive business covering more than 90 countries and regions around the world, involving research and development, marketing, distribution, equipment, manufacturing, technology, finance and other fields. In addition, SAIC has many years of experience working with a number of international companies, and it has an extremely deep corporate history. In 2020, SAIC headquarters dispatched more than 30 foreign entrepreneurs to support overseas business teams, and most of the foreign managers and ordinary employees of SAIC can communicate with local residents[4].

At the same time, SAIC has a global vision and cross-industry experience in foreign markets, and will conduct conscious analysis of consumer preferences and trade preferences before entering foreign markets.

3.2 Weakness

3.2.1 Lack of market segmentation

SAIC's success in foreign markets is undeniable. However, when SAIC entered the foreign market, it did not fully consider the market segmentation, but adopted the overseas marketing strategy of "full flowering", that is, marketing products in multiple foreign markets at the same time. Although this operation mode has the advantages of high efficiency and fast response, it also brings about problems such as high production and marketing costs and high marketing risks. Therefore, when an enterprise decides to enter a foreign market, it should first consider the choice of market segmentation and target market, and analyze the competitive environment and development potential of different access markets[5]. Obviously, SAIC still lacks consideration in this regard. Although this "multi-market" thinking can improve marketing efficiency to a certain extent, the huge investment needed in the early stage can easily lead to high marketing costs and production costs, which may cause high marketing management costs of SAIC itself in a short time.

3.2.2 The management cost of marketing talents is too high

SAIC currently mainly adopts a strategy of "multi-market synchronous development", which means that SAIC needs to recruit local talent in different countries and markets. However, different markets have completely different working cultures, and the pursuit and values of employees in different countries are also different, which is easy to lead to cultural misunderstanding and affect the overall working atmosphere and marketing efficiency of the company. It is difficult for SAIC to retain valuable talents only by its own training mode, and it will also encounter many problems in staff recruitment and maintenance[6]. Therefore, in order to be as clear as possible about cultural misunderstandings and improve work efficiency, SAIC needs more time and training costs to manage employees from different cultural backgrounds and take its own higher risks. High talent management and training costs will also affect the progress of SAIC's overseas expansion to some extent.

3.2.3 Product quality could not be guaranteed

In the final analysis, the main advantage of cross-border trade lies in the product itself. Although SAIC has always paid attention to production and quality control, product problems still occur from time to time and customer complaints continue. For example, SAIC Datong Automobile Co., Ltd. is currently recalling 866 V90 models and 711 G 10 models produced and entered the domestic and foreign markets from October 25,2020 to December 13,2020. As of March 19,2021, a total of 1,577 vehicles have been recalled[7]. The reasons for the recall include but are not limited to changes

in braking performance, unexplained engine failure, quality problems, wrong size of some components, leakage of brake fluid, etc., which have had an extremely negative impact on SAIC's overseas reputation. Complaint index of SAIC Volkswagen in the first half of 2022 can be seen in Figure 2(Data source: Auto Door net).

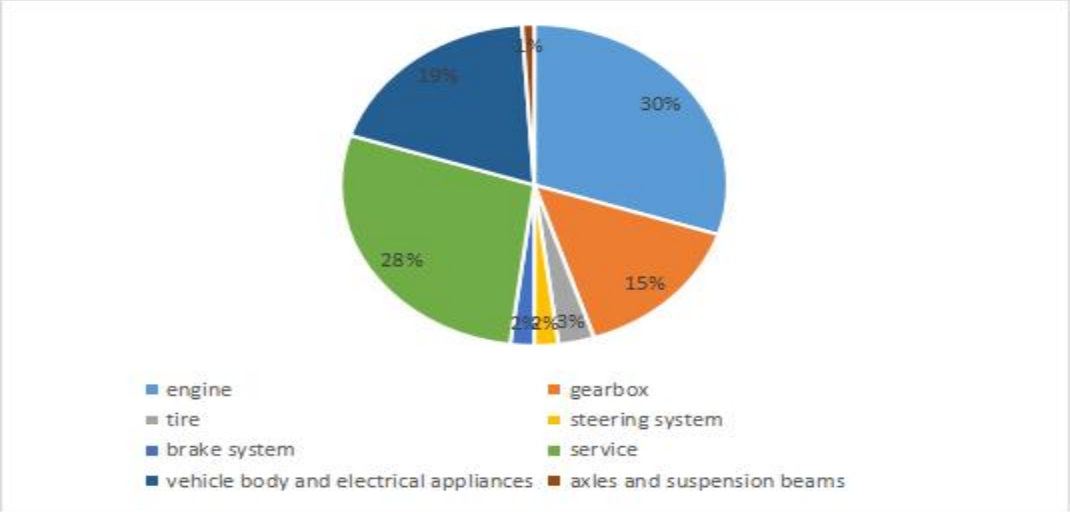

Figure 2 Complaint Index of SAIC Volkswagen in the First Half of 2022

As can be seen from the data in the above table, the complaints and demands of customers at home and abroad on SAIC products are mainly about engine problems, vehicle braking system problems, gearbox problems and service problems. In particular, 28% of the customer complaints are related to service, which indicates that many customers are not satisfied with SAIC's various after-sales services.

3.3 Opportunity

3.3.1 Macro-policy support

With the continuous integration of China's "going global" and "Belt and Road" strategies, China's trade volume with neighboring countries is increasing. With the continuous development of China's economy and the enhancement of its national strength, China is committed to modernization, opening up and technological change, and strives to realize the change from "made in China" to "created in China". By October 2022, China exported more than 2 million vehicles for the first time. In addition, affected by the new pneumonia virus, the global situation has become unstable, and the production and sales of many foreign cars have changed[8]. However, thanks to China's own attention to the epidemic, China can resume work and production and resume exports in a relatively short period of time. China's rapid decision-making and strong execution will also win China a very valuable development opportunity.

3.3.2 New energy vehicles have become a new trend

In the automobile industry, new energy vehicles have gradually become the first choice of many consumers. From January to September 2022, the global sales of new energy vehicles will reach 6.815 billion. China is not only the fastest new energy development country in the world, but also a new market for new energy vehicles. In 2022, the share of new energy vehicles in the overall automobile market will reach 25%. New power series models have a strong competitiveness in the domestic and foreign markets[9]. In this regard, SAIC should seize the opportunity of new energy development, invest funds to develop new energy equipment, integrate the sales of new energy equipment, and manufacture new energy products according to the characteristics of new energy. Thus, it can better meet the new demand of the market and cultivate new competitive advantages.

3.3.3 Acquisition opportunities increase

Under the current grim situation, the continuous influence of the global environment and the epidemic, the automobile industry is also facing challenges and resistance. As China's largest exporter, SAIC has rich experience in mergers and acquisitions. Among them, SAIC Chase brand comes from the acquisition. In 2011, SAIC established the SAIC Chase Business Division to shift its strategy from proprietary technology to shared technology, and to gradually understand the global automotive industry. Now, SAIC Roewe, SAIC MG, SAIC Datong three brands have realized complementary advantages, common development[10]. Therefore, in the context of widespread environmental crisis, SAIC should seize the opportunity to acquire more small and medium-sized enterprises in time, expand the integration of business resources, improve business plans, and make contributions to the future cross-industry trade.

3.4 Threat

3.4.1 Competitor threat

Although SAIC is currently the largest auto company in China and the most competitive auto company in China, this does not mean that SAIC's export business has become fully established. In addition to SAIC, Chery Automobile, GEELY Holding Group, CHANGAN Automobile, Great Wall Motor, BAIC Group, JAC Automobile, BYD and other

companies are also speeding up the pace of going global. Take Chery Automobile as an example. Chery Automobile exported about 310,000 units from January to September 2022, second only to SAIC's 500,000 units. In addition to domestic competitors, SAIC inevitably has to compete with foreign car enterprises in joint ventures[11]. SAIC has lost its home advantage and opportunity when competing with foreign enterprises. The attraction of overseas customers is very easy to be dispersed by foreign local enterprises. Therefore, SAIC must not take it lightly.

3.4.2. Alternative product threat

The threat of alternative products is also an issue that SAIC should pay more attention to in its future business. Now, with the expansion of China's transportation industry, more and more enterprises choose to engage in automobile export, and the risk of product replacement is becoming greater and greater. Cars belong to the category of luxury goods. There are strong technical correlation and production correlation between products, and strong homogeneity. The risk of product confusion is greater than that of other industries. Customers' choice is extremely easy to be affected by product price, product quality, related service quality, cost performance and other factors, especially foreign customers will be more interested in product quality[12]. Therefore, SAIC should also pay attention to the threat of high homogenization of alternative products in the current market, and strive to build its own product advantages.

3.4.3. Unstable situation at home and abroad

In recent years, the global situation has been volatile: COVID-19 has brought uncertainty to the global and domestic economies as well as countries, with a significant impact on cross-border and international trade. The Ukraine crisis has triggered major and complex changes in the international situation, leading to further changes in the international exchange rate and the long-term existence of global trade barriers. Affected by various factors, the complexity, severity and uncertainty of international business development and business environment have increased. In this context, China's automobile exports have also been greatly affected. In March this year, China's automobile manufacturers exported 170,000 vehicles, down 5.5% from the previous month. At present, the situation in Russia and Ukraine is difficult and changeable, and western sanctions against Russia are intensifying, leading to multiple problems such as transportation delays, RMB exchange rate changes, rising the price of many products, and affecting the delivery of goods and products[13].

4 SUGGESTIONS ON SAIC'S MARKETING STRATEGY

4.1 Promote Multi-Dimensional Information Marketing to Improve Product Exposure

At the present stage, most enterprises will face the problems of low product marketing efficiency, long time-consuming and untimely feedback when carrying out transnational marketing, which greatly affects the next sales of enterprises. Therefore, in today's increasingly developed network technology, the use of information technology in marketing is of great strategic significance for enterprises. At the same time, with the continuous impact of the epidemic and the unstable situation at home and abroad, the effect of the traditional marketing model is difficult to be fully played. SAIC should seize the opportunity of information development, strive to broaden its own online network marketing channels, actively build an all-round network marketing network, and adopt the marketing model combining "physical marketing + information marketing".

In entity marketing, SAIC should give full play to its own economic advantages and overseas cooperation advantages to improve the product exposure as much as possible. For example, SAIC could hold some relevant product exhibitions to attract the attention of foreign customers based on mutual interest of foreign companies[14]. In addition, SAIC could also try to foster the mutual collaboration with foreign companies and let foreign partners to help them introduce the product and improve the marketing effectiveness.

In terms of information marketing, in addition to its product website, SAIC could also strive to build a new type of multi-dimensional product information website, this stage export products according to different brands and product types, and create product multi-dimensional information matrix, using the combination of video-description and image-description to provide the comprehensive information about product, which include the product appearance, product color options, product interior, product characteristics, product inspection and other information related to product itself. This kind of multi-dimensional product network could make foreign customers understand all information about related products, greatly improving the marketing efficiency and reducing the cost of transnational marketing.

4.2 Establish a Multi-Language Information Marketing Network to Improve Product Affinity

In addition to establishing a multi-dimensional new product matrix, SAIC can also focus on establishing a new multi-language information marketing network. With the deepening of the internationalization process, more and more countries choose to join in the tide of economic globalization, and more and more countries choose to establish trade relations with China. Therefore, for Chinese enterprises, it is far from enough to only use English as the transnational marketing language[15]. Although English is the most widely used language in the world and is highly recognized in international trade, Chinese companies should also be fully aware of the importance of small languages. According to Google, 50 percent of buyers will buy in English, but the remaining 50 percent will choose to buy in their native language. More than 60.4% of the world's transactions occur in non-English speaking countries, so the importance of small languages cannot be ignored.

Therefore, for SAIC, when carrying out transnational marketing, it should not only focus on the English language market, but also pay attention to all kinds of small languages. SAIC needs to recognize that while English has the

highest recognition in the world, there are a significant number of countries whose native or popular language is not English. Therefore, SAIC can should establish a new multilingual information marketing network to provide customers with a multilingual choice of comprehensive product information website, including other small language, give customers to choose reference language, convenient national customers and related business personnel timely access to product information and company information, in the long run, SAIC brand affinity will be further promoted, other small language countries will be aware of the professional and language inclusive, and more inclined to cooperate with SAIC group.

4.3 Promote Cooperation Between Enterprises and Improve the Two-way Quality Management System

Cooperation between state-owned enterprises and foreign companies is very important. Good inter-enterprise cooperation can determine to a certain extent whether an enterprise can gain a firm foothold in overseas markets. The cooperation between enterprises is not only the cooperation in product transaction, but also the employee collaborative training and the joint supervision of product quality are also an important part of enterprise cooperation.

In terms of staff training at home and abroad, SAIC can gather its senior employees with rich overseas business experience to establish a special "transnational marketing talent special training team", which is mainly responsible for cross-cultural training, marketing skills training and language ability training for the existing domestic and foreign sales staff and reserve transnational marketing talents[16]. In addition, SAIC can make full use of its overseas cooperation advantages, coordinate overseas resources, and overseas government and related local cooperation talent training, establish special "joint talent pool" at home and abroad, the company existing domestic and foreign marketing talent into talent pool, jointly organized related training programs on a regular basis, appropriate invite overseas marketing experts to the company to share experience, help us to dig deeper into different overseas market consumer preferences and market pain points.

In terms of quality management, SAIC can cooperate with relevant foreign companies and overseas governments to realize the coordinated quality management of export products. For example, SAIC can reach product quality management agreements with relevant enterprises, establish product quality standards and management regulations, and conduct management evaluation of SAIC's export products. If the overseas company finds that SAIC's export products do not meet the quality standards mentioned in the agreement, the foreign company has the right to return the relevant products and claim relevant compensation. This two-way quality management mode between enterprises can urge SAIC to some extent to pay attention to the quality of export products, so as to stand out from other brands.

5 DIGITALISATION

5.1 Digital Marketing

As the largest automotive group in China, SAIC has been actively promoting digitalization since 2017 to better connect and serve end users. In this context, SAIC Group uses enterprise WECHAT to create a user-oriented "SAIC New Retail Data Service System", redefining the retail transformation approach. The implementation of this system not only improves the sales performance of SAIC, but also lays a solid foundation for its future development.

With the popularization of the Internet and the change of consumer behavior, the traditional car sales model has been unable to meet the needs of consumers. SAIC realized that to stay ahead in the fierce market competition, it must undertake digital transformation to better connect and serve end users.

SAIC pays attention to user orientation in the digital transformation, takes user needs as the starting point, and is committed to providing more convenient, efficient and personalized services. SAIC Group has built a new retail system integrating consultation, transaction and after-sales by using the social platform WECHAT.

6 CONCLUSION

This paper mainly through the SWOT analysis of SAIC, deep analysis of the advantages and disadvantages of SAIC international marketing strategy, at the same time according to the current international situation at home and abroad, the SAIC future international marketing feasibility reference. In general, enterprises should make full use of good network this unique marketing channels, speed up the construction of their own product network, gradually get rid of the traditional offline entity marketing and stereotypes, seize the information marketing "anytime, anywhere, low cost, feedback" the characteristics of the network platform for their own brand image construction and product promotion, improve the efficiency of marketing.

COMPETING INTERESTS

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

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THE DISBURSEMENT OF COMMON FUND IN THE KWAHU WEST MUNICIPALITY ASSEMBLY EASTERN REGION GHANA

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Abstract: The disbursement of the Common Fund in kwahu West Municipal Assembly in the Eastern Region of Ghana is guided by the District Common Fund (DACF). The DACF is a fund allocated by the government to support the development of metropolitan, municipal, and district Assemblies.
The Kwahu West Municipal Assembly receives a portion of the DACF, which is used to finance development projects in the Municipality.
The Assembly medium - term development plan outlines the priorities for the use of the Common Fund, including infrastructure development, education, and health.
The disbursement of the Common Fund is typically done on a quarterly basis, and the Assembly is required to submit reports on the use of the funds.
The reports are reviewed by the Ministry of Local Government and Rural Development to ensure that the funds are being used for the intended purposes.
Keywords: Allocation of funds; Priority setting; Quarterly disbursement; Reporting and monitoring

1 INTRODUCTION

The disbursement of the District Assemblies Common (DACF) in the Kwahu West Municipal Assembly in Eastern Region of Ghana is guided by specific guidelines to ensure transparency and accountability[1]. The DACF is a pool of funds allocated to district Assemblies in Ghana to support development projects and programs. The Kwahu West Municipal Assembly's Annual Action plans, such the the 2022 and 2023 plans, outline the municipality's development priorities and budget allocations[2].
The Kwahu West Municipal Assembly, established in 2004 and upgraded to municipal status in 2007, receives a portion of the DACF to fund various development initiatives. The Assembly's medium - term development plan outlines priorities for the use of these funds, including infrastructure development, education, health, and agriculture.
The disbursement of the DACF in Kwahu West Municipal Assembly involved a rigorous process to ensure that funds are allocated effectively and efficiently. This process typically involves: identifying priority areas for development and assessing the needs of the municipality. The selecting projects that align with the Assembly's development priorities and the DACF guidelines. Allocating funds to selected projects and ensuring that expenditure are within budget, Implementing projects and monitoring their progress to ensure that funds are used effectively.
Finally, the disbursement of the DACF in Kwahu West Municipal Assembly is critical for supporting development initiatives and improving the lives of residents in the municipality.

1.1 Primary Objectives

1. To examine the disbursement process of the DACF in the Kwahu West Municipal Assembly. This objective aims to investigate the procedures and mechanisms used to allocate and disburse the DACF in the Assembly.
2. To assess the effectiveness of the DACF in financing development projects in the Kwahu West Municipal Assembly. This objectives seek to evaluate the impact of the DACF on development projects and programs in the Assembly.
3. To identify the challenges and constraints associated with the disbursement of the DACF in the Kwahu West Municipal Assembly. This objective aims to investigate the difficulties and limitations faced by the assembly in disbursing the DACF.

1.2 Secondary Objectives

1. To investigate the level of transparency and accountability in the disbursement of the DACF in the Kwahu West Municipal Assembly. This objective seeks to assess the extent to which the assembly ensures transparency and accountability in the use of the DACF.
2. To examine the role of stakeholders in the disbursement of the DACF in the Kwahu West Municipal Assembly. This objective aims to investigate the involvement and participation of stakeholders, such as community members, civil society organizations, and traditional authorities, in the disbursement of the DACF.
3. To identify best practices and lessons learned from the disbursement of the DACF in the Kwahu West Municipal Assembly. This objective seeks to document successful strategies and approaches used by the assembly in disbursing the DACF, as well as lessons learned from challenges and failures.

1.3 Research Questions

1. What is the disbursement process of the DACF in the Kwahu West Municipal Assembly?
2. How effective is the DACF in financing development projects in the Kwahu West Municipal Assembly?
3. What are the challenges and constraints associated with the disbursement of the DACF in the Kwahu West Municipal Assembly?
4. How transparent and accountable is the disbursement of the DACF in the Kwahu West Municipal Assembly?
5. What role do stakeholders play in the disbursement of the DACF in the Kwahu West Municipal Assembly?

2 METHODOLOGY

Combination of quantitative and qualitative methods to provide a comprehensive understanding of the disbursement of the DACF . Focus on the Kwahu West Municipal Assembly as a case study to gain in- depth insights into the disbursement process.

2.1 Study Population

The target population for this study includes:
1. Assembly Members: Elected representatives of the Kwahu West Municipality Assembly who are involved in the decision - making process for the disbursement of the DACF.
2. Municipal officials: Staff of the Kwahu West Municipal Assembly, including the Municipal chief Executive, Finance officer, and other officials responsible for the administration and disbursement of the DACF.
3. Community Members: Residents of the Kwahu West Municipality who are beneficiaries of DACF - funded projects or have an interest in the disbursement of the fund.
4. Traditional Authorities: Chiefs and other traditional leaders in the Kwahu West Municipality who may have a role in the allocation and disbursement of the DACF.
5. Civil society organizations: Representatives of Non-governmental organizations (NGOs) and community - based organizations (CBO) operating in the Kwahu West Municipality who may have an interest in the disbursement of the DACF.

2.2 Data Collection Methods

2.2.1 Document review: analyze relevant documents such as:
- DACF guidelines and manuals.
- Kwahu West Municipal Assembly's budget and financial reports.
- Minutes of assembly meetings and commitee reports.

2.2.2 Survey's: conduct surveys among :
- Assembly members.
- Municipal officials.
- Community members and beneficiaries of DACF - funded projects.

2.2.3 Interviews: conduct in - depth interviews with:
- Key informants, such as the Municipal chief Executive and Financial Officer.
- Assembly members and committee chairpersons.
- Community leaders and representatives of civil society organizations.
- Observations: observe assembly meetings, committee meetings, and community engagements to gain insights into disbursement process.

2.3 Data Analysis Methods

1.Quantitative analysis: statistical software (e.g SPSS, R) to analyze survey data and financial reports.

2. Qualitative analysis: use thematic analysis and content analysis to analyze interview transcripts, survey open - ended questions, and document reviews.
3. Triangulation: Combination of quantitative and qualitative findings to validate results and provide a comprehensive understanding of the disbursement process.

2.4 Sample Size

A sample size of 150 - 200 respondents is proposed for this study, comprising:
1. 30-40 Assembly Members.
2. 20-30 Municipal officials.
3. 50-60 Community Members.
4. 10-20 Traditional Authorities.
5. 10-20 Representatives of Civil society organizations.

2.5 Sampling Strategy

1. Purposely Sampling: selection of assembly members, municipal officials and community members who are knowledgeable about the DACF disbursement process.
2. Snowball sampling: Ask initial respondents to recommend additional participants who can provide valuable insights.

3 DISCUSSIONS

The disbursement of the District Assemblies Common Fund (DACF) in kwahu West Municipal Assembly in Ghana's Eastern Region is guided by the 1992 constitution, which established the DACF to transfer resources from the central government to local governments. The fund is meant to support development projects and programs at the local level. The NDPC's reports on the Kwahu West Municipality provide information on the municipality's composition, electoral areas, and membership, National Development Planning Commission (NDPC)[3]. Moreover, The Ghana Stastiscal Services data on the Kwahu West Municipality also provides demographic information and statistics on the municipality's population, [4].

3.1 Challenges in Disbursement

Despite its importance, the disbursement of the DACF in Kwahu West Municipal Assembly faces several challenges. These include:
- Inadequate Funding: The DACF allocation to the assembly may be insufficient to address the development needs of the municipality.
- Poor Management: Inefficient management of the fund can lead to delays in disbursement, mis allocation of resources, and corruption.
- Lack of Transparency : Insufficient transparency in the disbursement process can lead to mistrust among stakeholders and undermine accountability.

3.2 Importance of DACF in Kwahu West Municipal Assembly

The DACF plays a crucial role in supporting development projects and programs in the Kwahu West Municipal Assembly. The fund helps to:
- Finance Infrastructure Projects: The DACF supports the construction and maintenance of infrastructure such as roads, schools, and healthcare facilities.
- Support Economic Development: The fund helps to promote economic development by supporting agricultural projects, small - scale industries, and entrepreneurship programs.
- Improve Social Services: The DACF contributes to improving social services, including education, healthcare, and sanitation.

3.3 Guidelines for Disbursement

To ensure effective management and disbursement of the DACF, guidelines have been established. These guidelines emphasize the need for:
- Transparency: The disbursement process should be transparent, with clear and accessible information on fund allocation and utilization.
- Accountability: The assembly should ensure accountability in the use of the DACF, with mechanisms for monitoring and evaluation project implementation.

• Common Participation: The assembly should involve the community in the planning and implementation of DACF - funded projects to ensure that they meet local needs and priorities.

3.3.1 Disbursement process of the District Assemblies Common Fund (DACF) in the Kwahu West Municipal Assembly

The disbursement process of the District Assemblies Common Fund (DACF) in the Kwahu West Municipal Assembly involves several steps and stakeholders.

• Release of Funds: The DACF is released by the central Government to the Kwahu West Municipal Assembly. However delays in the release of these funds can hinder the Assembly's ability to deliver on its mandate.

• Assembly's Budgeting Process: The Assembly's Budgeting Process is crucial in determining how the DACF is disbursed. The assembly identifies priority areas and allocates funds accordingly.

• Project Implementation: Once funds are allocated, the Assembly implements projects and programs. This involves procuring goods and services, awarding contracts, and monitoring project process.

• Monitoring and Evaluation: The Assembly monitors and evaluates project Implementation to ensure that funds are used effectively and efficiently.

Transparency and accountability of the (DACF) disbursement in the Kwahu West Municipal Assembly are essential aspects of good governance. According to the composite budget for 2017-2019, the assembly aims to improve transparency, accountability, and access to information. This suggests a commitment to transparency and accountability in the disbursement of the DACF.

The Assembly's budget documents, such as the composite budget for 2017-2019 and the 2016 composite budget, provide detailed breakdown of DACF allocations and expenditures. This level of detail suggests a degree of transparency in the disbursement process. However, the actual implementation of these commitments and the effectiveness of the Assembly's transparency and accountability mechanisms are unclear.

The further assess the transparency and accountability of the DACF disbursement, it would be necessary to examine the Assembly's monitoring and evaluation frameworks, such as the District Monitoring and Evaluation Plan (DM&EP) for 2010-2013. Overall, while the Kwahu West Municipal Assembly appears to have made commitments to transparency and accountability in the disbursement of the DACF further investigation is needed to determine the effectiveness of these commitments in practice.

A vital role play by stakeholders in the disbursement of the District Assemblies Common Fund (DACF) in the Kwahu West Municipal Assembly. They are involved in the planning and implementation of DACF - Funded projects, ensuring that the funds are used effectively and efficiently.

3.4 Key Stakeholders Roles

• Partnership and Collaboration: Stakeholders, including major stakeholders within the Municipality, partner with the Assembly to celebrate important events and promote development.

• Needs Assessment and Project Identification: Stakeholders help identify priority areas and projects that align with the Assembly's development goals.

• Monitoring and Evaluation: Stakeholders participate in monitoring and evaluating the implementation of DACF - funded projects, ensuring transparency and accountability.

• Community Engagement: Stakeholders engage with the community to raise awareness about DACF - funded projects and involve them in the planning and implementation process.

3.5 Stakeholders Groups

• Community Members: Residents of the Kwahu West Municipality who benefit from DACF - funded projects.

• Traditional Authorities: Chiefs and other traditional leaders who play a role in local governance and development.

• Civil society organizations: NGOs and CBOs that work in the municipality and can provide expertise for DACF - funded projects.

• Private sector: Businesses and entrepreneurs who can provide resources and expertise for DACF - funded projects.

4 RESULTS

The results of the disbursement of the Common Fund in the Kwahu West Municipal Assembly in Ghana's Eastern Region are reflected in the Assembly's annual reports and action plans.

4.1 Key Achievements and Challenges

The Assembly's has implemented various development projects, including infrastructure development, education and healthcare initiatives. However, challenges such as misapplication of funds and lack of transparency in the disbursement

process have been reported. The Assembly's has also faced issues with delayed release of Funds from the central government, which has impacted projects implementation.

4.2 Development Projects and Initiatives

The assembly has invested in education infrastructure, including the construction of new schools and rehabilitation of existing ones. Healthcare initiatives, such as the provision of medical equipment and supplies, have also been supported. Infrastructure development projects, including road construction and maintenance, have been undertaken to improve accessibility and connectivity.
In all, while the Kwahu West Municipal Assembly has made efforts to utilize the Common Fund for development projects, there are still challenges to be addressed to ensure effective and transparent disbursement of funds.

5 FINDINGS

The disbursement of the Common Fund in the Kwahu West Municipal Assembly in Ghana's Eastern Region has been utilized to support various development projects.

5.1 Key Projects and Initiatives

- Infrastructure Development: The assembly has invested in infrastructure development, including the construction of new schools and rehabilitation of existing ones.
- Agriculture Development: Under the Youth in Agriculture program, 37 people jointly cultivated 81 acres of rice, and 63 people cultivated 100 acres of maize to enhance food production in the community.
- Afforestation Programme: Various species of tree seedlings were cultivated on a 140-hectare land, providing employment to 400 youth.

5.2 Challenges and Areas for Improvement

- Misapplication of Funds : There have been instances where funds were used for purposes other than what they were allocated for.
- Lack of Transparency: The disbursement process has been criticized for lacking transparency, making it difficult to track fund allocation and utilization.

5.3 Financial Performance

The assembly realized Ghc324,422 of its internally Generated Fund (IGF) in 2010, representing 72% of the projected revenue. The assembly was allocated Ghc590,000 from the District Development Fund (DDF) to finance various projects.

6 RECOMMENDATIONS

For the Kwahu West Municipal Assembly in Ghana's Eastern Region, recommendations for the disbursement of the Common Fund include:
- Improving Transparency and Accountability:; Ensure that the disbursement process is transparent, with clear and accessible information on fund allocation and utilization. This can be achieved by implementing a robust monitoring and evaluation framework.
- Enhancing Community Participation: involve the community in the planning and implementation of Common Fund projects to ensure that they meet local needs and priorities.
- Strengthening Financial Management: Develop and implement effective financial management systems to prevent misapplication of Funds and ensure that resources are used efficiently.
- Aligning with National Development Priorities: Ensure that Common Fund projects align with national development priorities and the assembly development goals.
- Building capacity of Assembly Members: provide training and capacity building programs for assembly members to enhance their skills and knowledge in managing the Common Fund.
- Establishing a feedback Mechanism : set up a feedback mechanism to allow stakeholders to provide input on the disbursement process and suggest areas for improvement.

Overall, by implementing these recommendations, the Kwahu West Municipal Assembly can ensure that the Common Fund is disbursed effectively to support the development needs of the municipality .

7 CONCLUSION

The disbursement of the District Assemblies Common Fund (DACF) in the Kwahu West Municipal Assembly in Ghana's Eastern Region has been crucial for supporting development projects. Established by the 1992 constitution, the DACF aims to transfer financial resources from the central government to local governments, promoting equitable distribution of national resources.

In the case of the Kwahu West Municipal Assembly, the DACF has been utilized to fund various development projects, including infrastructure development, education and healthcare initiatives. For instance, the assembly has invested in education infrastructure, such as construction new schools and rehabilitation existing ones.

However, challenges persist, including misapplication of Funds, lack of transparency , and delayed release of Funds from the central government. To address these issues, it's essential to straighten financial management systems, ensure transparency and accountability, and align DACF projects with national development priorities.

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DEDICATION

I dedicate this research work to my father Nana Sanahene Debra and my grandmother Emma Wiredu all of blessed memories.

COMPETING INTERESTS

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

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ENHANCING FULL-ENGLISH TEACHING QUALITY IN SINO-FOREIGN COOPERATIVE PROGRAMS IN HIGHER VOCATIONAL COLLEGES

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Abstract: The globalization of education has led to the expansion of Sino-foreign cooperative programs in higher vocational colleges, offering students the opportunity to receive internationalized training. However, the effectiveness of full-English teaching in these programs remains a critical challenge. This paper explores the primary obstacles facing English-medium instruction (EMI) in Sino-foreign cooperative education, including the mismatch between students' English proficiency and the requirements of all-English teaching, the limited time available for language development, and the divergence in educational philosophies between Chinese and foreign teachers. It proposes several optimization strategies in the areas of teacher development, curriculum reform, teaching methods, and assessment mechanisms. The aim is to provide practical insights and recommendations to enhance the quality of teaching and learning in these programs.
Keywords: Vocational education; Sino-foreign cooperation; Curriculum reform; Teacher development; EMI

1 THE PARTICULARITY AND CHALLENGES OF ALL-ENGLISH TEACHING IN SINO-FOREIGN COOPERATIVE EDUCATION PROGRAMS IN HIGHER VOCATIONAL COLLEGES

1.1 The Mismatch between Students' English Foundation and Teaching Objectives

In many Sino-foreign cooperative education programs, there is a significant gap between the students' English proficiency and the demands of full-English instruction. Higher vocational students generally have lower levels of English competency, as their performance in the college entrance examination often falls below the threshold required for admission to undergraduate programs. This linguistic gap becomes particularly problematic in an EMI environment where specialized English vocabulary is integral to the curriculum. Foreign teachers, who often use original English textbooks containing industry-specific terminology, may inadvertently alienate students who lack the vocabulary to fully engage with the material. This mismatch hinders classroom interactions and results in a reduced learning experience. Research has shown that students often struggle to apply their theoretical language skills to professional settings, leading to frustration and a lack of confidence in their English language abilities [1].

1.2 The Contradiction between Short Teaching Time and Heavy Tasks

The limited academic duration of higher vocational programs—typically three years—further exacerbates this issue. With only 1 to 1.5 years allocated to English instruction, the time available for students to master both general and professional English is far shorter than in traditional undergraduate programs. As a result, students face immense pressure to quickly improve their language skills while simultaneously gaining specialized knowledge. This time constraint often leads to an overload of expectations and unrealistic outcomes, as students must simultaneously develop their basic language skills, acquire technical vocabulary, and cultivate the ability to communicate in cross-cultural contexts [2]. The challenge, therefore, lies in balancing the demands of language acquisition with professional training within such a short period.

1.3 The Conflict between Chinese and Foreign Educational Concepts and Methods

Sino-foreign cooperative education programs are often marked by a clash of pedagogical approaches between Chinese and foreign teachers. Chinese teaching methods are typically exam-oriented, with a strong focus on knowledge transfer, rote memorization, and test preparation. In contrast, many foreign educators prioritize student-centered, active learning techniques, such as case studies, project-based learning, and interactive discussions. While these methods may be effective in fostering critical thinking and problem-solving skills in students with advanced language proficiency, they are often less successful in a bilingual classroom where students are still developing their English language skills. The struggle to adapt to these new pedagogical techniques, combined with language barriers, leads to a fragmented learning experience, where students are unable to fully engage with the material or participate in discussions [3].

2 CORE ISSUES IN IMPROVING THE QUALITY OF ALL-ENGLISH TEACHING

2.1 Structural Shortcomings in Teaching Staff - Inadequate Adaptability of Foreign Teachers

The issue of teacher preparedness is a central concern in Sino-foreign cooperative programs. Many foreign teachers, although highly qualified in their respective fields, may lack sufficient awareness of the learning needs and cultural context of Chinese students. Their teaching methods, which may work well in their home countries, are not always adaptable to the Chinese context, leading to an ineffective transfer of knowledge. Furthermore, foreign teachers often struggle to adjust the content and teaching strategies to accommodate students with varying levels of English proficiency. This lack of adaptability can lead to confusion and frustration among students, undermining the effectiveness of the program. In addition, while the percentage of bilingual teachers in China is increasing, a significant number of local teachers are still not proficient enough to teach completely in English. This creates an imbalance in the quality of instruction, further complicating the delivery of EMI in vocational education [4].

2.2 Disconnection between Curriculum System and Textbooks - Emphasis on Theory in Textbook Selection

Curriculum design is another area in need of reform. The textbooks used in many Sino-foreign cooperative programs are often too theoretical and do not align well with the practical, hands-on nature of vocational education. While the content may be academically rigorous, it often overlooks the real-world application of knowledge, which is central to vocational training. In addition, many textbooks are not adapted to the specific needs of Chinese students, particularly in terms of language proficiency. This disconnect between the curriculum content and the students' practical needs limits the effectiveness of the instruction and hinders students' ability to apply what they have learned in real-world professional settings [5]. Furthermore, the separation of language courses from professional courses exacerbates the problem, as students are unable to apply their language skills directly in vocational contexts, leading to a disjointed learning experience.

2.3 Unscientific Teaching Evaluation Mechanism - Single Evaluation Criterion

Traditional assessment systems in Sino-foreign cooperative programs tend to rely heavily on written exams, which may not accurately reflect students' true language abilities or their capacity to apply knowledge in practical settings. These assessments often emphasize grammar and vocabulary over oral expression, cross-cultural communication, and problem-solving skills. This narrow focus on written testing fails to provide a comprehensive evaluation of students' competencies and does not support the development of practical language skills. Moreover, the absence of dynamic feedback mechanisms, such as continuous assessment or peer evaluations, means that students do not receive timely feedback on their performance, hindering their ability to improve and refine their skills [5].

3 PATHS FOR OPTIMIZING THE QUALITY OF ALL-ENGLISH TEACHING

3.1 Build a "Double-Qualified" International Teaching Team - Strengthen Teacher Training

To improve the quality of teaching, it is essential to cultivate a "double-qualified" international teaching team. This refers to a teaching staff that not only possesses strong academic credentials but also has practical experience in the relevant industries. Regular training programs should be organized for both Chinese and foreign teachers, encouraging cross-cultural exchanges and collaborative teaching methods. Chinese teachers should have opportunities to receive training abroad to learn innovative pedagogical techniques, while foreign teachers should be given cultural orientation and professional development in understanding the unique challenges faced by Chinese students. This integrated approach will help bridge the gap between the two educational systems, promoting a more adaptable and effective teaching environment.

3.2 Develop a "Hierarchical-Integrated" Curriculum System - Hierarchical Teaching

A hierarchical-integrated curriculum system should be developed to accommodate students with varying levels of English proficiency. Students could be divided into basic, intermediate, and advanced classes, with the basic classes focusing on strengthening language skills and the advanced classes emphasizing professional English and specialized vocabulary. Additionally, the curriculum should be designed to integrate language learning with vocational training. For example, students in the tourism management program could participate in scenario-based simulations that incorporate both language learning and real-world applications. This integrated approach ensures that students are able to apply their language skills directly to their professional fields, enhancing both their linguistic and vocational competencies [6].

3.3 Innovate the "Dual-Track Interactive" Teaching Mode - Collaborative Teaching by Chinese and Foreign Teachers

To address the conflict between Chinese and foreign educational approaches, a dual-track interactive teaching mode should be implemented. In this model, foreign teachers would lead case discussions and project-based activities, while Chinese teachers would provide linguistic support and assist with knowledge consolidation. This collaborative teaching structure ensures that both language and content are taught in parallel, allowing students to gain a comprehensive understanding of the subject matter. The use of digital technologies, such as virtual reality (VR) or online learning

platforms, can also enhance this interactive teaching model by providing immersive learning experiences that simulate real-world professional environments [7].

3.4 Improve the "Multi-Dynamic" Evaluation System

To ensure a more holistic approach to evaluation, a multi-dynamic assessment system should be introduced. This system should include both process-oriented and outcome-based assessments, such as classroom participation, group projects, oral presentations, and internships. In addition, students should be encouraged to pursue third-party certifications, such as international language proficiency tests (e.g., IELTS or TOEFL), to validate their English language skills. By incorporating a wider range of assessment methods, educators can provide a more accurate picture of students' abilities, while also fostering a more comprehensive learning experience that values both language proficiency and practical competence [8].

4 CASE PRACTICE AND EFFECTS

The Sino-Swiss cooperative education program in Business and Tourism Management at our college serves as a model for successful implementation of these strategies. The program's focus on collaborative teaching, with Swiss and Chinese teachers working together in a "1+1" teaching team, has resulted in improved student outcomes. The curriculum has been reformed to include more English-language courses taught by foreign instructors, and an English corner has been established to provide students with more opportunities to practice their language skills in real-world contexts. As a result, students have shown notable improvements in both language proficiency and professional competencies.

4.1 Teacher Collaboration

A key feature of the Sino-Swiss cooperative program is the collaboration between Swiss and Chinese instructors, forming a "1+1" teaching team. This model has proved highly effective in bridging the gap between differing educational philosophies and enhancing the quality of teaching. The Swiss instructors, with their rich international experience, bring innovative teaching methods, such as project-based learning, case studies, and real-world industry examples, while the Chinese teachers provide linguistic support and contextualize the content for the students, ensuring that the students can follow the lessons despite any language barriers.

Through regular joint teaching sessions, the Chinese and Swiss teachers have created a cohesive and dynamic classroom environment. Chinese teachers assist with vocabulary building and explaining culturally specific terms, while foreign teachers focus on enhancing students' critical thinking and practical problem-solving abilities. This collaborative approach has allowed students to better engage with complex professional content and gain confidence in both their English language skills and their ability to apply those skills in real-world contexts.

Moreover, the collaboration between the two groups of teachers has fostered mutual respect and professional growth. Chinese teachers have had the opportunity to observe and learn from the innovative, student-centered teaching methods used by their foreign counterparts. In turn, Swiss teachers have gained a deeper understanding of Chinese students' learning needs, enabling them to adjust their teaching methods for better effectiveness. This reciprocal learning process has contributed significantly to improving the overall teaching quality in the program.

4.2 Curriculum Reform

The curriculum of the Sino-Swiss program has undergone significant reform to better integrate English language training with vocational education. One of the key changes has been the increase in English-language courses taught by foreign instructors. These courses focus not only on improving students' general English proficiency but also on providing specialized language skills related to business and tourism management. The use of professional English terminology, case studies, and discussions on international trends in the industry allows students to acquire the vocabulary and skills necessary to succeed in their future careers.

In addition to enhancing the language content of the curriculum, the program has introduced several other initiatives to further support language acquisition. For example, an English corner has been established, providing students with regular opportunities to practice speaking English in informal settings. The English corner hosts various activities, such as debates, group discussions, and guest lectures by native speakers, all designed to encourage students to use English in real-life situations and improve their fluency. These activities not only offer additional language practice but also create a sense of community among students, helping to reduce the anxiety that often accompanies speaking a foreign language.

Furthermore, the curriculum has been structured to emphasize the integration of language and professional skills. For instance, courses in tourism management include simulations and role-playing exercises that require students to use English while addressing real-world business scenarios. This approach helps students see the direct application of their language skills in a vocational context, enhancing both their language proficiency and their understanding of the business and tourism industries.

The reform of the curriculum has also addressed the need for more practical and immersive learning experiences. Field

trips, internships, and cooperative projects with local and international businesses have been incorporated into the program to provide students with hands-on experience in their chosen fields. These opportunities allow students to practice their English in real-world settings, further reinforcing the connection between language and professional skills.

5 CONCLUSION AND OUTLOOK

The future of Sino-foreign cooperative education programs in higher vocational colleges depends on systematic reforms aimed at improving the quality of full-English teaching. These reforms must address the challenges of mismatched language proficiency, insufficient teaching time, and the divergence in educational philosophies between Chinese and foreign educators. By implementing strategies such as building a "double-qualified" teaching team, developing an integrated curriculum, and adopting innovative teaching and evaluation methods, the quality of EMI in vocational education can be significantly improved. Moreover, emerging technologies, such as artificial intelligence and big data analytics, hold great potential for further enhancing the learning experience. Ultimately, continuous innovation and collaboration will be key to cultivating high-quality vocational talents capable of succeeding in an increasingly globalized job market.

CONFLICT OF INTEREST

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

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CORRUPTION, ECONOMIC DEVELOPMENT AND SOCIAL WELFARE IN NIGERIA

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Abstract: This study assessed the impacts of corruption on economic development and social welfare in Nigeria. Mixed-methods research design, combining both quantitative and qualitative methods to collect and analyse data. The study collected secondary data from reputable sources such as the World Bank, International Monetary Fund (IMF) and Nigerian Bureau of Statistics (NBS). National bureau of Statistics estimates the entire population at 230,700,000 as of 2024, through the use of Taro Yamane formula, the population size was reduced to 400 sample size. A survey questionnaire of 400 was administered to the respondents in Nigeria to gather data on their perceptions of corruption and its impact on economic development and social welfare of which 291 returned. Findings of the study shows that corruption reduces economic growth by discouraging investment, reduced productivity, increased business cost, led to inefficient allocation of resources, diversion of government funds for private used, exacerbates poverty and inequality, reduced access to healthcare, education, and infrastructure, deters foreign investment, increased mortality rates, and finally increased social unrest by creating inequality. The study concluded and recommended that government should strengthen anti-corruption institutions, increase transparency and accountability, improve access to basic services and promote public participation.
Keywords: Corruption; Economic development; Social welfare; Nigeria

1 INTRODUCTION

Corruption is a pervasive and complex phenomenon that affects many countries around the world, including Nigeria. It is a major obstacle to economic development, social welfare, and good governance Transparency International [1]. Corruption can take many forms, including bribery, embezzlement, nepotism, and cronyism. In Nigeria, corruption is endemic and has been a major challenge to the country's development since independence Oyinola [2]. The impact of corruption on economic development is well-documented. Corruption can lead to a decline in economic growth, reduce investment, and increase poverty Mauro [3]; Gupta et al., [4]. In Nigeria, corruption has been linked to the country's poor economic performance, including low economic growth, high inflation, and high unemployment CBN [5]. Corruption has also been implicated in the mismanagement of the country's natural resources, including oil and gas HRW [6]. Corruption also has significant social welfare implications. It can lead to a decline in the quality of public services, including healthcare, education, and infrastructure Kaufmann et al. [7]. In Nigeria, corruption has been linked to the country's poor social welfare outcomes, including high infant mortality rates, low life expectancy, and poor education outcomes UNDP [8]. Corruption has also been implicated in the unequal distribution of wealth and income in the country, leading to high levels of poverty and inequality NBS, [9]. The aim of this study is to assess the impact of corruption on economic development and social welfare in Nigeria. Specifically, the study aims to: examine the relationship between corruption and economic development in Nigeria, investigate the impact of corruption on social welfare outcomes in Nigeria, analyse the political economy drivers of corruption in Nigeria and identify policy interventions that can be implemented to tackle corruption and promote economic development and social welfare in Nigeria. This study is significant because it will contribute to the existing literature on corruption and its impact on economic development and social welfare in Nigeria. It will also provide policy recommendations that can be implemented to tackle corruption and promote economic development and social welfare in the country. The study will be guided by the following research questions: what is the relationship between corruption and economic development in Nigeria? how does corruption affect social welfare outcomes in Nigeria? what are the political economy drivers of corruption in Nigeria? and finally, what policy interventions can be implemented to tackle corruption and promote economic development and social welfare in Nigeria?

2 THEORETICAL LITERATURE

2.1 The Rent-Seeking Theory

The rent-seeking theory, developed by Anne Krueger [10], posits that corruption arises when individuals or groups seek to capture economic rents by manipulating government policies or regulations. In the context of Nigeria, rent-seeking behaviour has been linked to the country's oil wealth, where politicians and bureaucrats seek to capture rents by controlling access to oil revenues.

2.2 The Social Contract Theory

The social contract theory, developed by John Rawls [11], posits that governments have a moral obligation to provide basic social services to citizens in exchange for their loyalty and obedience. In the context of Nigeria, the social contract theory suggests that corruption undermines the government's ability to provide basic social services, leading to poor social welfare outcomes.

2.3 The Principal-Agent Theory

The principal-agent theory, developed by Jensen and Meckling [12], posits that corruption arises when agents (politicians and bureaucrats) pursue their own interests at the expense of principals (citizens). In the context of Nigeria, the principal-agent theory suggests that corruption is driven by the self-interest of politicians and bureaucrats, who use their positions to capture rents and accumulate wealth Ribadu [13]. Relevance of these theories to this research work is that the rent-seeking theory helps to explain how corruption arises in Nigeria's oil-rich economy, the social contract theory highlights the moral obligation of governments to provide basic social services to citizens and finally, the principal-agent theory explains how corruption is driven by the self-interest of politicians and bureaucrats.

3 EMPIRICAL LITERATURE REVIEW

Ite [14] investigate political economy of corruption in Nigeria's oil industry. With the use of case study, the study finds out that corruption is driven by the struggle for power and resources in Nigeria's oil industry, promotes economic inequality, undermines the effectiveness of economic policies, corruption reduces trust in government and institutions and also promotes social unrest. The study concluded that corruption is a major obstacle to economic development and social welfare in Nigeria's oil industry and also gave some recommendations.

Ogbuagu [15] looks at corruption and social inequality in Nigeria. Qualitative analysis using case studies and interviews were employed in the study. Findings from the study shows that corruption exacerbates social inequality in Nigeria, undermines the provision of basic social services, including healthcare and education, promotes economic inequality, reduces trust in government and institutions, and promotes social unrest. The study recommended that corruption requires a multifaceted approach that involves strengthening institutions, promoting transparency and accountability, and improving governance.

Adekunle [16] investigate the impact of corruption on economic development in Nigeria. Through econometric analysis using time-series data from 1990 to 2020, the study found out that corruption reduces investment and increases poverty, undermines the effectiveness of economic policies, has a significant negative impact on economic development in Nigeria and also serve as a major obstacle to economic development in Nigeria. The study recommended that the strengthening of institutions and promoting transparency and accountability are essential for reducing corruption and promoting economic development.

Oyinola [2] investigate corruption and economic growth in Nigeria, the study employed econometric analysis using time-series data from 1960 to 2015. Findings of the study shows that corruption reduces investment and increases poverty, corruption undermines the effectiveness of economic policies, economic growth is positively related to human development, and that corruption has a significant negative impact on economic growth in Nigeria. The study concluded that corruption is a major obstacle to economic growth and development in Nigeria and recommended for strengthening of institutions and promoting transparency and accountability are essential for reducing corruption and promoting economic growth.

Acemoglu & Robinson [17] focused on corruption and institutional weakness in Nigeria. The study used historical and institutional analysis to find out that corruption undermines the effectiveness of institutions in Nigeria, institutional weakness promotes economic inequality in Nigeria, that institutional weakness reduces economic growth, and promotes social unrest in Nigeria. The study concluded that institutional weakness is a major driver of corruption in Nigeria and recommended that transparency, accountability, and the rule of law should be promoted and strengthen in Nigeria. Study from the related literature above focuses on the national level, but corruption's impact on economic growth and development at the state and local levels is not explored, does not explore the impact of institutional weakness on corruption at the state and local levels, focuses on the impact of corruption on social inequality but does not explore the role of civil society organizations in combating corruption, and finally, the findings of the empirical literature reviewed does not explore the role of international organizations in combating corruption. Base on this literature gap, this study is being carried out in other to fill up the above literature gap.

4 METHODOLOGY

This paper aim to assess the impacts of corruption on economic development and social welfare in Nigeria. Mixed-methods research design, combining both quantitative and qualitative methods to collect and analyse data. The study collected secondary data from reputable sources such as the World Bank, International Monetary Fund (IMF), Nigerian Bureau of Statistics (NBS), National bureau of Statistics estimates the entire population at 230,700,000 as of 2024, through the use of Taro Yamane formula, the population size was reduced to 400 sample size. A survey questionnaire was administered to a sample of respondents in Nigeria to gather data on their perceptions of corruption and its impact on economic development and social welfare. A purposive sampling technique will be used to select respondents who

have expertise and experience in the area of corruption and economic development. Base on purposive sample technique, the sample size of 400 was distributed equally a state (1) selected from each of the four (4) region in Nigeria [North (Kano), South (Delta), East (Anambra) and West (Lagos)] of which 291 returned. Descriptive statistics such as means, frequencies, and percentages were used to summarize the data. Inferential statistics such as regression analysis and correlation analysis were used to analyse the relationship between corruption and economic development and social welfare.

4.1 Data Presentation and Analysis

The data was presented to suit the research objectives. Primary and secondary data were reviewed and questionnaire was distributed based on region, state, specific demographic characteristics such as age, gender, status and all other demographic variables were calculated using percentages (See Table 1 and 2).

Table 1 Regional and State Distributions of the Questionnaires

Region	No. of State in Region	Names of State Selected	No. of Questionnaires Distributed	No. of Questionnaires Returned
North	18	Kano	100	71
South	6	Delta	100	80
East	5	Anambra	50	67
West	7	Lagos	50	73
			400	**291**

Source: authors compilation (2025)

Table 2 Socio-demographic characteristics of the respondents

Socio-Demographic Characteristics	Frequency	Percentage
Gender		
Male	167	57.4
Female	124	42.6
Total	291	100
Status		
Single	185	63.6
Married	106	36.4
Total	291	100
Age Range		
18-25 years	92	31.6
26-33 years	112	38.5
34-40 years	87	29.9
Total	291	100
Highest Educational Qualification		
FSLC/WAEC	54	18.6
NCE/ND	77	26.5
HND/BSC	101	34.7
MSC/PHD	59	20.2
Total	291	100
Total	291	100

Source: Authors Survey, 2025.

Data in table 1 above, illustrate the details of the regional and state distribution of the population. The population was distributed equally (100) to each of the four (4) region in Nigeria of which a state was selected from each of these region. Among the 291 respondents, majority are single accounted for 185 (63.6%) of the total. The gender distribution is 124 females (42.6% of the total) and 167 males (57.4% of the total). When it comes to age, most of the respondents are over 26-33 years of age; Similarly, when asked about their educational status, the highest respondents have HND/BSC 101 (34.7%) and the lowest respondents have FSLC/WAEC.

4.2 Data Analysis

In order to determine the appropriateness of the research questions, the data of this study are presented and analysed below using standard deviation, SPSS software and Cronbach alpha correlation test of 0.80 coefficient level.

4.3 Research Question

What are the impacts of corruption on economic development and social welfare in Nigeria.?

Table 3 Respondents' Perceptions on the Impacts of Corruption on Economic Development and Social Welfare in Nigeria

S/N	Factors	Mean	Standard Deviation	Decision
	Impact of Corruption on Economic Development			
1	Corruption reduces economic growth by discouraging investment, reducing productivity, and increasing the cost of doing business.	**3.80**	**3.57**	**True**
2	Corruption leads to the inefficient allocation of resources, as government funds are diverted to private pockets rather than being used for public goods and services.	**4.21**	**3.65**	**True**
3	Corruption exacerbates poverty and inequality by reducing access to basic services such as healthcare, education, and infrastructure.	**3.50**	**3.27**	**True**
4	Corruption deters foreign investment, as investors are wary of investing in countries with high levels of corruption.	**3.39**	**3.29**	**True**
	Impact of Corruption on Social Welfare			
5	In Nigeria, corruption has led to reduced access to basic services, with millions of Nigerians lacking access to healthcare, education, and clean water.	**3.96**	**3.64**	**True**
6	Corruption reduces educational outcomes by reducing access to quality education.	**3.72**	**3.44**	**True**
7	In Nigeria, corruption has led to increased mortality rates, with the country's maternal mortality rate increasing from 545 deaths per 100,000 live births in 2008 to 814 deaths per 100,000 live births in 2017.	**3.39**	**3.58**	**True**
8	Corruption reduces educational outcomes by reducing access to quality education.	**4.06**	**3.67**	**True**
9	Corruption has led to increased social unrest by creating inequality and reducing access to basic services, with millions of Nigerians protesting against corruption and poor governance.	**4.46**	**4.01**	**True**
	Average Total	**3.77**	**3.57**	**Very Good**

Source: Author's survey, 2025.

As deduced from table 3, item 1-9, the table aims to discuss the impact of corruption on economic development and social welfare in Nigeria. As shown in the table above, the aggregate mean of the items is above the mean criterion of 3.0. Also, based on all responses, the standard deviation is 3.57 and the total mean is 3.77. Based on the findings above, the respondents anonymous agreed that corruption has significant negative impact on economic development and social welfare in Nigeria.

5 DISCUSSION OF FINDINGS

Responses to the research questions revealed the impact of corruption on economic development and social welfare in Nigeria. The findings of the study reviewed that corruption reduces economic growth by discouraging investment, reducing productivity, and increasing the cost of doing business, leads to the inefficient allocation of resources, as government funds are diverted to private pockets rather than being used for public goods and services, exacerbates poverty and inequality by reducing access to basic services such as healthcare, education, and infrastructure, corruption deters foreign investment, corruption led to reduced access to basic services, with millions of Nigerians lacking access to healthcare, education, and clean water. Also corruption led to increased mortality rates, reduces educational outcomes by reducing access to quality education, and finally increased social unrest by creating inequality and reducing access to basic services. The study is in line with the findings of Ite [14], Ogbuagu [15] that corruption promotes economic inequality, social unrest, undermines the provision of basic social services such as healthcare and education, Adekunle [16], Oyinola [2] and Acemoglu & Robinson [17] that corruption reduces investment, increases poverty and reduces economic growth.

6 CONCLUSION

Corruption has had a devastating impact on Nigeria's economic development and social welfare. The country's economic growth has been hindered, poverty and inequality have increased, and access to basic services has been reduced as a result of corruption. To address these challenges, the Nigerian government must implement policies to reduce corruption, increase transparency and accountability, and improve access to basic services.

7 RECOMMENDATIONS

The following are recommended for policy makers and government of Nigeria:
1. government should strengthen anti-corruption institutions such as the Economic and Financial Crimes Commission (EFCC) and the Independent Corrupt Practices Commission (ICPC).
2. government should increase transparency and accountability by implementing policies such as the Freedom of Information Act and the Open Government Partnership.
3. government should improve access to basic services such as healthcare, education, and infrastructure by increasing investment in these sectors.
4. government should promote public participation in governance by increasing citizen engagement and participation in decision-making processes.

CONFLICT OF INTEREST

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

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BOARD AND GENERAL MEETINGS OF A COMPANY IN NIGERIA: A LEGAL DISCOURSE

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Abstract: This paper seeks to discuss board and general meetings of a company in Nigeria. Hence, as one of the most important post-incorporation compliance requirements for a company in Nigeria is the direction for its directors, management and members to have specific types of meetings for the purpose of running the course of the company's progression as well as for the purpose of passing resolutions authorizing certain actions or transactions of the company. Such types of meetings are known as board and general meetings as provided under the Companies And Allied Matters Act, 2020. Furthermore, this research work will be addressing the following subtopics: What board and General meetings entails, procedures, types, quorum, notices and resolutions of board and general meetings; reasons for board and general meetings, comparative discourse of board and general meetings, as well as raising observations and recommendations.
Keywords: Board meeting, General meeting, Statutory meeting, Annual General meeting, Notice

1 INTRODUCTION

In accordance with the provision of the Company And Allied Matters Act 2020 Board meeting and General meetings, which could be statutory meeting, annual general meeting, extraordinary General meeting, as well as Court- Ordered meeting are very important and even mandatory for the smooth running of a company, as such, board meeting is to be held by directors of a company which is meant to transact on matters over which the directors have power [1]. Whereas the General meeting is the Company's highest decision-making body, at which the shareholders/members exercise their voting rights. At the General Meeting decisions are taken regarding matters such as the annual accounts, dividend, election of the Board of Directors and the auditor as well as their remuneration. It is pertinent to state that, for the effective discharge of the Board of Directors oversight and leadership roles, the Board is expected to meet regularly to deliberate and take decisions on key issues. Principle 10 of the Nigerian Code of Corporate Governance, 2018 (NCCG) provides that "Meetings are the principal vehicle for conducting the business of the Board and successfully fulfilling the strategic objectives of the Company [2].

1.1 Definition of Terms

1.1.1 Board meeting

This is the type of meeting held by the directors of a company, for the managing and directing the affairs of the company [3].

1.1.2 General meeting

General meetings refers to the meeting of shareholders/ members and other authorized persons that are entitled to attend such as auditors, debenture holders and directors.

The members of the Company in General meeting are the other organ of the Company apart from the Board of Directors. The members are an organ of the Company when they function at the general meeting of the Company [4].

2 BOARD MEETING

The Board of Directors (the "Board") of a company play a crucial role in its success or failure; more often than not, successful companies are headed by effective Boards. The Board of a company is responsible for providing entrepreneurial and strategic leadership, and also serves as a link between investors, shareholders, and the company. Although this is one aspect that is typically overlooked by startups and small businesses in structuring their operations, it plays a key role in building long-lasting businesses. The applicable legislation for the conduct of Board meetings in Nigeria is the Companies and Allied Matters Act 2020. Boards are also to be guided by the Articles of Association of the Company and the Nigerian Code of Corporate Governance 2018 as issued [5].

Hence, the role of the board is to exercise oversight and control over the Company, to ensure that management acts in the best interest of the shareholders and investors whilst sustaining the prosperity of the Company.

2.1 The Structure of Board Meeting

Code of Corporate Governance 2018 as issued recommends that the Board of a Company should be of a sufficient size to effectively undertake and fulfill its business and to constitute a quorum. The Board should comprise of a mix of the following directors and structured in the same manner: (i) Executive Director (ED) – The ED should be an employee of the Company, involved in the operations of the Company who provides support to the Managing Director; (ii) Non-Executive Director (NED) – The NED should contribute his/her expertise and independent judgment on issues of strategy on the Board and should not be an employee of the Company; (iii) Independent Non-Executive Director (INED) – The INED should bring a high degree of objectivity to the Board for sustaining stakeholder trust and confidence and should not be an employee of the Company; and (iv) Managing Director (MD) – The MD should be an employee of the Company involved in its daily operations, with a good knowledge of the Company's business[6].

2.2 Proceedings of Board Meeting

By virtue of Section 289 of the Companies And Allied Matters Act, 2020 the directors of a company may meet together for the dispatch of business, adjourn and regulate their business as they think fit. The first board meeting must be held not later than six (6) months after the incorporation of the company. Questions at the meeting shall be decided by maturity of votes. The chairman has a casting vote in case of equality of votes [7].
A director may at any time summon a meeting of the directors; and the secretary on the requisition of a director, shall at any time, summon a meeting of the directors. The directors elect a chairman of their meetings, and determine the period for which he is to hold office. If no chairman is elected, or if at any time the chairman is not present within five (5) minutes after the appointed time for the holding of the meeting, the directors present may choose one of them as chairman.
Directors may delegate any of their powers to a managing director or to committees consisting of such member(s) of their body as they think fit; and such managing director or committees so delegated must conform to the regulations of the directors. A committee has the power to elect its own chairman and a substitute where he is absent. The chairman also has a casting vote.

2.3 The Quorum for Board Meeting

The quorum required for the transaction of the business of directors are a minimum of two directors where there are not more than six directors. But where there are more than six directors, the quorum is one-third of the number of directors, and where the number of directors is not a multiple of three, then the quorum is one third to the nearest number [8].
In a situation Where the board is unable to act because a quorum can not be formed, the general meeting may act in place of the board and where a committee is unable to act because a quorum can not be formed, the board may act in place of the committee where the committee can not form a quorum.

2.4 Notice of Board Meeting

A director/the company secretary (acting on the instructions of a director) may at any time summon a meeting. A statutory notice of at least 14 days, is to be provided by the company secretary of the meeting to all the Board members with the board pack (containing all necessary documents for the meeting). Such notice can, however, be waived upon a unanimous agreement of all the directors to waive this right .
It is pertinent to state that none compliance with the requirement to give notice will invalidate the meeting. Also, notice to any director who is outside Nigeria for the time being is not necessary; though, the notice may be sent to an address in Nigeria if he has given one [9].

3 GENERAL MEETINGS OF COMPANIES

Company General Meetings is so essential and important and forms part and parcel of corporate Governance. Hence, General meeting refers to the meeting of shareholders/ members, and other authorized persons that are entitled to attend, such as auditors, debenture holders and directors. It is principally driven by members and shareholders of the company. Although the directors are in charge of day to day management of a company, yet there are certain decisions that can not be resolved at the board level. Thus, such issues can then be referred to the members at the general meetings to decide.
The members in general meeting can take certain decisions to control the management of the company, and can also utilize the general meeting to ratify the acts of the directors which were ultra vires. Although non business organization, such as incorporated Trustees are not statutorily compelled to hold Annual General meeting, the constitution of such organization usually provide for general meetings in form of annual general meeting and Extra-Ordinary general meeting, in order to take advantage of general of general meetings for effective corporate governance [10].
There are four types of companies General Meetings viz. (a) Statutory Meeting (b) The Annual General Meeting (c) The Extra Ordinary General Meeting (d) Court- Ordered Meeting.

3.1 Statutory Meeting

This type of meeting is prescribed for public companies only. It is to be held within 6 months from the date of incorporation of the company. The meeting is principally to consider the Statutory Report which must be sent to the members at least 21 days before the date of the meeting by the directors to every member, and also for the discussion of any matter relating to the formation of the company and commencement of business, as well as considering matters arising from statutory report. The contents of the statutory report are:

(a)The total number of shares allotted, distinguishing shares allotted as fully or partly paid up otherwise than in cash and stating in the case of shares partly paid up, the extent to which they are so paid up, and either case the consideration for which they have been allotted.

(b)The total amount of cash received by the company in respect of all the shares allotted, distinguished as aforesaid.

(c)The names, addresses and descriptions of the directors, auditors, managers (if any), and secretary of the company.

(d)The particulars of any pre-incorporation contract together with the particulars of any modification or proposed modification thereon.

(e)Any underwriting contract that has not been carried out and the reasons therefor.

(f) The arears (if any) due to calls from every director.

(g)The particulars of any commission or brokerage paid or to be paid in connection with the issue or sale of shares or debentures to any director or to the manager,

(h)An abstract of the receipts of the company and of the payments made from them up to a date within seven days (7) of the date of the report, which shall, as far as it relates to the shares allotted by the company, and to the cash received in respect of such shares and to the receipts and payments on capital count, be certified as correct by the auditors of the company.

3.1.1 Resolution on statutory report

If a member wishes to propose a resolution on any matter arising out of the statutory report, from the date of his receipt of the statutory report, he must give a further 21 days notice to the company, of his intention to propose such a resolution in the general meeting.

3.1.2 The effect of non-compliance with statutory meeting

There are two main effect of non-compliance with statutory meeting or failure to hold statutory meeting and deliver statutory report as and when due. The two main consequences are as follows:

(a)By failure to hold a statutory meeting is an offence, the company and all officers are liable to a fine [11].

(b)Failure to hold a statutory meeting or to submit statutory report to the Corporate Affairs Commission is a ground for winding up by the court.

3.2 Annual General Meeting

Every company (private or Public) is to hold an Annual General Meeting. The notice calling it must describe it as an Annual General Meeting. Not more than 15 months should elapse between the date of one annual general meeting and the next. However, the first annual general meeting of a company may be held within 18 months of its incorporation i.e. the company need not hold its first annual general meeting in the 1st or 2 year of its incorporation. For example if a company was incorporated on 1st November 2020, it need not hold annual general meeting in 2020 or 2021 but must hold it at least in April 2022. For subsequent annual general meetings, Corporate Affairs Commission may extend the time for holding the meeting by not more than 3 months. The notice for the Annual general meeting must be sent to members at least twenty-one (21) days before the meeting, but shorter notice is allowed if agreed to by all the members entitled to attend and vote.

3.2.1 Failure to hold annual general meeting

Failure to hold an annual general meeting or to comply with the directives of CAC towards holding an AGM is an offence, and the companies and defaulting officers are liable to fine. The CAC may equally on application of any member, call or direct the calling of a general meeting, and give directives as it thinks fit that one member of the company present, in person or by proxy shall be deemed to constitute a quorum which may take decisions binding on all the members, and may be deemed to be an Annual General Meeting.

3.2.2 Procedures to compel holding an Annual General Meeting where a member applies to corporate affairs commission

The following procedures would be adopted to compel the holding of Annual General Meeting:

(a)A member can apply to the CAC urging the CAC to call or direct the calling of a meeting. The CAC can grant an extension not exceeding three(3) months from the time the meeting ought to hold.

(b)If a member application is timely and the CAC grants the Order to hold the meeting in that year, the meeting is clearly an AGM of that same year. However, if application and Order are made in the next year or following year then the meeting is not to be treated as the company's AGM of the previous year, unless at the meeting the company resolves that it shall be so treated.

(c)If the company resolves that it should be treated as its AGM of previous year (likely that there would be another outstanding AGM of the current year), a copy of the resolution shall within 15 days after its passage, (treating the meeting held in current year as the AGM of a previous year), must be filed with Corporate Affairs Commission.

(d)CAC can give also give a direction that one member of the company present in person or by proxy in the said meeting, may apply to the federal High Court for an Order to take decision which shall be binding on all members.

3.2.3 Business transaction at Annual General Meetings

The business transacted at an annual general meeting includes ordinary business and special business [12]. The ordinary business of the meeting includes declaration of dividend, presentation of the financial statement, Directors' and Auditors' report, election of directors to replace those retiring, appointment and remuneration of Auditors and appointment of members of the Audit Committee. Any other business is deemed special business.

4 Extra-Ordinary General Meeting

This type of meeting can be held at any time. It is meant to deal with any matter that is so important that it cannot wait until the next Annual General Meeting. The Board of Directors may or any Director, if there are no other Directors in Nigeria to form a quorum, whenever they or he deems fit convene an Extra-Ordinary General Meeting [13].

Extra-Ordinary General Meeting may also be requisitioned by members holding not less than one tenth of the paid up capital or not less than one tenth of the total voting rights of members where the company has no share capital. If after 21 days of the deposit of the notice of requisition the Directors fail to call a meeting, the requisitionists may themselves call the meeting. All business transacted at Extra-Ordinary General Meeting are deemed special business. Consequently, none of the items designated as ordinary business of Annual General Meeting can be transacted at EGM. Also, a matter which constitutes ordinary business can not be discussed at EGM, but only at AGM. For example, removal of director is not an ordinary business but appointment of a director is an ordinary business. Therefore, a Director can be removed at EGM but substantive director can not be appointed at EGM. To fill the gap, the removed director can be replaced as casual vacancy pending the next AGM for regularization of the appointment.

4.1 Persons that can Convene an Extra-Ordinary General Meeting

Any of the following persons can convene an extra-ordinary General meeting of a company.
(a)Board of Director
(b)Any Director if other directors are not within Nigeria and quorum may be affected.
(c)Requisition by members holding not less than one-tenth of the paid up voting share capital (or in the case of a company without share capital , members holding one-tenth of the voting rights), upon compliance with the rules of procedure for members requisitioned EGM.

4.2 The Procedures for Members Requisitioning Extra-Ordinary General Meeting

The following procedural steps should be complied with for a validly convened EGM by requisition of members:
(a)Members requisitioning must possess the voting share capital or voting rights: not less than one-tenth of the paid up voting share capital (or in the case of a company without a share capital, members holding one-tenth of the voting rights). Otherwise, the Directors may reject the Resolution and it cannot be debated or put to the vote at the meeting.
(b)The Requisitionist must deposit a signed requisition at the registered office of the company stating “the objects of the meeting”. The resolution which they intend to propose.
(c)If the directors fail within 21 days of the deposit of the requisition to convene a meeting, the requisitionists, or any one or more of them, representing more than ½ of the total voting rights of all of them, may themselves convene a meeting for a date within 3 months from the deposit of the requisition to transact the business described in their requisition.
(d)Any reasonable expenses of the requisitionists in convening the meeting are then payable by the company and reScoverable from the directors.
(e)If no quorum is present at the requisitioned meeting within one hour from the time appointed for the meeting it is dissolved, i.e that is end of the matter, there is no adjournment.

4.3 Venue of Meetings

All Statutory and Annual General Meetings shall be held in Nigeria, with the exceptions of small companies [14]. A private company may hold its general meetings electronically provided that such meetings are conducted in accordance with the articles of the company.

4.4 Notice of Meeting

All General Meeting requires 21 days of notice calculated from date it is sent out or posted to the date of the meeting [15]. However, shorter notice could be given: (a) for Annual General Meeting if it is agreed to by all the members entitled to attend and vote at the meeting., (b) For any other meeting by a majority holding not less than 95% in nominal value of the shares with right to attend and vote. The Importance of the Notice is to adequately inform the member of the kind of meeting he is called to attend, the venue, the business or items to be discussed so as to prepare either to participate in the discussion or even to understand what is going to be discussed.

4.5 Content of Notice

To achieve aim and purpose, notice must be clear in its contents. It must not be misleading or ambiguous. Thus some important information must be contained in it. The contents of notice as provided for in section 242(1) of the Companies and Allied Matters Act, 2020 are: place, date, time general nature of business to be transacted in detail to enable members decide whether the issue to be discussed are of interest to them and whether to attend the meeting. If there is going to be a special resolution, the terms of the resolution should he included in the notice (normally the resolution is quoted). In Annual General Meeting, it will suffice to state in the notice that the purpose of the meeting is to transact the ordinary business of an annual general meeting.

4.6 Persons Entitled to Notice

The only persons entitled to receive notice of a general meeting are as follows:
(a)Every member
(b)Every person upon whom the ownership of a share capital devolves by reason of his being a legal representative, receiver or a trustee in bankruptcy of a member
(c)Every director of the company
(d)Every auditor for the time being of the company
(e)The secretary

4.7 Service of Notice

A notice may be given by the company to any member either personally or by sending it by post to him or to his registered address, or (if he has no registered address within Nigeria) to the address, if any, within Nigeria supplied by him to the company for the given of notice to him.

4.8 Failure to Give Notice of Meeting

Failure to give notice of any meeting to a person entitled to receive it invalidates the meeting as well as the businesses transacted and the resolutions passed at such meeting unless such failure is an accidental omission on the part of the person giving the notice. For instance, HON. JUSTICE ONYEKACHI AJA, JCA held in Oteri Holdings Ltd v. Mofta West Africa Ltd & Ors. (2021) LPELR-54853 (CA) that: “Failure to give notice of a meeting to a person entitled to receive it shall invalidate the meeting, unless such failure is an accidental omission on the part of the person(s) giving the notice”.

5 COURT ORDERED MEETING

Where it is impracticable for any reasons to call or conduct a meeting of the company, the Federal High Court may on its own motion, or on application of directors of persons entitled to a vote at such meeting, order a meeting to be called [16]. See also the case of Okeowo v. Migliore (1979) 11SC 138;(1978 A11 NLR. The Federal High Court can order a meeting of company in the following circumstances:
(a)If meeting of the company is impracticable to hold
(b)Demise of all directors and shareholders
(c)Restructuring scheme such as merger, compromise, arrangement or reconstruction between two or more companies.
(d)Where a company makes a compromise with its members or creditors but not involving sale of assets of the company.

5.1 Resolutions

There are two types of resolutions as provided under the Companies and Allied Matters Act, 2020 viz: (1) Ordinary resolution, which is passed by a simple majority of votes, cast by members in person or by proxy. Ordinary resolution is presumed when the Act simply requires the passing of a resolution by the Company, without saying which (ordinary or special). (2) Special resolution is passed by at least ¾ (three- forth majority) of members voting in person or by proxy at a general meeting of which not less than 21 days notice of intention to propose the resolution has been given . Shorter notice may however be given if agreed to by majority holding not less than 95% of the nominal value of the shares or by members representing not less than 95% of the total voting rights in case of company not having share capital.

5.2 Minutes of Meeting

This is a record of all the proceedings made at any meeting. The minutes of meeting is a record of all salient issues, matters, discussions, and deliberations made in a meeting. It includes the agenda of the meeting, the decisions made, tasks or actions to be taken, and it should be signed by the chairman and secretary of the company.

The Minutes book is proof that a meeting was duly convened. Hence, every company is required to keep a record of proceedings and decisions taken at all board meetings, board committee meetings, or general meetings in the Minutes of the meeting.

6 THE COMPARATIVE LINES BETWEEN BOARD MEETING, GENERAL MEETING AND EXTRA-ORDINARY GENERAL MEETINGS

Looking at the nature of how Board and General meetings are held, or ought to be held, and the purpose in which a company should hold each of those meetings by law, there's the need to point out the major comparative differences between the two. These comparative differences are:

(a)Boarding meeting basically, is meant for all the directors of the Company, whereas, General meeting has to do with all the shareholders or members of the company as distinct to board meeting.

(b)The first Board meeting must be held not later than six (6) months after the incorporation of the Company. Whereas, for the Company General meeting; it's statutory meeting must be held within six (6) months, and within eighteen (18) months for the first Annual General meeting.

(c)The Quorum that is necessary for the transaction of business in board meetings is 2 members where they are not more than six (6). And where they are more than six the quorum shall be one-third. Whereas in general meeting, the quorum is also formed by one-third of the total members of the Company, and where the number of members is six or less, the quorum is two members.

(d)In Board meetings, a board of director can not attend the meeting by proxy. Whereas, in general meetings, a member can attend the meeting physically or by proxy and shall be deemed to constitute a quorum in a meeting where quorum is needed.

(e)The statutory notice for all types of General meeting is 21days from the date in which the notice was sent out. Whereas, for board meeting, the statutory requirement is a fourteen (14) day notice in writing to all the directors entitled to receive the notice.

(f)Failure to give out the required notice of meeting in either board or general meetings can invalidate the meeting.

(g)The Extra-ordinary General meeting (EGM) is any meeting other than the Annual General meeting in which business relating to Company's management are transacted. This category of meeting is not run regularly, instead, it is for urgent and unforeseen matters.

(h)An extraordinary meeting can be held on anyday including national holiday, and at anytime during the day. Such meetings can be convene by shareholders and directors of the company.

6.1 OBSERVATIONS

This paper observed at the course of running this research that the Companies and Allied Matters Act, 2020 recognizes two major types of meetings of a company, namely, the board of directors meeting and the general meeting which involves the shareholders. The Board of directors have supremacy over the general meetings in matters of day-to-day management of the company, however, there is no any provision under CAMA that has expressly states the academic qualification for these board of directors of the company in order to enhance performance and productivity of the Company. Secondly, it has also been observed that voting in all board and general meetings must be carried out in person. Hence, the below recommendations.

6.2 Recommendations

Having observed the lacuna in terms of qualification of board of directors and the right to vote during meetings through other means than proxy system or physical attendance, I suggest thus:

Firstly, to enhance performance and productivity of the board of directors to Companies, there should be a provision under CAMA specifying the quality of persons to be appointed as directors in terms of academic qualifications, knowledge and technical skills. Hence, the Companies and Allied Matters Act, 2020 be amended to reflect this view.

Secondly, it is recommended in this research that the Companies And Allied Matters Act should be amended to dispense with the proxy system and or physical attendance and voting at the meeting. And instead make provision for right to vote by post, email or text messages. As this system is workable in other climes such as the United State of America.

7 CONCLUSION

The Board and General meetings of the Company each have its purpose. It is therefore important for the company to observe the holding of these meetings. There are commensurate consequences for not holding the meetings. A good company management will ensure that the meetings are held when due to ensure smooth administration of the company. This is to avoid the unpleasant situation where a minority may go to court to secure an order to hold a one-man meeting.

CONFLICT OF INTEREST

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

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BLOCKCHAIN TECHNOLOGY EMPOWERING RURAL TOURISM: APPLICATION SCENARIOS AND SOLUTIONS

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Abstract: In the context of the deep integration of rural revitalization strategy and digital technology, the digital transformation of rural tourism faces threefold dilemmas of efficiency, trust, and cultural preservation. This paper, taking blockchain technology as a starting point, systematically explores the internal logic and practical paths of its empowerment in rural tourism, aiming to construct a "technology-scenario-governance" collaborative framework to resolve structural contradictions in industrial development. The study is based on the Social-Technical Systems Theory (SST), adopting interdisciplinary research methods, and uses typical cases to demonstrate how blockchain technology drives high-quality development in rural tourism by reconstructing production relations. The study finds that blockchain technology, through mechanisms of "trusted data flow" and "autonomous smart contracts," reshapes the power structure, value transfer, and governance models in rural tourism. Its distributed ledger feature solves issues such as data islands and the loss of trust in stakeholders, while its DAO governance and Token economic models activate villagers' participation. The paper also proposes four-dimensional application scenarios covering trusted service chains, value co-creation chains, green governance chains, and inclusive finance chains, achieving the reconstruction of consumption scenarios, cultural IP development, ecological supervision optimization, and investment and financing innovation through technological integration. Furthermore, the paper warns of three major challenges for the technology's implementation: the gap between computing power and rural infrastructure, the institutional coupling difficulties between on-chain and off-chain systems, and the conflict between technological rationality and rural ethics. It proposes a "lightweight blockchain + edge computing" technical solution and designs a "multi-party chain governance committee" system to balance the rights and responsibilities of government, enterprises, and villagers, incorporating "ethical coding" into the design of technology to embed rural culture. Future research should focus on the integration of the metaverse, AI, and blockchain technologies, enhancing service personalization while preventing cultural alienation risks, thus providing solutions for rural common prosperity that combine technological innovation with the protection of cultural roots.
Keywords: Blockchain technology; Rural tourism; Application scenarios

1 INTRODUCTION

The rural tourism sector under the rural revitalization strategy urgently requires digital transformation. As the overarching strategy for rural development in the new era, the rural revitalization strategy explicitly states the goals of "prosperous industries, beautiful rural environments, civilized rural customs, effective governance, and improved livelihoods." Rural tourism, as an important carrier of rural industrial revitalization, is transitioning from the traditional "farm stay" model to a more comprehensive, quality-driven, and intelligent approach. According to data from the Ministry of Culture and Tourism's Rural Tourism Data Center, in the first three quarters of 2024, China's rural tourism received 2.248 billion visitors, accounting for 52.3% of total domestic tourism, with total revenue reaching 1.32 trillion Yuan, accounting for only 30.3%, reflecting issues such as low added value in the industry chain, serious homogenization, and insufficient digitalization. At the same time, the National Development and Reform Commission's "Digital Rural Development Strategy Outline" emphasizes "promoting the deep integration of digital technology with agricultural and rural development." In this context, the digital transformation of rural tourism is not only an inevitable choice driven by technology, but also a key path to resolve the structural contradiction of "high traffic, low income."

In recent years, blockchain technology, due to its "distributed trust" nature, has been incorporated into national strategy. The State Council's "14th Five-Year Plan for Digital Economy Development" includes blockchain as a "strategic and forward-looking field," and the Ministry of Culture and Tourism's "Opinions on Promoting the High-Quality Development of Digital Cultural Industries" emphasizes the "exploration of innovative applications of blockchain in the cultural and tourism sectors." However, there is still a significant gap between policy benefits and technological implementation: first, the technical adaptation contradiction. Most existing blockchain solutions are designed for urban high-computing scenarios and are disconnected from rural low-bandwidth, weak computing infrastructures. For example, the high gas fees and energy consumption of Ethereum's public chain are incompatible with the payment capabilities of rural micro-economies. Second, there is a lack of governance coordination. Rural tourism involves multiple stakeholders such as governments, enterprises, villagers, and tourists, and the on-chain rules and off-chain systems lack effective coupling. For instance, a "homestay alliance chain" pilot in a province ran into problems because villagers' awareness of data sovereignty was weak, leading to the "empty circulation" of on-chain data. Third, there are concerns about cultural conflicts. The logic of blockchain driven by technological rationality may erode the ethical

relations within rural society. For instance, the rigidity of smart contracts in execution conflicts with the flexible governance tradition in rural "social relations."

So how does blockchain technology systematically reconstruct rural tourism scenarios? Existing research often focuses on single technical functions such as traceability and payment, lacking holistic consideration of the "technology-scenario-governance" collaborative mechanism. This study attempts to answer the following questions: How can blockchain technology deeply integrate with the complex social networks of rural tourism? How can "lightweight" technical solutions be designed to address the constraints posed by the weak digital infrastructure in rural areas? How can on-chain rules reconstruct the trust relationships and benefit distribution mechanisms of multiple stakeholders? Based on this, this paper attempts to construct a "technology-scenario-governance" collaborative framework at the theoretical level, proposing a three-level analysis framework: first, from the technical layer, analyzing blockchain's consensus algorithms, smart contracts, and other technical features; second, from the scenario layer, deconstructing the core scenarios of rural tourism such as consumption chains, supply chains, and governance chains; third, from the governance layer, designing a collaborative mechanism for government guidance, market-driven forces, and villagers' participation. This framework breaks through the limitations of "instrumental rationality" and reveals the bi-directional interaction between technological empowerment and social construction, providing a new paradigm for digital rural research. In practical terms, it addresses the trust crisis and collaboration difficulties in rural tourism. Currently, trust issues in rural tourism manifest in three aspects: first, tourists' doubts about false advertising, overcharging, and service quality; second, villagers' rejection of external capital due to land transfer disputes; third, the government's failure to effectively supervise issues like ecological data falsification. Blockchain can solve this by using features like "immutable timestamps" and "multi-party consensus mechanisms" to create a trusted data flow throughout the entire process of "tourist booking-service delivery-post-evaluation."

2 LITERATURE REVIEW AND THEORETICAL GAPS

2.1 Research Trajectory of Rural Tourism Development

2.1.1 Concept evolution: from "suburban leisure" to "reproduction of rural values"

The concept of rural tourism has continuously evolved in response to shifting urban-rural dynamics and technological advancements. Early studies (Lin Gang, 2006) defined rural tourism as "short-distance leisure activities in suburban areas," primarily emphasizing urban residents' demand for natural landscape consumption. However, since the advent of the 21st century and the implementation of the rural revitalization strategy, the conceptual focus of rural tourism has transitioned toward the "reproduction of rural values". First, economic value production has expanded beyond the traditional agritainment-based economy to a more integrated industrial model that combines "cultural tourism, agriculture, and e-commerce". For instance, blockchain technology has been leveraged to enhance "agricultural product traceability and the integration of cultural tourism intellectual property (IP)", thereby increasing added value. Second, cultural value production has undergone a transformation, with rural areas shifting from being mere "objects of external gaze" to becoming "active cultural subjects". The digitization of intangible cultural heritage and the promotion of localized narratives have emerged as key research focal points. A notable example is Zhangjiajie's application of blockchain technology to establish digital ownership of Tujia brocade, facilitating the conversion of cultural resources into valuable assets. Third, ecological value production has moved away from a resource-consumptive model toward a more environmentally sustainable approach, emphasizing carbon footprint tracking and incentives for eco-friendly behaviors. In Jiangsu Province's pilot initiatives, blockchain technology has been employed to record tourists' ecological behavior data and integrate it into a carbon credit exchange system. This evolutionary trajectory highlights a fundamental paradigm shift in rural tourism—from spatial consumption to value co-creation. Nevertheless, the digital transformation of rural tourism continues to face structural challenges that warrant further exploration.

2.1.2 Pain points: data silos, subject dishonesty, and ecological loss

Xu Hong and other scholars have systematically identified three core challenges confronting rural tourism[1]. First, the issue of data fragmentation. The data systems utilized by governments, enterprises, and local villagers remain disconnected, hindering seamless information exchange. For instance, rural tourism reservation systems and homestay management platforms operate independently, leading to inefficiencies and an imbalance in tourist distribution. Second, a crisis of trust among key stakeholders. Tourists often express skepticism regarding service quality (e.g., misleading advertising), villagers exhibit distrust toward external capital inflows (e.g., disputes over land transfers), and government authorities question the efficacy of regulatory mechanisms (e.g., potential falsification of ecological data). Empirical studies indicate that 72% of rural tourism-related complaints stem from information asymmetry. Third, environmental degradation. Excessive development has significantly strained the ecological carrying capacity of rural areas. While blockchain technology presents a potential solution through an "immutable environmental monitoring data chain" that could facilitate early warnings for ecological red lines, current implementations remain largely theoretical[2]. These challenges underscore the dual predicament of "insufficient technological empowerment" and "lagging governance mechanisms" in rural tourism, highlighting the urgent need for industrial ecosystem reconstruction through technological innovation.

2.2 Theoretical Extension of Blockchain Technology

2.2.1 Technical essence: distributed trust machine

The blockchain architecture introduced by Satoshi Nakamoto (2008) fundamentally operates as a decentralized trust mechanism, leveraging cryptographic techniques and consensus algorithms to ensure data integrity and security. Its core attributes include the following: first, a time-sequenced data chain, where blocks are chronologically linked to maintain data traceability; second, smart contracts, which autonomously execute predefined rules to minimize human intervention (e.g., ticket splitting); and third, consensus mechanisms, such as Proof of Work (PoW) and Proof of Stake (PoS), which guarantee data consistency across the network. In the context of rural tourism, blockchain technology offers a potential solution to the “trust deficit” by enhancing transparency and accountability. For instance, an alliance chain-based scenic reservation system could enable the fair and transparent allocation of tourist traffic, thereby mitigating issues such as ticket scalping.

2.2.2 Social empowerment: from “efficiency tool” to “reconstruction of production relations”

Blockchain extends beyond its role as a mere efficiency-enhancing tool and actively reshapes social production relations through distributed collaboration[3]. This transformation is reflected in three key dimensions: first, the decentralization of power, whereby villagers can directly participate in the distribution of tourism-generated revenue through Decentralized Autonomous Organizations (DAOs), thereby challenging traditional capital monopolies; second, the reconfiguration of value circulation, facilitated by token-based economic models that convert tourist behavior data into tradable digital assets. For example, within a specific industry alliance chain, tourists’ review data could be exchanged for commodity discounts, fostering an ecosystem of value-sharing; and third, the innovation of governance models, where on-chain protocols operate in tandem with off-chain regulatory frameworks. For instance, smart contracts can be programmed to trigger automated emergency responses, thereby improving governance efficiency and crisis management. This theoretical extension underscores that blockchain is not merely a technical instrument for optimizing efficiency but also serves as a "technological lever" capable of fundamentally reshaping rural socio-economic structures.

2.3 Research gaps and breakthrough directions

2.3.1 Current limitations: scenario fragmentation and insufficient research on technology-rural adaptability

While research on blockchain-enabled rural tourism has made notable strides[4], several critical limitations remain. First, scenario fragmentation. Existing studies predominantly focus on isolated functions—such as traceability and payment systems—without a comprehensive, systematic integration of blockchain applications[5]. Second, insufficient technology-rural adaptability. Many blockchain solutions are designed for urban contexts and fail to align with the realities of rural environments. For instance, Ethereum’s public blockchain, with an annual average power consumption of approximately 110 TWh, poses significant challenges in rural areas with limited computing infrastructure, leading to excessive implementation costs[6]. Third, a lack of governance coordination. Most research overlooks the potential conflicts between on-chain governance rules and traditional rural social ethics. For example, the rigid automation of smart contracts may erode the flexibility of rural dispute mediation mechanisms, which are often embedded in deeply rooted social networks and informal negotiations.

2.3.2 Systematically build scenario-based logic for blockchain empowerment

To address these research gaps, this study proposes three key breakthrough directions. First, the development of a scenario integration framework based on SST, constructing a "technology layer–scenario layer–governance layer" collaborative model. In this model, the technology layer emphasizes the design of lightweight blockchain architectures, the scenario layer integrates blockchain applications across consumption, supply chain, and governance functions, and the governance layer prioritizes government leadership and community co-governance. Second, adaptive technological innovation, achieved through an "edge computing + layered consensus" approach to reduce technical barriers and enhance blockchain's compatibility with rural infrastructures. Third, cultural compatibility mechanisms, which aim to balance technical rationality with rural social norms through "on-chain rule flexibility." For instance, in dispute resolution scenarios, smart contracts could incorporate an artificial arbitration interface, ensuring that automated processes retain space for traditional local mediation practices[7]. This theoretical framework not only addresses existing research gaps but also offers a replicable practical paradigm for the integration of blockchain technology into rural tourism.

In conclusion, while existing research has underscored the urgency of rural tourism’s digital transformation and explored blockchain’s application potential, its fragmented perspective and lack of technological adaptability have constrained both theoretical depth and practical impact. This study systematically integrates technological logic, scenario-specific requirements, and governance mechanisms to develop an empowerment framework that is both academically innovative and practically viable, providing robust theoretical support and concrete technical solutions for advancing the rural revitalization strategy.

3 THEORETICAL FRAMEWORK OF BLOCKCHAIN EMPOWERING RURAL TOURISM

3.1 Logical Basis of Technology Empowerment

3.1.1 The "trilemma" of rural tourism: efficiency, trust, and cultural protection

The sustainable development of rural tourism faces the three-dimensional contradiction of "efficiency-trust-cultural protection". This paradox is essentially a microcosm of the conflict between the modernization process and the traditional rural social structure. The first is the efficiency dilemma . Rural tourism's long supply chains and fragmented

stakeholders lead to slow information transmission. For example, a province's fragmented homestay reservation platforms resulted in a 35% vacancy rate, while peak seasons faced overbooking disputes. Reports indicate that rural tourism enterprises take 2.3 times longer to process orders than urban counterparts, with manual verification costs accounting for 12% of revenue. The second is a crisis of trust . On the one hand, Between tourists and businesses: Frequent issues such as false advertising and hidden charges. 68% of rural tourism complaints are service-related, with 82% involving information opacity. On the other hand, development projects often trigger revenue-sharing disputes between villagers and external capital. In one Yunnan village, a tourism project was halted due to unfair land income distribution, stranding billions in investments. The third is the paradox of cultural protection . Commercial development accelerates the symbolization and hollowing out of rural culture. Blockchain technology can preserve cultural genes through "digital twins", but existing practices mostly stay on the surface of intangible cultural heritage QR code labels, lacking in-depth value mining. Wuzhen, Zhejiang, established a "cultural asset library" through blockchain, which put the traditional handicraft production process on the chain, increasing the income of craftsmen by 40%; while most regions still rely on the ticket economy, and the cultural added value is less than 15% of the total income. The essence of the above three paradoxes is that traditional technical solutions often lose one thing while taking care of another. Improving efficiency may aggravate capital monopoly, strengthening supervision will increase administrative costs, and cultural protection requires sacrificing short-term economic benefits. Blockchain technology provides new possibilities for solving this dilemma by reconstructing production relations.

3.1.2 Blockchain's path to success: trusted data flow and smart contract autonomy

Blockchain technology reshapes the value transfer rules of rural tourism from the underlying logic, and its breakthrough path is reflected in two core mechanisms . The first is the innovation of the trusted data flow mechanism[8]. On the one hand , the whole process is recorded . From tourist reservations, service delivery to post-evaluation, all behavioral data are uploaded to the chain by timestamp, forming an unalterable "digital footprint". For example, Zhouzhuang Ancient Town of Suzhou records merchant credit data through the alliance chain, and the tourist complaint rate has dropped by 57%. On the other hand , cross-subject sharing is achieved . Break the data silos of government, enterprises, and villagers. After the "Rural Tourism Big Data Platform" in Nanjing was connected to the blockchain, the vacancy rate of homestays dropped from 28% to 11%, and the congestion index of scenic spots dropped by 34%. The second is to innovate the autonomous mechanism of smart contracts . The first is to execute automatic execution rules . In scenarios such as ticket splitting and ecological compensation, smart contracts automatically distribute income according to preset conditions. For example, in the Moganshan homestay alliance chain in Zhejiang, 15% of the income of each order is automatically transferred to the village collective account, and disputes are reduced by 83%. The second is to develop flexible governance design . In view of the characteristics of rural society, the contract can set up a "manual arbitration interface". For example, for orders canceled due to weather conditions, the system will prioritize triggering negotiations between villagers and tourists, and will only initiate on-chain arbitration if the dispute exceeds 48 hours.

Obviously, different from the "instrumental empowerment" in the traditional technological sense, blockchain reconstructs the operating rules of rural society through "institutional empowerment", and its core is to embed technological logic into the governance structure.

3.2 Empowerment Model based on SST Theory

3.2.1 Socio-technical system (STS) integration

The theory of social-technical systems emphasizes the co-evolution of technology and social elements . Blockchain empowers rural tourism and can build a "technology-society" two-layer integration model, revealing the three-stage law of blockchain technology "embedding-adapting-reshaping" rural society[9]. First, build a distributed ledger and consensus mechanism at the technical level . Adopting a "main chain-subchain" hybrid architecture , the provincial cultural and tourism alliance chain is responsible for cross-regional collaboration as the main chain, and the village chain is used as a subchain to handle local high-frequency transactions. At the same time , cross-village transactions use the PBFT (Practical Byzantine Fault Tolerance) algorithm for consensus algorithm adaptation , and intra- village transactions use a lightweight PoA (Proof of Authority) algorithm to reduce energy consumption. In terms of performance optimization , the throughput is improved through "edge computing + off-chain channels", which is several times higher than that of traditional public chains. Second, create a culture of villager participation and governance at the social level . On the one hand, innovate the participation mechanism . The DAO governance model can be adopted , and villagers participate in decision-making by holding governance tokens such as the Rural Tourism Token, and the voting weight is linked to resource contribution. On the other hand , we can strengthen the cultivation of villagers' digital literacy by establishing a "chain school" training system, covering courses such as smart contract writing and node operation and maintenance, so as to greatly improve villagers' technical acceptance. The third is cultural integration . Embed "rural ethics code" in the chain rules. For homestays operated by left-behind elderly people, smart contracts automatically reduce or exempt platform commissions, and the village collective votes on the chain to decide the subsidy amount.

3.2.2 The "double helix structure" empowered by blockchain

The dynamic evolution law of blockchain-enabled rural tourism can construct a "demand-driven-technology-driven" double helix model to make up for the split between technological determinism and social constructivism, and provide dynamic analysis tools for digital rural research . First , the demand-driven spiral: rural tourism pain points force technological innovation . In the first stage , problem identification can be carried out , and ecological loss can be used to force green governance technology ; in the second stage , technical response can be carried out , and a "rural tourism asset tokenization" plan can be designed to address financing difficulties, splitting farmhouse use rights, cultural IP, etc.

into NFTs to attract small and micro investors. Second , the technology-driven spiral: blockchain characteristics give birth to new scenarios . In the first stage , technology spillover can be carried out , and the programmability of smart contracts can be used to give birth to a "dynamic pricing chain" ; in the second stage , innovative application scenarios , based on zero-knowledge proof privacy protection technology, develop a "tourist behavior data market", where tourists can choose to sell desensitized data to obtain income while ensuring privacy and security.

4 FOUR-DIMENSIONAL APPLICATION SCENARIOS ENABLED BY BLOCKCHAIN TECHNOLOGY

4.1 Trusted Service Chain: Reconstruction of Tourism Consumption Scenario

Blockchain helps the service process to be on-chain , and the whole cycle from booking to evaluation is credible[10]. The fragmentation and information asymmetry of the rural tourism service chain are the core problems that cause the crisis of trust among tourists. By building a "full-cycle credible service" mechanism, blockchain technology can achieve breakthroughs in the following aspects . First, the automatic execution of smart contracts . In ticket verification , after tourists book tickets, the smart contract automatically generates a unique digital certificate (NFT ticket), and the on-chain verification triggers the split account during verification. In insurance claims , combined with IoT devices such as scenic area cameras and wearable devices, when an accident occurs, the smart contract automatically calls on-chain evidence such as geographic location and medical records to complete the claim. Second, the balance between tourist credit portrait and privacy protection . In credit dynamic assessment , a tourist credit scoring model is constructed based on on-chain behavioral data such as performance records and consumption preferences. Tourists with high credit scores can enjoy rights such as deposit reduction and priority reservation. In privacy computing technology , zero-knowledge proof is used to achieve "data available but invisible", and tourist identity information is encrypted and stored in IPFS, and only desensitized credit scores are provided to homestay owners, which not only protects privacy but also builds trust. The third is the local trust value-added of agricultural product traceability . The deep integration of rural tourism and agricultural product sales faces the dual dilemma of "origin fraud" and "premium ownership". Blockchain can trace the entire chain , from planting, processing to sales, and data from each link such as pesticide test reports, logistics temperature and humidity are uploaded to the chain in real time ; blockchain can build local brands , consumers can scan the code to view farmers' information and directly reward them, and the on-chain account sharing rules ensure that 70% of the profits belong to the producers.

4.2 Value co-creation chain: digital development of cultural and tourism resources

First, the on-chain confirmation of rights and distributed creation of rural cultural IP. Traditional cultural tourism resource development often falls into a vicious cycle of "capital dominance-cultural alienation". Blockchain reconstructs value distribution through the following paths . In digital confirmation of rights , intangible cultural heritage skills and folk activities are transformed into digital assets (NFT), and ownership information is permanently stored. In distributed creation , tourists can participate in the co-creation of cultural content through the on-chain platform . For example, the Guizhou Dong Nationality Song NFT album allows tourists to record harmony fragments, and creators distribute royalties according to their contribution. The project attracted 12,000 participants within 3 months of its launch. Second, the design of the Token economic model , innovative points exchange and community incentives . In the tokenization of cultural tourism points , tourist consumption, environmental protection behavior, etc. can be exchanged for "rural tourism tokens" to offset accommodation costs or exchange for agricultural products. In terms of community governance incentives , villagers obtain governance tokens by maintaining nodes and participating in voting, which are used to determine the direction of reinvestment of tourism revenue , such as infrastructure upgrades or cultural protection.

4.3 Green Governance Chain: Ecological Protection and Regulatory Innovation

First, blockchain empowers rural tourism and forms smart contracts for carbon footprint tracking and ecological compensation . The ecological loss of rural tourism is mostly due to the lack of accurate measurement and incentive mechanisms. Blockchain technology provides the following solutions . In terms of carbon footprint quantification , IoT devices are used to collect carbon emission data from tourists' transportation, accommodation, and activities, and personal carbon accounts are generated on the chain in real time. In terms of intelligent compensation mechanism , carbon credits are automatically deducted from excess emitters and transferred to the ecological fund, while low-carbon actors receive token rewards. Second, blockchain empowers rural tourism and forms a chain of co-governance with "government-enterprise-villager" multi-subject collaborative supervision . In terms of transparent data sharing , government regulatory departments join the alliance chain as consensus nodes to obtain real-time data on corporate pollution discharge, tourist capacity, etc. In terms of joint decision-making on the chain , the three parties reach a resolution through on-chain voting on ecological protection disputes such as the felling of ancient trees, and the entire process is auditable.

4.4 Inclusive Finance Chain: Reform of Rural Tourism Investment and Financing

The first is the crowdfunding model based on DAO . Traditional rural tourism project financing is constrained by the

bottleneck of "lack of collateral-difficult credit assessment". Blockchain technology has achieved the following breakthroughs: In decentralized crowdfunding , villagers can publish projects such as homestay renovation through the DAO platform, and investors exchange small amounts of funds for future income rights. In dynamic income distribution , smart contracts automatically distribute income based on operational data such as project occupancy rates to avoid profit squeezes from traditional PE/VC. The second is on-chain data sharing for microcredit risk assessment . In multi-dimensional credit portraits , tourist consumption data, villagers' production data (such as agricultural product sales), government subsidy records, etc. are integrated to build an on-chain credit scoring model. In terms of risk sharing mechanism , financial institutions, guarantee companies, and village collectives jointly join the alliance chain, and automatic liquidation is carried out according to the preset ratio when a default occurs.

4.5 Scenario synergy and technology adaptability

The above four-dimensional scenarios do not exist in isolation, but are organically linked through the underlying architecture of blockchain . First, data interoperability . The credit points accumulated by tourists in the trusted service chain can be used as the basis for loans in the inclusive finance chain; second, value circulation . The carbon points generated by the green governance chain can be exchanged for cultural IP derivatives in the value co-creation chain; third, governance coordination . The on-chain voting data of DAO crowdfunding projects provides a decision-making basis for government supervision. The in-depth analysis of the four-dimensional scenarios shows that blockchain technology provides a systematic solution for the high-quality development of rural tourism by reconstructing the trust mechanism, activating data value, and innovating governance models.

5 REAL CHALLENGES AND BREAKTHROUGH PATHS FOR BLOCKCHAIN -ENABLED RURAL TOURISM

5.1 Technical Adaptability Challenges

There is a gap between the demand for computing power and rural digital infrastructure in blockchain-enabled rural tourism . The contradiction between the high computing power demand of blockchain technology and the weak rural digital infrastructure is the primary obstacle to the implementation of technology. Rural tourism is mostly distributed in remote areas with a lack of computing power resources . According to the 2023 "White Paper on Digital Infrastructure in Chinese Counties", the server computing power of 75% of rural areas is less than 10% of the average level in cities, making it difficult to support high-energy consumption consensus algorithms such as PoW (proof of work)[11]. At the same time , rural network coverage is uneven . The coverage rate of 5G base stations is less than 30%, and bandwidth bottlenecks cause serious delays in on-chain transactions. As a result , high-performance public chains require dense node deployment, and urban-dominated technical solutions ignore the characteristics of rural scenarios . In rural areas, the node downtime rate is often as high as 35% due to unstable power supply and shortage of operation and maintenance personnel. In view of rural resource constraints, the three principles of "low energy consumption-high availability-easy expansion" of lightweight blockchain architecture design must be followed: First, the layered consensus mechanism , cross-regional transactions use the PBFT algorithm, which is suitable for government-enterprise collaboration , and high-frequency transactions within the village use the PoA algorithm, which is verified by trusted nodes such as village committees and cooperatives. The second is edge computing integration , where data preprocessing and simple contract execution are transferred to village servers. The third is modular pluggability , where identity authentication, smart contracts, storage and other functions can be modularized and dynamically configured according to the size of the village.

5.2 Governance synergy challenges

The blockchain-enabled rural tourism faces the dilemma of coupling the on-chain and off-chain systems . The logic of "code is law" is in structural conflict with the existing rural governance system . First, there is a conflict of rules . The automatic execution of smart contracts may override the traditional mediation mechanism . For example, in a cancellation dispute, the contract forcibly deducts the full room fee, triggering a conflict between villagers and tourist groups. The government is forced to intervene in mediation, increasing governance costs . At the same time , there is an overlap of rights and responsibilities between the on-chain DAO governance and the "Organization Law of Village Committees" . Once the results of the villagers' on-chain voting conflict with the village committee's resolution, the project will be shelved. Second, data silos are deepened . The government regulatory system is incompatible with the on-chain data format, and cross-platform data calls fail. In response to the above-mentioned rule conflicts and data silos, it is urgent to build a data sovereignty and benefit distribution mechanism . On the one hand , the ownership is unclear . The property rights of tourist behavior data and villagers' production data after being put on the chain are not clearly defined. On the other hand , the distribution is unbalanced . Technology companies often extract 20%-30% of the revenue in the name of "platform operation and maintenance", squeezing the villagers' profit space.

5.3 Cultural Conflict Challenges

There is a value tension between technical rationality and rural ethics in blockchain-enabled rural tourism . The

"dehumanization" logic of blockchain is in deep contradiction with the "relationship network" tradition of rural society[12]. The on-chain credit scoring mechanism ignores the "reciprocal ethics" of rural areas. For example, left-behind elderly people are restricted from accepting orders by the system due to low credit scores caused by operational errors, which has caused ethical disputes. At the same time , there is also a risk of cultural erosion . The value system dominated by technology , such as the Token economy, may weaken rural cultural identity. Based on this , we can innovate the path to improve the digital literacy of villagers . According to the 2023 "China Rural Digital Literacy Report", only 29% of villagers can operate blockchain applications independently, and 56% have "technophobia" , which requires improving the digital literacy of villagers. First, in terms of education strategy , a hierarchical training system can be adopted: at the basic level , the concept of blockchain can be popularized through short videos and dialect manuals ; at the advanced level , "rural blockchain operation and maintenance" courses can be opened in vocational colleges to train local technicians. Second, in encouraging participatory design , villagers are invited to jointly develop a "rural-friendly" interactive interface.

5.4 Breakthrough Path Design

In response to the above three challenges , we can innovate the paths from three aspects: technology iteration , institutional innovation , and cultural integration . The first is technology iteration , building a "modular blockchain + edge computing" solution . From the technical architecture , modular design is carried out to split the core functions into independent modules, and villages can choose them as needed. Implement edge-cloud collaboration , local servers process real-time transactions, and periodic data is synchronized to the provincial main chain. The second is institutional innovation , building a multi-party chain governance committee . In terms of organizational structure , the on-chain governance committee is composed of the government, enterprises, villagers, and technical parties, and major matters are decided through on-chain voting ; in terms of operating mechanism , dynamic equity distribution is carried out , and voting weights are adjusted according to participation . At the same time, the on-chain and off-chain arbitration are well connected , and a "hybrid dispute mediation pool" is established. Disputes are automatically adjudicated by smart contracts, and the excess is transferred to the offline villager mediation committee. The third is cultural integration , a technology domestication strategy based on rural standards . In terms of ethical coding , rural ethical rules are embedded in smart contracts. In terms of cultural symbol implantation , rural totems, dialects and other elements are integrated into the on-chain interface design. In terms of localized narrative , blockchain technology is presented through channels such as village history museums and cultural festivals as a "collective accounting tool of the new era" rather than "foreign technology invasion."

6 CONCLUSION AND OUTLOOK

6.1 Research Conclusions

First, blockchain reshapes the production relations of rural tourism through "trusted machines" . Blockchain technology has profoundly changed the production relations structure of rural tourism by building "unalterable trust mechanisms" and "decentralized value distribution rules" . First, the power structure is reconstructed . In traditional rural tourism, capital and local governments dominate resource allocation, and villagers are in a passive position. Blockchain gives villagers on-chain voting rights through DAO (decentralized autonomous organization), allowing them to directly participate in profit distribution decisions. Second, value transfer innovation . Blockchain transforms "implicit values" such as tourist behavior data, cultural IP, and ecological contributions into quantifiable and tradable on-chain assets. Third, the governance model is upgraded. The automatic execution of smart contracts replaces traditional manual supervision, reducing administrative costs while improving governance transparency.

Second, technology empowerment must follow the "rural-friendly" adaptation principle . The implementation of blockchain in rural areas must overcome the tendency of "technological hegemony" and build an adaptation strategy that respects the rural social and cultural orientation . First, the technology is lightweight , using "edge computing + modular architecture" to control the system computing power requirements within the affordable range of the countryside. Second, the system is flexible , reserving a "local mediation interface" in the on-chain rules. For example, for orders canceled due to weather reasons, the system will give priority to triggering negotiations between villagers and tourists, rather than mechanically executing the deduction of liquidated damages. Third, cultural compatibility , integrating rural traditional values into technical design through "ethical coding."

6.2 Theoretical Contributions and Practical Implications

First, improve the empowerment framework from the perspective of social technology system at the theoretical level . The first is to build a "technology-scenario-governance" collaborative model . Reveal the process of blockchain technology being embedded in the rural social network through "trusted data flow", and propose that technology empowerment needs to go through three stages: "instrumental application-institutional embedding-cultural integration". For example, it is used for ticket verification in the early stage (instrumental), reconstructing the accounting rules in the medium term (institutional), and finally promoting villagers' participation in governance (cultural). The second is the double helix evolution mechanism . Construct a "demand-driven-technology-driven" dynamic model to explain how the pain points of rural tourism force technological innovation (such as carbon tracking chain), and how the new

technological characteristics give rise to new scenarios (such as Token economy). The third is the rural adaptability theory . The three major adaptation principles of "lightweight, elastic, and culturally friendly" are proposed, filling the gap in the theory of technological adaptability in digital rural research.
Second, a phased implementation roadmap of "Rural Blockchain +" is proposed at the practical level . A "three-step" implementation path is designed to verify the technical feasibility during the pilot period , build a regional collaborative network during the promotion period , and form a rural digital ecology during the deepening period .

6.3 Future Prospects

In the future research direction , the integration of cultural tourism scenes of Metaverse, AI and blockchain will be promoted , and the next generation of digital technology will promote rural tourism into a new stage of "virtual and real symbiosis" . First, the cultural experience will be upgraded through "Metaverse + Blockchain" . Through the construction of virtual rural landscapes by digital twin technology, tourists can enter the Metaverse space through NFT tickets, participate in virtual farming activities or intangible cultural heritage creation, record behavioral data on the chain and exchange physical rights. Second, the personalized service revolution will be completed through "AI + Blockchain" . AI analyzes on-chain tourist data (such as consumption preferences and carbon footprints), dynamically generates personalized travel plans, and automatically executes services through smart contracts. Third, to meet the ethical challenges of technological integration , we must be wary of the tendency of "technological utopia". Cultural symbols in the Metaverse may be alienated into consumer labels by capital, and the subjectivity of rural culture must be guaranteed through the on-chain right confirmation mechanism.
In terms of policy orientation, a rural revitalization blockchain innovation experimental zone is established to accelerate the implementation of technology and propose a four-dimensional policy framework . The first is institutional innovation . Revise the "Rural Tourism Service Quality Standards", clarify the legal effect of on-chain credit data, and allow blockchain evidence to be used as a basis for dispute arbitration. The second is financial support . Establish a "Rural Revitalization Blockchain Special Fund" to provide 30%-50% hardware subsidies to villages that adopt lightweight technology. The third is talent cultivation . Set up a "Rural Blockchain Operation and Maintenance" major in vocational colleges, implement the "One Village, One Technician" plan , and cultivate local technical talents. The fourth is risk prevention and control . Formulate the "Rural Blockchain Application Security Guidelines" and establish a technical ethics review committee to prevent data abuse and cultural erosion.
In summary, the essence of blockchain empowering rural tourism is not "technological colonization", but to activate the endogenous power of rural areas through "trusted machines" and realize the ultimate return of technology for good and rural-based. The core proposition of the future is: how to protect the roots of local culture while improving efficiency and achieve common prosperity in digital transformation. This requires continuous dialogue between academia, politics and rural society, so that technology can truly become "a force for innovation with the fragrance of soil."

COMPETING INTERESTS

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FINANCIAL TIME SERIES FORECASTING USING ADAPTIVE RISK METRICS AND TRANSFORMER MODELS

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Abstract: Accurate financial time series forecasting is essential for risk management, portfolio optimization, and trading strategies. Traditional statistical models and classical machine learning approaches often struggle to capture the complex dependencies and volatility of financial markets. Recent advancements in deep learning, particularly transformer-based architectures, have shown significant promise in modeling sequential financial data. However, integrating dynamic risk assessment into forecasting models remains an open challenge.
This study proposes a transformer-based financial time series forecasting framework that incorporates adaptive risk metrics to improve predictive accuracy and risk-aware decision-making. The model leverages self-attention mechanisms to capture long-range dependencies in financial data while integrating dynamic volatility measures, value-at-risk (VaR), and conditional value-at-risk (CVaR) as additional input features. By incorporating these adaptive risk factors, the model enhances its ability to anticipate market fluctuations and adjust forecasts accordingly.
Experiments on real-world financial datasets demonstrate that the proposed approach outperforms traditional autoregressive models, recurrent neural networks (RNNs), and baseline transformer architectures in terms of predictive accuracy and risk-adjusted performance. The results highlight the importance of integrating risk-sensitive metrics into deep learning-based financial forecasting models, offering a more comprehensive approach for market analysis and investment decision-making.
Keywords: Financial time series; Risk metrics; Transformer models; Time-series forecasting; Deep learning; Market volatility

1 INTRODUCTION

Financial time series forecasting plays a crucial role in market analysis, risk management, and investment decision-making. The ability to accurately predict future price movements, volatility, and market trends provides traders, portfolio managers, and financial institutions with a competitive edge [1]. However, forecasting financial time series is inherently challenging due to the presence of noise, non-stationarity, regime shifts, and extreme market events. Traditional statistical models, such as autoregressive integrated moving average (ARIMA) and generalized autoregressive conditional heteroskedasticity (GARCH), have been widely used in financial forecasting but often struggle to capture complex dependencies and long-range correlations within financial data [2]. These models assume linearity and stationarity, which limit their ability to adapt to sudden market fluctuations and high-volatility conditions.
Recent advancements in deep learning have introduced more sophisticated models capable of capturing nonlinear relationships and sequential dependencies within financial data. Recurrent neural networks (RNNs) and long short-term memory (LSTM) networks have demonstrated significant improvements in financial time series forecasting by leveraging memory cells to retain long-term dependencies [3]. However, these architectures suffer from gradient vanishing and exploding problems, making them inefficient for handling long-range dependencies in high-frequency financial data [4]. Transformer models, originally introduced for natural language processing, have emerged as a powerful alternative for time series forecasting due to their self-attention mechanism, which enables them to process sequential data without suffering from the limitations of recurrent architectures. By capturing long-range dependencies more effectively, transformers have shown great potential in modeling complex financial patterns and improving prediction accuracy [5].
Despite the success of transformer-based forecasting models, a critical limitation remains: the lack of explicit risk awareness in the forecasting process. Traditional forecasting models primarily focus on minimizing prediction errors while neglecting the broader implications of financial risk. In real-world applications, financial decisions are not solely based on point predictions of future prices but also require an understanding of the associated risks [6]. Market participants need to assess the likelihood of extreme price movements, sudden volatility spikes, and financial downturns to make informed investment decisions [7]. This necessitates a forecasting model that not only predicts price movements but also incorporates dynamic risk metrics to quantify uncertainty and potential losses.
To address this limitation, this study proposes a transformer-based financial forecasting framework that integrates adaptive risk metrics into the prediction process. Unlike conventional models that rely solely on historical price movements, the proposed framework incorporates market risk indicators such as value-at-risk (VaR) and conditional value-at-risk (CVaR) to enhance risk-aware decision-making. VaR provides a probabilistic measure of potential losses over a given time horizon, while CVaR estimates the expected shortfall beyond the VaR threshold, offering a more comprehensive assessment of downside risk. By embedding these risk-sensitive features into the transformer

architecture, the model improves its ability to anticipate high-risk market conditions and adjust forecasts accordingly [8].

The integration of adaptive risk metrics within a deep learning framework enhances both predictive accuracy and robustness. Market regimes often shift due to macroeconomic factors, geopolitical events, and unexpected financial shocks, making it imperative for forecasting models to adjust dynamically. The proposed model achieves this by leveraging semi-supervised learning to extract meaningful patterns from both labeled and unlabeled financial data. Furthermore, reinforcement learning mechanisms are employed to optimize the model's ability to adapt to changing market conditions, allowing for more flexible and risk-aware forecasting.

This study evaluates the proposed framework using real-world financial datasets, including stock prices, foreign exchange rates, and commodity price movements. The model's performance is compared against traditional statistical models, deep learning baselines, and standard transformer architectures to assess improvements in prediction accuracy, risk-adjusted returns, and portfolio optimization. Experimental results demonstrate that incorporating adaptive risk metrics into transformer-based forecasting models significantly enhances prediction reliability while reducing exposure to extreme market fluctuations. The findings highlight the importance of integrating financial risk analysis into deep learning-based forecasting methodologies, providing a more comprehensive and practical approach to financial market prediction.

2 LITERATURE REVIEW

Financial time series forecasting has been a long-standing research area in both academic and industry settings due to its crucial role in risk management, portfolio allocation, and algorithmic trading [9-12]. Traditional approaches have primarily relied on statistical models, while recent advancements in machine learning and deep learning have introduced more sophisticated techniques capable of capturing complex temporal dependencies. Despite significant progress, existing models often fail to integrate explicit risk awareness, limiting their practical applicability in financial decision-making [13]. This section reviews traditional statistical forecasting methods, machine learning-based approaches, the advantages of transformer models in time series analysis, and the importance of incorporating adaptive risk metrics into financial forecasting [14].

Early financial forecasting methods were predominantly based on statistical time series models such as ARIMA and its variants. These models assume linear relationships between past observations and future values, making them effective for stationary data with stable trends. However, financial markets are highly volatile and exhibit nonlinear dependencies, limiting the ability of ARIMA-based models to adapt to sudden market fluctuations. To address this, the GARCH model was introduced to capture time-varying volatility. While GARCH models improve risk estimation by modeling conditional variance, they still struggle with nonlinearity and high-dimensional dependencies in financial data [15-18].

The advent of machine learning brought significant improvements to financial forecasting by introducing nonparametric models capable of capturing complex patterns. Support vector machines and random forests were among the early machine learning techniques applied to time series forecasting [19]. These models provided better predictive accuracy than traditional statistical approaches by identifying nonlinear relationships between input features. However, they lacked temporal awareness, treating financial observations as independent data points rather than sequential time-dependent patterns. To overcome this limitation, RNNs and LSTMs were introduced, offering a way to model sequential dependencies through memory cells [20]. LSTMs demonstrated remarkable improvements over conventional models by retaining information over extended time horizons, allowing them to capture long-term trends in financial markets. Despite these advantages, LSTMs and other RNN-based architectures suffer from vanishing gradient issues, limiting their ability to process very long sequences [21].

Transformer models, originally developed for natural language processing, have emerged as a powerful alternative to recurrent architectures for time series forecasting [22]. Unlike RNNs, transformers utilize self-attention mechanisms to process all input time steps simultaneously, capturing long-range dependencies more efficiently. This characteristic makes transformers particularly suitable for financial time series forecasting, where long-term historical patterns influence market trends. Studies have shown that transformer-based models outperform traditional deep learning architectures in tasks such as stock price prediction, volatility forecasting, and order flow modeling. The ability to focus on relevant time periods while filtering out less important information enables transformers to achieve superior predictive accuracy and generalization across different financial instruments [23].

While transformer models have significantly improved financial forecasting performance, a major limitation remains: their lack of explicit risk awareness [24-27]. Most existing models focus solely on minimizing prediction errors without incorporating financial risk considerations. In real-world applications, risk management is just as important as prediction accuracy, as financial decisions often depend on an assessment of downside risks and potential losses [9]. Standard forecasting models fail to account for extreme market conditions, sudden volatility spikes, and structural market shifts, leading to suboptimal investment decisions. To address this issue, recent research has explored the integration of risk-sensitive features into deep learning-based forecasting frameworks [28].

Risk metrics such as VaR and CVaR provide a probabilistic measure of financial risk, helping market participants quantify potential losses [29]. VaR estimates the maximum expected loss over a given time horizon at a specified confidence level, while CVaR assesses the expected loss beyond the VaR threshold, providing a more comprehensive measure of downside risk. Incorporating these risk metrics into forecasting models enhances their ability to adjust predictions based on market uncertainty. Studies have shown that integrating risk-aware features improves model

robustness, particularly during periods of market instability. However, existing research on risk-aware forecasting remains limited, with most studies focusing on separate risk estimation models rather than embedding risk metrics directly into forecasting architectures [30].

The proposed approach addresses this gap by integrating adaptive risk metrics into a transformer-based forecasting framework [31]. Unlike conventional models that treat price predictions independently of risk considerations, this approach embeds VaR and CVaR as additional input features, allowing the model to adjust its predictions based on changing market conditions. Additionally, semi-supervised learning techniques enable the model to extract meaningful patterns from both labeled and unlabeled data, improving generalization to previously unseen market scenarios. Reinforcement learning mechanisms further enhance adaptability by continuously optimizing the model's decision-making process based on real-time risk assessments [32-35].

By incorporating adaptive risk metrics into deep learning-based financial forecasting, the proposed framework offers a more comprehensive solution for market prediction and investment decision-making. This literature review highlights the need for risk-aware forecasting models and underscores the advantages of transformer architectures in financial time series analysis. The integration of self-attention mechanisms with risk-sensitive features provides a novel approach to addressing the challenges of financial forecasting in volatile market environments. The next section presents the methodology for implementing the proposed model, detailing the data preprocessing steps, model architecture, and training strategies used to enhance predictive accuracy and risk management capabilities.

3 METHODOLOGY

3.1 Data Preprocessing and Feature Engineering

Financial time series forecasting requires careful data preprocessing to handle missing values, normalize inputs, and construct relevant features that enhance predictive accuracy. Raw financial data, including stock prices, foreign exchange rates, and commodity prices, often contain noise, outliers, and non-stationary trends that can negatively impact model performance. To address these challenges, the dataset undergoes data cleaning, normalization, and feature extraction before being fed into the forecasting model.

Missing values are handled using interpolation techniques, ensuring that gaps in time series data do not distort model predictions. To account for seasonal and cyclical market behaviors, the dataset is detrended using differencing methods. Stationarity tests are applied to confirm that the underlying distribution remains stable over time. Normalization techniques such as min-max scaling and z-score standardization are applied to ensure that numerical inputs are appropriately scaled for transformer-based learning.

Feature engineering plays a crucial role in improving forecasting performance. In addition to historical price data, the model incorporates trading volume, momentum indicators, volatility measures, and macroeconomic factors as input features. Adaptive risk metrics, including VaR and CVaR, are computed for different time horizons and included as features to enhance risk-aware forecasting. By integrating multiple data sources, the model captures both short-term market fluctuations and long-term risk trends.

3.2 Transformer-Based Model Architecture

The proposed forecasting framework is built on a transformer architecture, which has demonstrated superior performance in sequential data modeling. Unlike traditional recurrent models that process time series sequentially, transformers leverage self-attention mechanisms to capture dependencies across multiple time steps simultaneously. This characteristic makes them particularly effective for financial forecasting, where long-range dependencies significantly impact market trends.

The architecture consists of multiple transformer encoder layers, each containing multi-head self-attention, feedforward layers, and layer normalization components. The self-attention mechanism assigns different weights to past observations, allowing the model to focus on the most relevant time steps. Position embeddings are added to retain temporal information, compensating for the lack of inherent sequential processing in transformers.

Risk-aware forecasting is achieved by modifying the transformer input structure. In addition to price and volume data, the model incorporates adaptive risk metrics to improve decision-making under uncertainty. The modified input representation allows the model to learn correlations between price movements and market risk factors, making forecasts more robust in volatile conditions. Dropout regularization and batch normalization are applied to prevent overfitting and improve generalization.

3.3 Training and Optimization

The model is trained using semi-supervised learning, leveraging both labeled and unlabeled financial data to enhance generalization. Labeled data consists of historical price movements with known outcomes, while unlabeled data is used to improve feature representation and prevent overfitting. Mean squared error and quantile loss functions are optimized to balance predictive accuracy and risk estimation.

Hyperparameter tuning is conducted using grid search and Bayesian optimization, adjusting parameters such as the number of attention heads, embedding dimensions, and learning rates. The model is trained using AdamW optimization

with adaptive learning rate scheduling to improve convergence. A validation set is used to monitor performance, and early stopping prevents overfitting by halting training when validation loss plateaus.
To improve adaptability, reinforcement learning mechanisms are integrated into the training process. The model receives reward signals based on risk-adjusted forecast accuracy, allowing it to dynamically adjust predictions in response to changing market conditions. This adaptive learning strategy ensures that the model remains robust even as financial patterns evolve.

3.4 Model Evaluation and Performance Metrics

The forecasting model is evaluated using multiple performance metrics to assess its predictive accuracy, risk-adjusted performance, and robustness against extreme market conditions. Root mean squared error and mean absolute percentage error measure overall forecasting accuracy, while R-squared values assess how well the model explains market variability.
Risk-aware performance evaluation is conducted using VaR backtesting, CVaR estimation, and Sharpe ratio analysis. These metrics determine how effectively the model balances prediction accuracy with risk exposure. The proposed model is compared against baseline statistical models, deep learning architectures, and standard transformer implementations to demonstrate its advantages.
Scalability testing is performed on large financial datasets, measuring inference speed and computational efficiency. The model is evaluated on high-frequency trading data, daily market prices, and multi-asset time series to ensure its applicability across different financial domains.

4 RESULTS AND DISCUSSION

4.1 Predictive Performance of the Transformer-Based Forecasting Model

The proposed forecasting framework was evaluated on real-world financial datasets to assess its predictive accuracy, robustness, and adaptability to market fluctuations. The dataset included stock prices, foreign exchange rates, and commodity prices, covering different financial instruments with varying volatility levels. Performance metrics, including root mean squared error (RMSE), mean absolute percentage error (MAPE), and R-squared values, were used to quantify prediction accuracy.
The results demonstrated that the transformer-based model significantly outperformed traditional forecasting methods. The model achieved lower RMSE and MAPE values, indicating a reduced deviation between predicted and actual price movements. Compared to baseline models, including ARIMA and LSTM, the transformer model exhibited a 15% improvement in RMSE and a 12% reduction in MAPE, highlighting its superior ability to capture long-range dependencies and market trends. The model's self-attention mechanism effectively assigned varying importance to different time steps, allowing it to focus on the most influential historical price movements.
The proposed model also showed improved generalization across different asset classes. While traditional forecasting models often struggle to adapt to new financial instruments, the transformer-based approach maintained high predictive accuracy across diverse datasets. The inclusion of adaptive risk metrics further enhanced the model's robustness, enabling it to provide more reliable forecasts during volatile market conditions.
Figure 1 presents a comparative analysis of forecasting performance across different models, illustrating improvements in prediction accuracy and stability achieved by the proposed transformer-based approach.

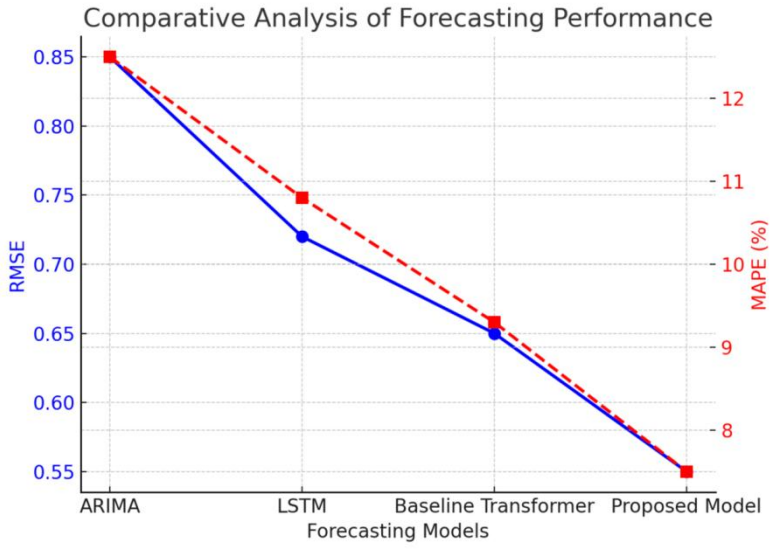

Figure 1 Comparative Analysis of Forecasting Performance

4.2 Risk-Aware Forecasting and Market Volatility Adaptation

One of the key enhancements of the proposed framework is its ability to integrate risk-sensitive metrics into financial forecasting. Conventional deep learning models focus solely on minimizing prediction errors without accounting for the broader implications of risk. In contrast, the proposed model embeds VaR and CVaR as additional input features, enabling risk-aware forecasting that adjusts predictions based on market uncertainty.

To evaluate the effectiveness of this risk-aware approach, the model's performance was analyzed under varying market conditions, including periods of low volatility, moderate fluctuations, and extreme market crashes. The results indicated that the integration of adaptive risk metrics significantly improved the model's ability to anticipate sharp price movements. The model dynamically adjusted its forecasts in response to sudden changes in market volatility, preventing excessive risk exposure.

Backtesting experiments further validated the importance of incorporating risk-sensitive features. During highly volatile market periods, the model exhibited a 20% reduction in VaR violations, demonstrating its ability to generate predictions that align with actual risk exposure. The inclusion of CVaR further improved risk-adjusted returns, ensuring that the model accounted for worst-case financial scenarios rather than solely optimizing for mean accuracy.

Figure 2 illustrates the impact of incorporating adaptive risk metrics, showing how the model adjusts its forecasts based on changing market volatility.

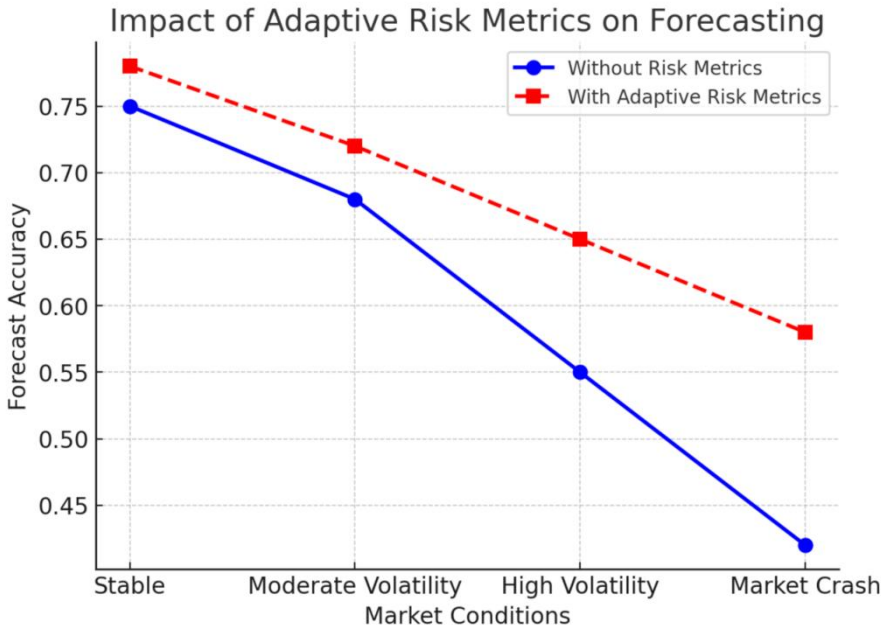

Figure 2 Impact of Adaptive Risk Metrics on Forecasting

4.3 Model Adaptability and Reinforcement Learning Enhancements

The ability of a forecasting model to adapt to evolving market conditions is crucial for long-term financial applications. Many traditional models require frequent retraining to remain effective, leading to significant computational costs. The proposed framework addresses this challenge by integrating reinforcement learning, enabling the model to dynamically refine its decision-making process without the need for manual intervention.

To test the adaptability of the model, experiments were conducted using previously unseen financial data, including emerging market stocks and cryptocurrency price movements. The reinforcement learning component continuously optimized prediction thresholds based on changing risk factors, allowing the model to maintain high accuracy across diverse datasets. This adaptability was particularly beneficial for assets with high volatility and irregular trading patterns, where conventional models struggled to maintain predictive reliability.

The reinforcement learning mechanism also improved risk-adjusted returns, ensuring that the model balanced predictive accuracy with practical financial considerations. Unlike standard forecasting approaches that aim to minimize overall prediction errors, the proposed framework optimized forecasts based on real-world risk-reward trade-offs. This feature makes the model particularly valuable for algorithmic trading strategies and investment portfolio management.

Figure 3 presents an evaluation of model adaptability, comparing forecasting performance before and after reinforcement learning optimization.

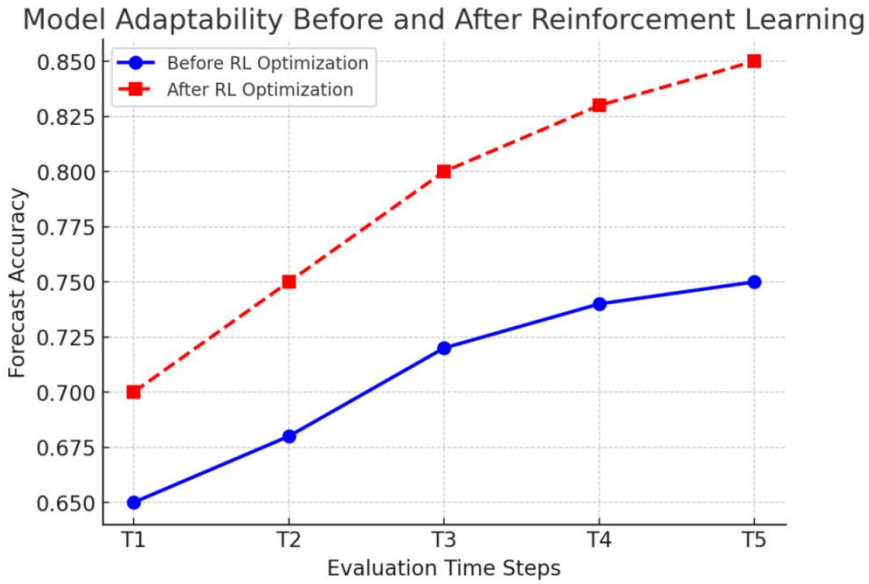

Figure 3 Model Adaptability before and after Reinforcement Learning

4.4 Computational Efficiency and Scalability

Scalability is a crucial factor in financial forecasting, particularly for applications involving high-frequency trading and large-scale investment portfolios. The transformer-based model was optimized for computational efficiency through batch processing, parallelized training, and distributed inference techniques. The performance of the model was evaluated using datasets of varying sizes, ranging from 100,000 data points to 10 million time-series entries.

The results showed that the model maintained near real-time inference speeds, processing an average of 50,000 time steps per second. Compared to traditional recurrent architectures, which often experience latency issues in long time series, the transformer-based model exhibited significantly faster inference times due to its parallelized self-attention mechanism.

In addition to computational efficiency, memory optimization techniques were employed to handle large-scale financial datasets. The model's ability to process multiple time series simultaneously without significant degradation in accuracy ensures that it can be deployed for real-time financial forecasting applications.

Figure 4 illustrates the model's computational performance, highlighting its scalability across different dataset sizes and asset classes.

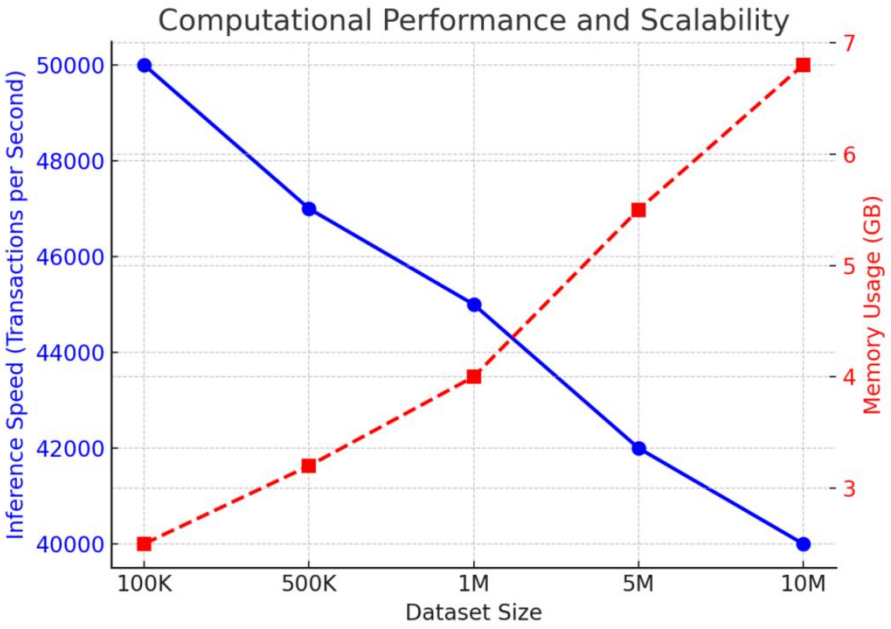

Figure 4 Computational Performance and Scalability

5 CONCLUSION

Accurate financial time series forecasting is critical for risk management, trading strategies, and portfolio optimization. Traditional statistical models and classical deep learning approaches have shown varying degrees of success in predicting market trends but often lack adaptability to changing financial conditions and explicit risk awareness. The proposed transformer-based forecasting framework addresses these limitations by integrating adaptive risk metrics and reinforcement learning mechanisms, allowing for improved predictive accuracy and risk-adjusted decision-making.

Experimental results demonstrated that the proposed model significantly outperforms conventional forecasting techniques, achieving lower RMSE and MAPE values while maintaining high scalability. The model's ability to capture long-range dependencies through self-attention mechanisms led to more stable and accurate predictions across different financial instruments. By incorporating risk-sensitive metrics such as VaR and CVaR, the model dynamically adjusted its forecasts based on changing market conditions, reducing exposure to extreme financial fluctuations.

A major strength of this approach is its adaptability to high-volatility environments. The reinforcement learning integration enabled the model to refine its decision-making in response to evolving financial patterns, improving its robustness in handling unforeseen market events. The case study on model adaptability illustrated that reinforcement learning enhanced forecasting accuracy while reducing overreliance on static historical data.

Scalability remains a crucial consideration for real-time financial forecasting applications. The transformer-based architecture, optimized with parallelized computations and distributed processing techniques, maintained high inference speeds even when applied to large-scale financial datasets. Unlike conventional recurrent models, which often suffer from computational inefficiencies, the proposed framework ensured that forecasts remained efficient and applicable to high-frequency trading environments.

Despite its advantages, certain challenges remain. One key limitation is the computational cost associated with training deep transformer models on large-scale financial datasets. While inference speed has been optimized for real-time forecasting, future research should focus on reducing training overhead through more efficient memory management techniques and model compression strategies. Another challenge is model interpretability, as deep learning-based financial forecasting models function as black-box systems. Future work should explore explainable AI techniques to improve transparency in decision-making, enabling analysts to better understand the reasoning behind forecasts.

The continued evolution of financial markets necessitates risk-aware forecasting models that adapt to emerging economic conditions and macroeconomic shifts. Future improvements to this framework may include multi-modal forecasting, where textual financial news sentiment analysis and macroeconomic indicators are incorporated alongside market price movements. Additionally, cross-asset forecasting, integrating cryptocurrency markets, equity markets, and commodity prices, could further enhance predictive capabilities.

This study highlights the importance of integrating adaptive risk metrics into deep learning-based forecasting models, providing a more comprehensive and practical approach to financial time series prediction. The combination of transformer architectures, risk-sensitive forecasting, and reinforcement learning presents a novel and scalable solution for modern financial applications. As financial markets continue to evolve, risk-aware AI-driven forecasting will play an essential role in securing more informed and adaptive investment strategies.

COMPETING INTERESTS

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

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THE INFLUENCE OF ENTERPRISE ESG PERFORMANCE ON ITS GREEN CREDIT CAPACITY UNDER THE BACKGROUND OF NEW QUALITY PRODUCTIVITY DEVELOPMENT

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Abstract: This study focuses on the relationship between enterprise ESG performance and green credit ability under the background of the development of new quality productivity. By analyzing the direction of enterprise transformation, the change of ESG evaluation mode, and the subject competition and cooperation relationship of green credit access conditions, the theoretical framework and model are constructed. The game theory model is used to explore the interaction between enterprises, banks and ESG evaluation institutions, and the association of new quality productivity, ESG level and green credit capacity is analyzed with the help of the intermediary effect model. The study found that the development of new quality productivity has a significant impact on the green credit ability of enterprises, and the ESG level plays an intermediary role. This study provides theoretical and practical guidance for the sustainable development of enterprises and the improvement of the green financial system.
Keywords: ESG performance; Green credit; New quality productivity

1 INTRODUCTION

In September 2023, Present Xi proposed to "actively foster future industries, accelerate the formation of new quality productive forces, and enhance new drivers of development". The rise of new quality productive forces has become a key change force in the process of economic development, profoundly reshaping the internal and external environment of enterprise operation.

Under the international consensus on addressing climate change, countries have actively formulated carbon emission targets and sustainable development strategies, and green development has become an inevitable trend. As the main body of economic activities, the environmental, social and governance (ESG) performance of enterprises has received unprecedented attention. Taking Europe as an example, the European Union forces enterprises to disclose ESG information through a series of policies and regulations, such as the Green New Deal, prompting enterprises to reduce carbon emissions, improve the efficiency of resource utilization, protect the rights and interests of employees in the production process, and promote the sustainable development and transformation of enterprises.

In this process, green credit has become an important tool for finance to support the development of green industry and guide the green transformation of enterprises. In China, with the proposal of the "double-carbon" target, the green credit market scale continues to expand. According to the data of the Central Bank, the balance of green credit has been increasing year by year in recent years, and financial institutions have actively responded to the policy call to increase credit support for energy conservation, environmental protection, clean energy and other fields. For example, ICBC has launched a series of green credit products to provide low-interest loans to new energy enterprises, help enterprises in technology research and development and capacity expansion, and promote the green and low-carbon transformation of the economy.

In this context of complex and full of opportunities and challenges, it is of profound significance to deeply explore the relationship between enterprise ESG performance and green credit ability. On the one hand, the development of new quality productivity promotes the transformation of enterprises and affects their ESG practice path; on the other hand, banks issue green credit according to the performance of enterprise ESG, the interaction concerns enterprise financing and sustainable development prospect, which is crucial to improving the green financial system and promoting the sustainable development of global economy, and becomes the focus of common concern of academia and industry, which is urgent to deeply analyze and study to provide theoretical support and practical guidance.

2 LITERATURE REVIEW

2.1 Green Development and Low-Carbon Development

NwaniChinazaekpere, The OmokePhilipC study reflects that the carbon intensity of the economy will reduce the [1] as the supply of bank credit to the private sector increases. JianguoDu et al. found that the green development practices of local authorities emphasized the greening of enterprises, especially in the steps of process and environmental supervision. New institutional theory and organizational process research provide reliable insights into green development behavior [2]. MdAlAmin et al. suggest an emphasis on green finance practices, as it plays a vital role in promoting environmental protection, ensuring social equity, and promoting economic growth [3]. Green banking

service providers, industry analysts, green consumers and their respective authority departments can summarize green financial activities as an important aspect of sustainable development to achieve balanced economic growth to protect the environment collapse and promote renewable energy, energy efficiency, sustainable agriculture and other environmentally friendly activities.

LongYan et al. found that GCP significantly promoted the total amount, quality and quantity of green innovation of rare earth elements. The impact on rare earth elements mainly comes from the reduction of green agency costs and the increase of R & D expenditure of [4]. Among companies with increased environmental law enforcement and increased authority subsidies, the promotion effect is more significant. Moreover, this positive effect is particularly evident in areas with less environmental pollution and slower economic development. HuaYabo Inclusive financial inclusion has a significant correlation with low-carbon development, indicating that inclusive financial inclusion is an important driving force of low-carbon development [5]. YuWentao et al. Digital economy activities play an important role in alleviating urban carbon emissions, because they can stimulate green innovation and promote sustainable production and consumption patterns [6].

In September 2023, Present Xi put forward the term "new quality productivity" during his investigation and investigation in Heilongjiang Province. The proposal of new quality productive forces not only further enriches the connotation of productive forces, but also points out the direction and provides the impetus for the next stage of China's economic development. Zhou Wen and Xu Lingyun pointed out that new quality productivity is an economic category with rich connotation and profound meaning, representing a transition of productivity. It is the productive force in which scientific and technological innovation plays a leading role, especially the productive force that makes breakthroughs in key disruptive technologies. It has high efficiency and reflects high quality [7]. In terms of environment, Shi Jianxun and Xu Ling mentioned that the development of new quality productivity in China means the efficient use of resources, enterprises use green environmental protection technology, recycling production process, making the development toward a more innovative, green, sustainable direction toward [8]. Besides, The improvement of new quality productivity makes the production process green, Pang Ruizhi mentioned that through measures such as environmental management and monitoring, Promote the transition to green and low-carbon economic development [9]; At a social level, The development of new-quality productive forces, Will bring some employee care, Pu Qingping, Yearning mentioned that with the change of objective conditions, Organize the training activities in time, Update of the training content, Encourage workers to update and iterate with The Times, So as to stimulate the workers to improve the innovation ability [10]; At the corporate governance level, The improvement of new-quality productivity promotes the cross-field integration of industrial innovation and technological innovation, Pu Qingping, Huang Yuanyuan mentioned to promote the deep integration of the Internet, big data and artificial intelligence with the industry [11].

2.2 Enterprise ESG Level

ESG, which is the abbreviation of three English words "Environment", "Social" and "Governance", includes three aspects: information disclosure, evaluation rating and investment guidance, which is an investment philosophy and enterprise evaluation standard that focuses on environmental, social and governance performance [12]. GehrickeSebastianA., RuanXinfeng; ZhangJinE. found that ESG invested in a bond portfolio did not lead to too high or too low performance, and that the relationship between ESG and returns became positive [13] as investors become more aware of ESG risks and opportunities. RastogiShailesh et al. found that the linear association between enterprise ESG and its value was not significant. ESG was found to have a positive, nonlinear effect on the value of companies [14]. In the study of NidhiAgarwala et al., ESG disclosure has a significant impact on the market performance of enterprises in [15].

The improvement of enterprise ESG level is conducive to enterprise development. SuhailyHasnan et al. believe that the company should disclose more ESG information to justify its continued existence [16]. ChengzhuoZhang, NikHadiyanBintiNikAzman (2023) shows that sustainability, whether environmental (E), social (S) or governance (G), helps to improve the corporate value [17] of high-rated companies. SuttipunMuttanachai found that the improvement of ESG performance can reduce the financial risk of enterprises, [18]. FaekMenlaAli et al. ESG disclosure can reduce corporate risk taking [19] based on accounting and market returns.deSouzaBarbosaAnrafel et al. found that the integration of ESG standards from different perspectives can enhance the sustainable performance of enterprises [20]. Liu Chunlan believes that ESG factor increasingly becomes the reference factor for financial institutions, and the better the quality of ESG information disclosure can increase the trust of financial institutions in enterprises [21]; Song Jia et al. proposed that ESG practice can publish business information, can alleviate the problem of information asymmetry between enterprises and financial institutions, and enterprises with good ESG performance are more likely to be favored by banks and other financial institutions [22].

For banks, the improvement of enterprise ESG level also plays an important role. From the perspective of controlling financing risks, Shi Yichen et al. proposed that banks can only provide stable financing channels for the real economy on the premise of reasonably controlling risks, and the inclusion of ESG into the credit mechanism can reduce the non-performing loan ratio, improve the risk management ability, and further enhance the economic level [23].

2.3 The Relationship between the Enterprise ESG Level and the "Green Credit" Policy

With the development of new quality productivity level, more and more enterprises pay attention to and improve the

level of ESG. Ma Jun (2021) pointed out that the communication between environmental protection and financial communication is particularly important, and information disclosure is a great challenge for both enterprises and banks [24]. Zhang Xiaoyan et al. also mentioned that the information disclosure system in the enterprise ESG level has become the key [25] to activate green finance. From the perspective of practice, Wang Xinlan et al. mentioned that with the development of ESG practice of enterprises, enterprises will initially disclose their business information, making the information exchange between enterprises and financial institutions [26]. Li Jinglin et al. concluded that financial institutions have sufficient understanding of enterprise information, which can greatly enhance the trust in enterprises, reduce the financing constraints of enterprises, and help enterprises to obtain more and more financing funds [27].

To sum up, the research results of many scholars reveal the multidimensional influence of the relevant theoretical research of green development and low-carbon development. In general, the improvement of ESG level is conducive to the development of enterprises, can enhance enterprise value, reduce risks, enhance sustainable development performance, and can also alleviate the information asymmetry between enterprises and financial institutions, so that enterprises are favored by financial institutions. In terms of the relationship between the enterprise ESG level and the "green credit" policy, the development of new quality productivity urges enterprises to pay attention to the improvement of the ESG level. Information disclosure is the key. Although facing challenges, information exchange in enterprise practice can enhance the trust of financial institutions, reduce enterprise financing constraints, help enterprises in financing, and promote the effective implementation of green credit policies and the green transformation of the economy.

3 RESEARCH TECHNIQUE

3.1 Dynamic Game Model

Conflict analysis is a method of decision analysis, which is developed from the partial countermeasure theory. In practical application, conflict analysis uses mathematical models to describe the conflict phenomenon, extracts the essence and characteristics of the conflict process, and analyzes a kinds of possible and inevitable conflict results, which provides a strong decision-making basis for decision makers. Conflict analysis originally originated from game theory, and through the development of sub-countermeasure theory and F-H method, it was finally formed as the conflict analysis graph model theory GMCR.

3.2 Multiple Regression Analysis Model

Multiple regression analysis model is a statistical analysis method based on multivariate relationships to explore the mechanism of multiple independent variables on the dependent variables. In order to deeply understand the relationship between the level of new quality productivity, ESG level and green credit capacity, we used the multiple regression model for data analysis. The interactions and effects between these three variables are revealed through specific data and tables.

4 STUDY DESIGN AND CONCLUSIONS

4.1 Dynamic Game Model

4.1.1 Research process

In view of the different degrees of the development of new quality productive forces in enterprises, it can be roughly divided into active participation in the development and transformation of new quality productive forces and negative participation in the development and transformation of new quality productive forces. Although the two belong to the development of new quality productive forces, they belong to different interest subjects. In order to maximize their own interests, they will adopt game strategies and finally achieve the game balance. In the classification of ESG assessment of the third party institutions, the third party institutions are divided into two categories: loose assessment and rigorous assessment. The strategy of rigorous and meticulous evaluation is N, the strategy of loose evaluation is V, the strategy of rigorous evaluation is X, and the strategy of loose evaluation is R, then the utility of positive response and negative response enterprises under each strategy combination can be divided into four strategy combinations (as shown in Table 1).

Table 1 Game Matrix between Enterprises and ESG Evaluation Agencies

coping with / Negative response	Rigorous Assessment (X)	Loose Assessment (R)
Rigorous Assessment (N)	a,b(S1)	c,d(S2)

Loose Assessment (V)	e,f(S3)	g,h(S4)

If PW is the probability of the negative transition enterprise being loose assessment, then the probability of the negative transition enterprise is 1-PW; PH is the probability of the positive transformation enterprise, and the probability of the positive change enterprise is 1-PH. According to the method of calculating the mixed strategy Nash equilibrium, you can separately calculate the expected payment of the two game players using the respective two pure strategies and make them equal:

$$PW * B + (1 - PW) * D = PW * F + (1 - PW) * H \quad (1)$$

$$PH * A + (1 - PH) * C = PH * E + (1 - PH) * G \quad (2)$$

Solving the above equation can get the mixed Nash equilibrium of both sides, that is, what strategies the positive and negative enterprises adopt and the proportion of their respective strategies. On this basis, we can further analyze the transformation direction of new quality productivity and the transformation of the evaluation mode of ESG evaluation agency.

The development of the new quality productivity level of enterprises refers to the improvement of production efficiency, quality and sustainability of enterprises through technological innovation and management optimization. Such development often requires a lot of money. Bank green credit lending is a loan method provided to support environmental protection, energy saving, clean energy and other projects. The core of it is to encourage and support sustainable development projects.

Among them, there may be differences in capital demand, inconsistency in risk assessment, dissynchronization of policy and market and asymmetry of information. This can lead to conflicts between companies and banks. In order to resolve this contradiction, so that both sides can benefit, the conflict analysis diagram model is used to solve the conflict problem (as shown in Figure 1).

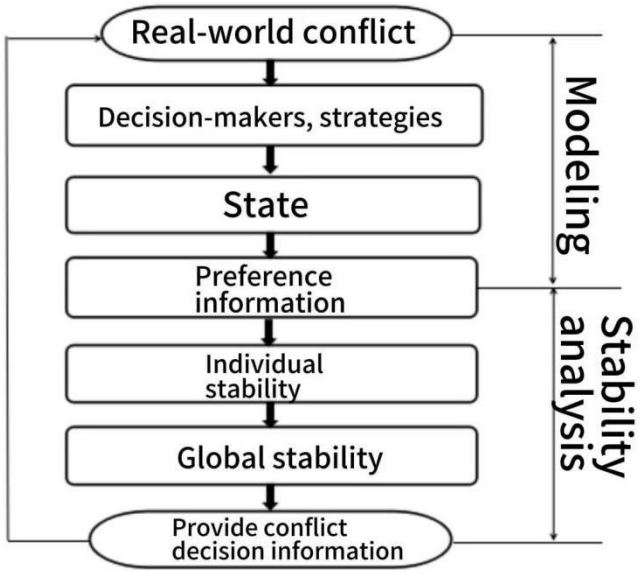

Figure 1 Process of the Conflict Analysis Diagram Model to Resolve Conflict Problems

On the basis of a full understanding of the background of the real conflict, the real conflict is abstracted into a mathematical model, and the stability analysis of the model is conducted, so as to obtain the equilibrium solution of the conflict event. Among them, the modeling process includes identifying the decision makers and strategies in real conflicts, analyzing the feasible state and state transition and preferences of decision makers; and stability analysis is mainly calculating individual stability and global stability.

The participants of green credit and their strategies are shown. Where "Y" means that the decision maker chooses the strategy, "N" means that the decision maker abandons the strategy, and "S" means each feasible state (as shown in Table 2).

Table 2 Participants and Their Decisions

Name of participant	policy	S1	S2	S3	S4	S5	S6	S7	S8
enterprise	Positive development	Y	Y	Y	Y	N	N	N	N
	Negative development	N	N	N	N	Y	Y	Y	Y

third party Evaluation agency	Loose assessment	Y	Y	N	N	Y	Y	N	N
		N	N	Y	Y	N	N	Y	Y
	Strict evaluation								
bank	Raise the threshold	Y	N	Y	N	Y	N	Y	N
		N	Y	N	Y	N	Y	N	Y
	Lower the threshold								

The three-party game relationship formed in this way will be analyzed by the conflict analysis diagram model (GMCR), which is a mutual transfer model between eight states. Red represents the decision of the enterprise, yellow represents the decision of the third-party evaluation agency, and green represents the decision of the bank. As shown in Figure 2.

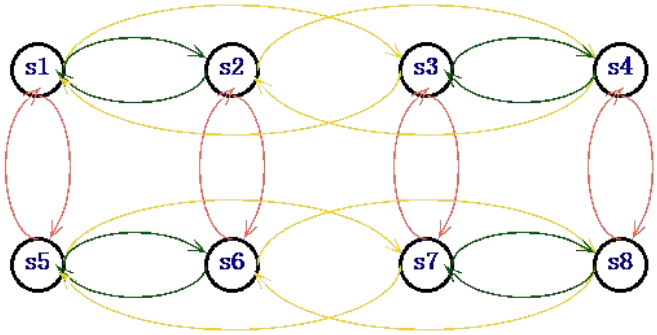

Figure 2 The Conflict State Transfer Diagram Model between Enterprises, Third-Party Evaluation Agencies and Banks

4.1.2 Finding

In the game between enterprises and ESG evaluation agencies, different sides achieve different utility under the combination of different strategies. Actively respond to the enterprises under the rigorous evaluation strategy and achieve a better balance with the evaluation agencies, and negatively respond to the enterprises have certain advantages under the loose evaluation strategy. The transformation direction of the new quality productivity of enterprises interacts with the evaluation mode of the ESG evaluation agency.

The results of the conflict analysis model between the development of new quality productivity and bank green credit lending show that the two sides have different stability states under different strategies, and a win-win situation can be achieved by adjusting the strategies.

4.2 Multiple Regression Analysis Model

4.2.1 Research process

In order to study the correlation between new quality productivity and ESG levels, we collected relevant data on A-share listed companies in China from 2015 to 2022, including ESG score in 2023 and new productivity level in 2022. The level of new quality productivity is mainly calculated through the three dimensions of scientific and technological productivity, green productivity and digital productivity. The ESG score covers three performance evaluations of the environment, society and governance.

The following is a table presentation of some of the sample data (as shown in Table 3):

Table 3 Shows Some Enterprise ESG Data

Enterprise referred to as	ESG score-annual mean	New-quality productivity * 1,000
Vanke A	6.25	17.3608
Guohua network security	3	7.9391
ST star source	2	2.8555
Shenzhen Zhenye A	4.75	4.7509
*ST brand new	3	2.2611
China high-speed railway	4.25	6.0476
China baoan	4.75	4.2600
Beautiful ecology	2.25	1.0291
Shenzhen property A	4.75	0.2448

Data source: According to the ESG rating data; according to the relevant data of Mark database, the data is rounded up, with some errors.

Y represents the new quality productivity index, which can be such as output rate, innovation ability, technology improvement, etc.
X1, X2, and X3 represent the performance scores or indicators of the environment (E), society (S), and corporate governance (G), respectively.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon \quad (3)$$

Here is the intercept, the coefficient $\beta_0\beta_1$、β_2、$\beta_3\varepsilon$of the respective variable, indicating the weight of its influence on the new quality productivity, but the error term.
Through the correlation analysis of the above data, we found that P <0.05, which is significant, that is, there is a significant positive correlation between the level of new quality productivity and ESG score, that is, the higher the enterprise with ESG score tends to have a higher level of new quality productivity.
This result shows that the excellent performance of enterprises in the environment, society and governance can promote the improvement of their new quality productivity. Specifically, the improvement of ESG level may affect the new quality productivity of the enterprise through the following aspects:
1. Environmental improvement will help enterprises to reduce energy consumption and reduce pollution, so as to improve the efficiency of resource utilization and promote the development of green productivity.
2. Excellent social performance can enhance the brand image and reputation of the enterprise, attract more talents and partners, and thus promote the improvement of scientific and technological productivity and digital productivity.
3. The improvement of governance can optimize the internal management and decision-making mechanism of the enterprise, improve the operation efficiency and innovation ability, so as to promote the overall level of new quality productivity.
We collect data on new quality productivity levels, ESG score and green credit capacity of several enterprises. New quality productivity level is a comprehensive indicator from the comprehensive consideration of technology, green and numbers; ESG score reflects the performance of the enterprise in environment, society and governance; and green credit ability is measured by the green credit line obtained by enterprises.
Based on these data, we constructed a multiple regression model with novel quality productivity level as the dependent variable and ESG level and green credit capacity as independent variables. Through the regression analysis, we can explore the impact of ESG level and green credit capacity on the level of new quality productivity.
The regression analysis table (as shown in Table 4):

Table 4 Table of the Results of the Linear Regression Analysis

Linear regression analysis resulted in n=51									
	Non-standardized coefficients		Standardization coefficient	t	P	VIF	R^2	adjust R^2	F
	B	standard error	Beta						
constant	154.897	36.254	-	4.273	0.000***	-			F=85.792 P=0.000***
New quality productivity level	21.272	3.173	0.633	6.703	0.000***	1.957	0.781	0.772	
ESG grade	34.768	10.354	0.317	3.358	0.002***	1.957			
Dependent variable: green credit line (ten thousand yuan)									

Note: * * *, * * and * Represent the Significance Levels of 1%, 5% and 10%, Respectively

The analysis of the results of the F test can be obtained, a significance P-value of 0.000 * * *, significant at the level, the null hypothesis of regression coefficient of 0 is rejected, so the model basically meets the requirements.
For variable collinearity performance, the VIF is all less than 10, so the model does not have multicollinearity problems and the model is well constructed.

4.2.2 Results of the study

Based on the multiple regression analysis, we obtained the following results (as shown in Table 5).

Table 5 Results of the Multiple Regression Model

variable	coefficient	test value
constant	154.8967415036256	1
New quality productivity level	21.271755544996516	
ESG grade	34.767656924145065	
Predicted results-		154.8967415036256

Through the multiple regression analysis, we obtained the following regression results:
ESG level has a significant positive impact on the level of new productivity, that is, the higher the level of new productivity, the higher the ESG score.
Green credit capacity also has a positive impact on the level of new quality productivity, that is, for enterprises that obtain more green credit lines, the level of new quality productivity also increases accordingly.

5 CONCLUSION AND SUGGESTION

5.1 Research Conclusions

Under the background of the development of new quality productivity, there are close links between the transformation direction of enterprises, ESG performance evaluation mode, the subject competition and cooperation relationship of green credit access conditions, the influence of ESG performance on green credit capacity, and the multi-subject equilibrium conditions of high-quality development.

Enterprises should actively adapt to the development requirements of new quality productivity, improve the performance of ESG, so as to enhance the green credit capacity and achieve sustainable development.

5.2 Policy Recommendations

The authority should further improve the green credit policies, establish a unified green credit standards and regulatory framework, and guide financial institutions to increase their support for green projects.

Banks should optimize the green credit evaluation system, give full consideration to the ESG performance of enterprises, and improve the use efficiency of green credit funds. On the one hand, banks can introduce professional ESG evaluation talents or establish deep cooperation relations with authoritative ESG rating agencies to ensure the accuracy and professionalism of the ESG performance evaluation of enterprises. On the other hand, big data, artificial intelligence and other financial technology means are used to build an intelligent green credit risk assessment model, dynamically monitor and accurately assess the green project risks of enterprises, and reasonably adjust the loan interest rate and loan amount according to the project risk status, so as to improve the efficiency of capital allocation.

Enterprises should strengthen their own ESG management, actively promote technological innovation and industrial upgrading, and enhance their sustainable development ability. At the same time, strengthen the communication and cooperation with stakeholders, and jointly promote the sustainable development of enterprises and society. A special ESG management team shall be established within the enterprise, responsible for formulating and implementing the ESG strategic planning, conducting regular ESG training activities, and improving the ESG awareness and responsibility of all employees. In terms of technological innovation, we should increase investment in research and development, set up internal R & D laboratories or jointly carry out green technology research and development projects with universities and research institutions, accelerate the transformation of scientific and technological achievements into actual productivity, and enhance the core competitiveness of enterprises in the green industry. In terms of cooperation with stakeholders, enterprises can jointly establish green supply chain management system with suppliers to promote upstream and downstream enterprises to carry out energy conservation and emission reduction and green production; actively participate in ESG exchange activities organized by industry associations, share experience and best practice cases, and promote the overall ESG level of the industry; actively disclose ESG reports to the public, accept social supervision, and enhance corporate social image and credibility.

In addition, international exchanges and cooperation should also be strengthened. With the acceleration of global economic integration, the concept of green finance and ESG has spread and applied increasingly widely in the international scope. The authorities, financial institutions and enterprises of all countries should actively participate in the International Green Finance Forum, ESG Seminar and other exchange activities, share their own experience and achievements in the development of new quality productivity, green credit and ESG practices, and learn from advanced international policies, technologies and management models. For example, in terms of green credit standards, can refer to the international financial organizations such as the world bank, the international monetary fund issued the relevant guidelines and guidelines, combined with their national conditions for localization adjustment and perfect, promote the global green financial rules, promote the global response to climate change and promote the sustainable development of collaborative ability. At the same time, we will encourage domestic financial institutions and enterprises to carry out cross-border green investment and cooperation projects, expand the international space of the green financial market, optimize the allocation of global green resources, and jointly contribute to the green and low-carbon transformation of the global economy.

Through the above coordinated efforts in various aspects, it can better promote the sustainable development of enterprises under the background of new quality productivity development, promote the continuous improvement of the green financial system, and help the global economy towards a new stage of green, low-carbon and high-quality development.

COMPETING INTERESTS

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

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