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Research Article

Digital Technology in Strategic Orientation and Performance of Construction Trade in Guangdong Under WTO Framework: A Literature Review

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ABSTRACT

This study explores the role of digital technology in the relationship between strategic orientation and international trade performance, focusing on construction enterprises in Guangdong Province under the WTO framework. While market orientation, innovation orientation, and learning orientation are key drivers of trade success, digital transformation significantly enhances its impact by streamlining operations, improving regulatory compliance, and optimizing supply chains. However, slow adoption of digital tools due to financial constraints, cybersecurity concerns, and inconsistent WTO digital trade policies pose challenges for construction firms. This study integrates the theoretical underpinning of the resource-based View (RBV) and Dynamic Capabilities Theory (DCT) to explain how digital resources serve as strategic assets and dynamic enablers of trade performance. The systematic literature findings suggest that harmonized digital trade regulations and industry-wide digital adoption initiatives are necessary to improve global competitiveness. Future research should explore longitudinal studies and sector-specific digital policy frameworks to enhance the technological adaptability of construction enterprises in international trade.

Keywords: Digital Transformation, Strategic Orientation, International Trade Performance, Construction Enterprises, WTO Digital Trade Policies.

INTRODUCTION

Background and Context

The construction industry is an important sector in the economy through enabling infrastructure development, which is crucial for increasing international trade in Guangdong Province. As one of China's leading provinces, Guangdong has completely opened up to the global market as a center for manufacturing and trade; construction firms are especially involved in cross-border contracts and exports of construction materials, equipment, and engineering services (W. Xia, Y. Zheng, L. Huang, & Z. Liu, 2023). As China progresses towards globalization and participates in WTO (World Trade Organization), construction enterprises are making efforts to strengthen their strategic competitiveness worldwide (Beliaeva, Shirokova, Wales, & Gafforova, 2020).

Strategic orientation on the other hand deals with the firm capacity to match up its resources, capabilities, and focus on markets with external opportunities and threats. It covers the market orientation, innovation orientation, and learning orientation which determine the international competitiveness of a firm (Kindermann et al., 2021)

Market-driven firms operate with the current trends of the international market, innovation-driven firms use technology as an input, and learning-driven firms operate as per the changing rules and regulations of

international trade (Meekaewkunchorn, Szczepańska-Woszczyna, Muangmee, Kassakorn, & Khalid, 2021).

Digital transformation has become an important driver of internationalization by offering better management of operations, better information sharing in supply chain management, and expansion opportunities (Drori, Alessandri, Bart, & Herstein, 2024). Technologies such as blockchain, artificial intelligence, cloud, and big data have enhanced the globalization of trade by cutting transactional costs and informing decision-making (Gomez-Trujillo, Velez-Ocampo, & Gonzalez-Perez, 2021). However, the use of digital technology in construction enterprises has not caught up with organizational support as most enterprises face challenges in management and utilization of available technology for international business (Naji, Gunduz, Alhenzab, Al-Hababi, & Al-Qahtani, 2024).

The WTO has strategic functions in international trade development, especially in setting rules on digital trade and regulating e-commerce, cross-border transactions, and intellectual property protections (WTO, 2021). The current WTO agreements like the Joint Statement Initiative on E-commerce have indicated increased reliance on digital technology in the current global trading system (Chander, 2020). However, some gaps emerge to indicate that the WTO policies still lag on how the construction industries can adopt digital transformation (Wirjo et al., 2020). More research is needed to determine how the WTO policies affect the digital trade of construction firms.

Problem Statement

Previous research has established that digital technology has an influence on international trade, particularly in the construction sector, however, there is limited literature that examines the impact of strategic orientation and trade performance using digital technology. While prior research has investigated the relationship between strategic orientation and firm performance, the effects of digitalization on trade competitiveness have received less attention (Meekaewkunchorn et al., 2021; Gomez-Trujillo et al., 2021).

New technologies, such as cloud computing, blockchain, intelligence, and data analysis, are revolutionizing trade by making it easy and transparent in the world market. However, the extent to which these digital solutions have contributed to enlarging the conversion rate of construction enterprises in Guangdong from the international perspective is still open to debate (Beliaeva et al., 2020). While some firms leverage technology tools to manage production and penetrate global markets, others are constrained by integration issues that affect their trade (Naji et al., 2024). While some firms leverage technology tools to manage production and penetrate global markets, others are constrained by integration issues that affect their trade.

The systematic literature review (SLR) is crucial for aggregating and mapping existing knowledge and for future work to identify the gap where digital technology affects trade competitiveness in the construction sector. Thus, the purpose of this study is to establish a better understanding of the strategic use of digitalization in the international trading environment and articulate future research directions. As the WTO supports Digital Trade policies, a critical approach to understanding their impact on the usage of digital technologies by construction enterprises is lacking. This is important because of increased interconnectivity through the digitalization of import and export trade globally. To fill the above gaps, this study aims to adopt an SLR to examine the role of digital technology on strategic orientation and international trade performance in the construction industry in Guangdong under the WTO regime.

Research Objectives & Research Questions

The purpose of this study is to investigate how strategic orientation influences the international trade activity of construction enterprises in Guangdong Province and analyses the function of digital technology under the WTO framework. The key objectives are:

Examine the impact of strategic orientations on the international trade performance of construction enterprises in Guangdong Province.

Analyze the contributions of digital technologies—cloud computing, blockchain, artificial intelligence, and data analytics—in enhancing the trade competitiveness of construction companies.

Evaluate WTO's policies on digital trade and their role in promoting and regulating digital technologies in international construction trade.

From the following research questions, this study aims to provide the answers through the systematic literature review:

What does past literature reveal about the impact of various strategic orientations on the international trade performance of construction enterprises in Guangdong?

How have digital technologies—such as cloud computing, blockchain, and AI—been utilized to enhance trade

efficiency, effectiveness, and competitiveness?

How do WTO's international digital trade policies influence the adoption of digital transformation in construction enterprises?

Therefore, this paper aims to examine and identify the research gaps in the context of strategic orientation, digitalization, and international trade performance in the construction sector of Guangdong Province.

Significance of the Study

This paper contributes to the existing literature in areas of international trade, digital transformation, and strategic management through a thorough synthesis of the relevant literature. Consequently, focusing on Guangdong's construction industry provides insights into how firms can use technology advancements to improve their trade performance (Gomez-Trujillo et al., 2021). From a policy perspective, the research results will help WTO policymakers understand the difficulties construction enterprises experience when engaging in the implementation of digital trade to enhance the definition of international policies (Chander, 2020). Furthermore, this research enables business managers to create digital strategies in the context of the international environment to enhance their ability to compete globally (Naji et al., 2024).

Therefore, this research lays the groundwork for future empirical research on digital transformation in international trade by filling various gaps in the literature. These findings will be of use to academics, policymakers, and construction industry professionals so that the construction enterprises in Guangdong will be able to develop strategies that will effectively deal with the global trade uncertainties prevailing under WTO.

LITERATURE REVIEW

The Role of Strategic Orientation in International Trade

Strategic orientation has a significant relation with competitive advantage, flexibility, and sustainability of a firm in international business (Khan, Salamzadeh, Abbasi, Amin, & Sahar, 2022). The challenges that firms face in the current trade environment are diverse and more so bearable due to shifting regulatory rules, the differences in culture, and changes in the economy, advances in technology/ engineering. This paper identifies that a strategic orientations framework consisting of market orientation, innovation orientation, and learning orientation can assist the international trade strategy formulation by the firms by guiding the positioning of corresponding strengths, resources, and capabilities.

Market orientation is essential in compensating for the efficiency of helping firms identify customers' needs, competencies, and environments in various areas globally. In the view of Khan et al. (2022), a firm that invests in market intelligence is in a better position to develop products and services that fit the various international markets and, hence, increase its competitiveness. This is especially true for industries such as construction, which requires the recognition of regional and national requirements as well as materials and environmental standards before one can transact in that particular market (Meekaewkunchorn et al., 2021).In addition, the literature shows that market-oriented firms leveraging digital technologies like AI-enabled market analysis, smart contract compliance based on blockchain, and cloud-managed project in the international context give a competitive advantage to firms (Brahmana, Ali Akbar, Camelia, & Sinaga, 2022; Akter, Hossain, Lu, & Shams, 2021). These technologies help firms to improve compliance, analyze market trends, and manage their supply chains. In the construction industry that has compliance with regulatory requirements, materials sourcing, and risk management affecting trade performance, utilizing market intelligence through technology makes decisions and processes optimal (Naji et al., 2024).

Innovation orientation adds to the competition improvement of an organization in the global environment as it ensures the necessary production of products, services, and processes that are suitable for the global market (Sondhi, Salwan, Behl, Niranjan, & Hawkins, 2024). It was found that firms involved in research and development and technological innovations can easily stand out from the rest if there are changes in trade policies. Firms that invest in research and development, and technological advancements have a strategic plan to survive by embracing new changes in trade policies such as compliance rules, digital trade, and sustainability standards (Alshourah, Altawalbeh, Mansour, Al Haraisa, & Al-Kharabsheh, 2023). The market changes are facilitated by the use of technological innovations such as blockchain, AI, and automated systems for firms' market access and regulation.

Moreover, orientation in learning constitutes another success factor within international trade. As pointed out by Tolstoy, Nordman, and Vu (2022), firms that can accumulate and implement new knowledge are in a position to respond to any changing trade features, such as economic volatility, alterations in tariffs, and shifts in

geopolitics. Companies that adopt learning will ensure that they develop strategies to handle the risks as well as gain from opportunities that emerge within trades.

However, although the presence of strategic orientation is deemed to determine the international trade performance, it is not enough. The role of digital technologies has emerged as one of the most critical success factors for firms as these technologies accelerated trade by providing the exact strategic initiatives for supply chains and global market insights (Attaran, 2020). Digital transformation can be seen to enhance strategic orientation in that the firms are equipped with the new tool and insights to positively effect change in the global environment.

Digital Technology in World Trade Performance

It is a fact that the introduction of digital technology has had a profound impact on enhancing the efficiency of international trade (Vuko, Thango, & Nethanani, 2024) through facilitation and reduction in cost and promotion of transparency of transactions. Technologies like AI, blockchain, and cloud/ data analytics let firms enhance supply chain management, contract handling, and risk evaluation (Hussain & Al-Turjman, 2021). These advancements make international trade efficient by relieving the delays and repetition of errors while doing the formalities and observing the legal requirements of other countries.

Girardi (2023) asserts that digitally capable firms are better placed to compete in the international market since they implement mechanized logistics, are in a better position to deal with regulatory issues, and have an opportunity to manage and analyze big data for decision-making. Digital transformation improves the strategic disposition of firms to help them perform better in the market and make proactive decisions on trade risks and customer relations. According to L. Liu, J. Z. Zhang, W. He, and W. Li (2021), the expansion of digital technologies has improved the efficiency of dealing with information asymmetry in activities linked to international trade transactions, thereby allowing firms to develop more appropriate decisions in a shifting market environment.

However, Naji et al. (2024) explain that the strategy is not harmless, as there are limitations when firms embrace digital transformation due to technological constraints, cost factors, and regulations. Geopolitical factors remain evident in present-day global trade, specifically in emerging economies, mainly because of inadequate technology accessibility, security risks, and diverse rules and policies. Such barriers indicate that trade performance improvement cannot solely rely on digital technology; firms' internal digital competencies should be realized and synchronized with the relevant global trade policies.

Theoretical Perspectives on Digital Trade and Strategic Orientation

The Resource-Based View (RBV) and the Dynamic Capabilities Theory (DCT) enhance the understanding of the role of technology in the WTO. RBV, in particular, points out that only those firms that have access to and commit the valuable sporting assets can achieve competitive advantage when those assets are rare, difficult to imitate, and have no substitute. Digital tools are defined as elements, valuable assets for use to improve operations and competitiveness within the context of the global supply chain (Girardi, 2023). This means that businesses that adopt the use of technology can enhance the process of trade, (Kowalski, Lee, & T. K. Chan, 2021) increase the quality of decision-making, and expand their operations into the global market.

On the other hand, DCT holds to the idea that firms need to strive to ensure that they capture the trends in the use of technology through investment in the technology if there is to be sustainable be competitiveness in the international trade (Paul & Dhiman, 2021). This way, strong dynamic capabilities cause firms to be adaptable to the global markets by applying AI in trade analytics, employing blockchain contracts, and integrating robot-generated compliance reports (Zong & Guan, 2024). However, there are still some imperatives that act as barriers to people's decision to adopt the digital platforms. Hence, from the studies of Akter et al. (2021), it has been observed that the decisive barriers that prevent many firms in the emerging market from embracing digital technologies include high costs, lack of skilled workforce, and cybersecurity threats. Additionally, W. Xia et al. (2023) note that other forms of dynamism in digital trade regulation cause problems and hinder the development of digital trade in international markets. This is in line with the Resource-Based View (RBV) where digital trade policies are identified to benefit firms with technological resources and being a constraint for firms that lack resources in adapting to new regulations. As well, the Dynamic Capability Theory (DCT) specifies that firms have to adapt to new trade digital laws through innovation and compliance. To improve IT compliance under WTO rules for the construction enterprises in Guangdong province, the integration of new technologies like blockchain and AI is crucial to managing the dynamic trade policies.

Literature Review Gap

Although the influence of digital technology on firm performance and supply chain management has been described in a plethora of articles (Girardi, 2023), the related studies focus on the trade performance globally in a

rather limited manner. The previous work does not incorporate digital adoption difficulties that firms in emerging markets encounter, with more concentration on developed nations (Akter et al., 2021). Moreover, papers mainly focus on the positive outcomes at the company level while addressing regulatory barriers, digital inequalities, or geopolitical factors that hinder global trade, which are yet sparsely researched (W. Xia et al., 2023). Another research gap is the lack of research focusing on specific selection criteria of digital competencies to support the international trade policies in improving firms' performance. Whereas DCT argues about the necessity under which firms have to tread for technology changes, there is very little scholarly work on the part of trade agreements and digital governance competence in promoting or constraining digital trade.

METHODOLOGY

Systematic Literature Review (SLR)

A Systematic Literature Review (SLR) is an orderly and rigorous method of washing, scrutinizing, and compiling literature related to a certain subject (Xiao & Watson, 2019). The previous research is first searched and reviewed through databases, academic and research journals, conference papers, and other non-reviewed sources. Afterwards, a strict selection method is put into practice, where the identification of studies is usually presented on the PRISMA flow diagram, which indicates the number of included studies, excluded studies, excluded duplicates, and excluded studies after the analysis of title and abstract (Page et al., 2021). As noted by Snyder (2019), an SLR ensures that the study is rigorous through the use of search procedures and terms, inclusion and exclusion criteria, and thematic analysis frameworks to provide more objective and valid conclusions. For this reason, this methodology is suitable for this study since the use of digital technology in international trade is an emerging concept that needs synthesis of knowledge from trade, business, and digital transformation perspectives (Boell & Cecez-Kecmanovic, 2015).

In addition, to review and select studies, the study employs the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline established by Page et al., (2021). From the analysis of previous research, this paper presents empirical findings on how the function of digital transformation mediates the relationship between strategic orientation and trade performance for construction.

Search Strategy & Selection Criteria

In line with the PRISMA guidelines for SLRs, this SLR aims at identifying and including all studies focusing on the management of poor prognosis patients eligible for the current analysis based on well-defined inclusion criteria. A literature review was therefore made in the various academic and industry relevant databases to unveil relevant peer-reviewed articles on digital transformation on strategic orientation on trade performance in the construction industry.

The databases that were used for this particular search were:

Google Scholar – For obtaining numerous articles, policy papers, and conference proceedings cutting across disciplines.

Web of Science & Scopus – For finding scholarly articles of high relevance and quality related to the topics of digitalization, strategic management, and international business.

WTO Reports – as a source for obtaining information concerning policies and regulations of digital trade globally.

Industry Analysis Reports – For evaluating the effectiveness of the digital technologies in construction enterprises.

Search Keywords

An AND approach is used through the following keyword; and their relevant sub-topic that were used in the search include:

"Strategic Orientation" AND "International Trade Performance"

"Digital Transformation" AND "Trade"

"WTO Policies" AND "E-commerce Regulations"

"Construction Enterprises" AND "Digital Adoption in Global Trade"

Inclusion & Exclusion Criteria

As for the criteria used in selecting articles, the following were used;

Inclusion Criteria:

Peer-reviewed journal articles and conference papers.

Current research to capture a new generation's ideas and concepts of the trade is evident from 2013 to 2024.

English-language publications to ensure accessibility.

Topics of papers on IMF dealing with various issues such as digital transformation, strategic orientation and services trade performance.

Exclusion Criteria:

Non-peer-reviewed sources such as blog posts and opinion pieces.

Research studies that are not necessarily connected with the digital trade or with the organizational strategic management plan.

After excluding articles before the year 2013, in case, they provide the base for the theoretical framework used later.

PRISMA Flow Diagram & Study Selection

According to the PRISMA checklist, the flow of articles involves four steps, which are identification of the studies, screening of the articles, determining the eligibility of the studies, and inclusion of the studies into the review. The studies estimated in each stage are as follows:

Synthesis: A total of 3,250 papers were identified in the search in the selected databases at this stage.

Google Scholar: 1,500 studies

Web of Science: 800 studies

Scopus: 600 studies

WTO Reports: 200 studies

Industry Analysis Reports: 150 studies

Titles and abstract screening: From the remaining after the elimination of irrelevant records, 2,100 articles went through the next phase of titles and abstract screening after excluding 1,150 records, which were duplicates.

Inclusion Criteria: By comparing the results of all the texts, including the full texts, it was determined that 500 studies were not relevant or peer-reviewed.

Screening: Out of the 145 potentially eligible articles, a final list of 20 articles was compiled and classified according to the identified topics in this systematic content analysis. These papers were identified given methodological soundness, relevance to the research objectives, and contribution to the field of digital adoption in international trade.

PRISMA Flow Diagram (Figure 1)

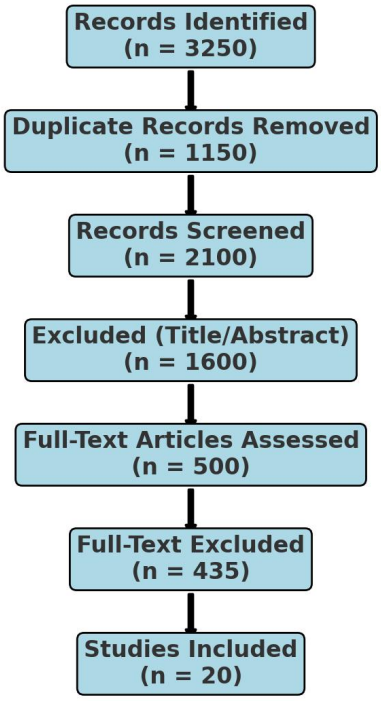

Figure 1. PRISMA Flow Diagram: Study Selection Process

Data Extraction & Thematic Analysis

In a synthesis of studies for this subject, research works were grouped into three broad classes:

The research focuses on market, innovation, and learning orientation and its impact on trade competitiveness.

Technology Assimilation: Assessment of the impact of Advanced Technologies such as Artificial Intelligence, Blockchain Technology, and Automation on trade performance.

WTO Implications in Digital Trade: Assessing global trade policies on digital trade adoption in construction enterprises.

To extract the themes, the method that was adopted was a coding technique that involved the identification of patterns across the chosen literature. The findings of this study helped to give an understanding of how digital transformation moderates the linkage between the level of strategic orientation and international trade performance.

Summary of Finalized Studies

Table 1 below presents an overview of the four finalized studies, detailing their citation, aim, methodology, and key findings.

Table 1. Summary of Finalized Studies

Source Citation	Author(s)	Study Aim	Methodology	Key Findings
Alshourah et al. (2023)	Alshourah, Altawalbeh, Mansour, Al Haraisa, and Al-Kharabsheh	Examines the impact of digital strategic orientation on firm performance under environmental uncertainty	Empirical Study (Survey-Based Analysis)	Digital strategic orientation enhances trade competitiveness, but effectiveness depends on regulatory stability and market conditions.
Yu et al. (2024)	Yu, H. Zhong, and Bolpagni	Examines the integration of blockchain with	Systematic Literature Review (SLR)	Blockchain and BIM integration enhance contract transparency,

Source Citation	Author(s)	Study Aim	Methodology	Key Findings
		BIM for global construction trade		reduce trade risks, and streamline compliance in international construction projects.
Akter et al. (2021)	Akter, Hossain, Lu, and Shams	Examines the role of big data-driven strategic orientation in international marketing	Empirical Study (Survey & Data Analysis)	Big data analytics enhance market intelligence, strategic decision-making, and trade competitiveness in international markets.
Naji et al. (2024)	Naji, Gunduz, Alhenzab, Al-Hababi, and Al-Qahtani	To systematically review the digital transformation trends, challenges, and opportunities in the construction industry	Systematic Literature Review (SLR)	Digital adoption improves efficiency and project management in construction but faces barriers like cost, cybersecurity risks, and regulatory inconsistencies.
Meekaewkunchorn et al. (2021)	Meekaewkunchorn, Szczepańska-Woszczyna, Muangmee, Kassakorn, and Khalid	Examines the role of learning orientation in enhancing international trade performance	Empirical Study (Survey-Based Analysis)	Learning orientation strengthens firms' ability to integrate digital tools, improving strategic adaptability and competitiveness in global markets.
Chander (2020)	Chander	Explores WTO's digital trade agreements	Policy Analysis	WTO agreements facilitate digital trade liberalization.
Wirjo et al. (2020)	Wirjo, Müller, del Carmen, Sangaraju, D., Crystal, and Siah	Evaluates gaps in WTO e-commerce policies	Systematic Review	WTO lacks sector-specific digital trade regulations.
Khan et al. (2022)	Khan, Salamzadeh, Abbasi, Amin, and Sahar,	Analyzes strategic orientation & trade performance	Quantitative Study	Strategic orientation increases firm competitiveness.
L. Liu et al. (2021)	Liu, L., J.Z. Zhang, W. He, and W. Li	Examines blockchain's role in international trade	Empirical Analysis	Blockchain enhances transparency and efficiency in global supply chains.
Girardi (2023)	Girardi	Assesses dynamic capabilities in trade performance	Conceptual and Theoretical Analysis	Dynamic capabilities foster business model transformation, enabling firms to adapt to digitalization and trade competitiveness.
Jain & Kartar Singh (2024)	Jain and Kartar Singh	Investigates digital trade barriers	Policy Analysis	Cybersecurity risks and compliance costs hinder trade efficiency.

Source Citation	Author(s)	Study Aim	Methodology	Key Findings
Hussain & Al-Turjman (2021)	Hussain and Al - Turjman	Analyzes AI's role in digital trade efficiency	Literature Review	AI enhances supply chain optimization
Eisenhardt & Martin (2000)	Eisenhardt and Martin	Explores Dynamic Capabilities Theory	Theoretical Framework	Firms must constantly adapt technology for trade success.
Paul & Dhiman (2021)	Paul and Dhiman	Reviews export competitiveness literature	Systematic Review	Digital transformation influences trade competitiveness.
WTO (2021)	WTO Report	Outlines WTO's digital trade policies	Policy Report	WTO promotes digital trade but lacks sector-specific clarity.
Zong & Guan (2024)	Zong and Guan	Assesses AI-driven trade efficiency	Empirical Study	AI-powered predictive analytics improve global market positioning.
Tapscott & Tapscott (2016)	Tapscott and Tapscott	Investigates blockchain's impact on global trade	Theoretical Study	Smart contracts reduce fraud and enhance trust in digital trade.
Drori et al. (2024)	Drori, Alessandri, and Bart	Analyzes digitalization's role in trade expansion	Case Study	Firms leveraging digital transformation outperform competitors.

RESULTS

Strategic Orientation and International Trade Performance

Strategic orientation is one of the most important predictors of the international trade performance of firms especially in industries such as construction that operates in a constantly changing environment. It refers to the strategic management planning at the firm level, to match the internal and external environment to achieve competitive advantage (Ding, X. Wang, & P. X. Zou, 2023). Market orientation, innovation orientation, and learning orientation as the three strategic orientations that define how a company can meet global trade challenges and leverage opportunities. These orientations help in understanding the positioning of construction enterprises in Guangdong Province and across the world regarding international trade.

Market orientation can, therefore, be described as the ability of an organization to obtain and respond to vital information concerning the customers, competitors, and other factors relevant to the marketplace. In the context of international business, it helps firms to operate in different markets, distinguish consumer demands of different geographic locations, and local international trade laws (Meekaewkunchorn et al., 2021). The more companies have a high market orientation, the more they can change their trading strategies in response to the flow of demands and policies all over the world.

On the other hand, innovation orientation entails the use of technology or the introduction of new business strategies or solutions to boost the competitiveness level, as noted by Khan et al, (2022). For innovation-oriented firms, they use cutting-edge technologies in trade, including blockchain in transactions, AI in analytics, and use of automation in logistics, which enhances the trade performance due to effectiveness on cross-border activities.

On the other hand, learning orientation is defined as an organization's ability and willingness to learn and change and enhance organizational processes. This is an important factor in the case of international operations because firms are required to frequently adapt to emerging trade relations, tariffs, and new technologies (Bellomi, 2014). This study establishes that increased learning orientation is an effective way of implementing and adapting to digital trade policies, WTO rules, and new opportunities that are commonly realized in the international market.

Empirical Evidence on Strategic Orientation and International Trade Performance

As has been pointed out by Meekaewkunchorn et al. (2021), market knowledge, innovation, and organizational learning increase International Trade performance and firms with a strong strategic orientation.

They also established that while exploring export markets, firms with high market orientation had better performance in terms of determining profitable markets, conforming to different international market conditions, and creating good networks in the overseas market. In respect of Guangdong Province, which is considered the largest exporting region of construction equipment in China, market orientation is even more important as firms face changing demands from global markets, shift in trade policies around the world, and highly competitive international prices. Those construction enterprises that continually engage in assessing trade regulations and foreign market conditions will enhance the construction trade performance by relating their strategies to the international construction standards.

Kolbe, Frasquet, and Calderon (2022) further pointed out that another factor, innovation orientation, also has a significant influence on the international trade performance. It emerged from their studies on emerging market firms that adopted information technology for investment, trade in digital goods and services and relying on research led to better export market performance. This is particularly so with construction firms in Guangdong given the new trends in international construction such as the Use of BIM and smart construction as well as automation. Through these technological solutions, the business entity is in a position to optimize a project and meet international trading policies and barriers to entry in those foreign markets. On the other hand, business organizations that do not adhere to these trends may suffer from a poor cross-border supply chain, noncompliance with these laws and regulations, and limited market entry.

Strategic Orientation in the Construction Industry and Global Trade Implications

Market orientation assumes a crucial role in the success of companies in the construction sector in foreign markets. (Ding et al., 2023) have pointed out that effectiveness in international marketing is achieved by conducting market research, developing relationships with stakeholders, and structuring services to meet market demands in construction enterprises. The market orientation also focuses on adapting construction projects to specific regulations in the foreign country, local climate, and culture, thus enhancing the competitive advantage of the firms.

In addition, Kolbe et al. (2022) also pointed out that enhancing the aspect of innovation orientation plays a vital role in increasing the performance of trade in construction firms. They found out that firms that embrace and integrate new technologies, environmentally friendly building materials, and digital project delivery techniques have a high chance of winning international contracts and future business relationships. The use of BIM, the integration of AI into project planning and scheduling, and the automation of machinery in firms have made them operate with efficiency and effectiveness by lowering operation costs and delivering on their projects making the firms more competitive internationally.

Furthermore, firms that have a learning orientation also develop strong capabilities in dealing with uncertainties in the global trade environment. Organizations having a strong learning orientation are likely to effectively deal with new trade agreements, changes in foreign policy, and new technologies. In construction project deliveries, firms that sustainably update their workforce skills, implement international practices, and failure analysis, tend to have higher trade success rates. For instance, the collaborations of the construction enterprises in Guangdong may learn from the knowledge spillovers of global engineering firms, thus enhancing their technical competencies, legal compliance, and innovation.

Digital Technology and International Trade

Digital technology has thus transformed the landscape of international trade due to its benefits in increasing efficiency, decreasing the costs of transactions, and improving market access. The global business has revolutionized its system of cross-border transactions through the implementation of various technological innovations such as artificial intelligence, blockchain, cloud computing, and big data analytics. These technologies allow the firms to manage the supply chain, reduce compliance risks, and provide real-time data on trade between different regions thus enhancing trade relationships.

Manyika, Lund, and Bughin (2016) observed that digital trade has grown. More than 12% of global trade is digitalized, showcasing the use of e-commerce, digital payment systems, and digital trade logistics to compete. The integration of platform trading and cloud-based enterprise applications has encouraged small and medium enterprises to trade in international markets with comparatively low entry hurdles.

However, Gomez-Trujillo et al. (2021) found that even as digital transformation promotes trade participation there are some barriers to adoption especially in the construction industry. Several organizations still do not possess adequate skills and systems to leverage data analytics, blockchain-based contract implementation, and artificial intelligence integrated market forecasting. This is evident in enterprises in Guangdong province; whereas digital procurement, logistics tracking, and AI-based project handling remain fragmented.

Blockchain has become revolutionary to international trade by enhancing credibility and combating fraud in

cross-border transactions. According to Tapscott and Tapscott (2016), smart contracts provided by blockchain have eliminated the need for middlemen, making trading costly and slow. This is especially the case in construction projects where issues of multiple parties from different countries are involved, thus necessitating safe contracts and transparent payment mechanisms.

New technologies like e-commerce and payment systems have also impacted the globalization of trade and made cross-border buying and selling easier and more extensive. According to OECD (2020), by engaging in digital platforms such as Alibaba, Amazon, and Shopify among others, firms from developing regions can now enter the international markets at relatively low cost and hence contribute to trade growth and export diversification.

However, there are concerns in this area regarding the regulatory as well as issues to do with Cybercrimes. Jain and Kartar Singh (2024) suggest that data protection legislation; cybersecurity risks; and uneven digital trade policies are barriers to firms' international operations. While the WTO has created a framework for digital trade policies through instruments such as the Joint Statement Initiative on E-commerce, the actual implementation of these policies remains inconsistent.

Digital Technology on Strategic Orientation & Trade Performance

Theoretical Perspectives and Empirical Analysis

From the SLR, it is quite credible that digital technology can act as a mediator between the two concepts of strategic orientation and trade performance. For instance, findings found in this empirical study are in support of the propositions of the Resource-Based View (RBV) and Dynamic Capabilities Theory (DCT) to show how the firms' trade capabilities are enhanced through digital transformation in the construction industry of Guangdong Province.

The Resource-Based View (RBV) postulates that for a firm to obtain sustained competitive advantage in the international environment, they have to own resources that are valuable, rare, inimitable, and non-substitutable (Pereira, Durão, Moreira, & Veloso, 2022). This is affirmed by the SLR findings whereby firms that implement technological interventions in construction project management, such as the use of AI, blockchain technology, and big data analytics, had a higher potential of enhancing trade efficiency compliance with regulations. These findings suggest that companies that adopt these technologies have better performances than their rivals because they increase regulatory compliance, optimize supply chain processes, and lower trade costs (Meekaewkunchorn et al., 2021). For instance, the analysis of literature in the form of several studies reveals that blockchain is great in implementing security and transparency in cross-border transactions thereby decreasing the risks of fraud in International Construction Contracts (Jain & Kartar Singh, 2024). Likewise, through big data analysis, firms can predict the pattern of trade and possible regulatory problems, thus improving the trade rate and efficiency to meet market needs (Beliaeva et al., 2020). In light of RBV, the author means that construction firms in Guangdong that successfully adopt technological advancements can build up superior resources within the organization hence improving the firms' competitive advantage in WTO digital trade regulations (Chander, 2020).

While the RBV takes a view of digital technology as a tangible asset, the DCT explains the firm's capability to change its digital capabilities in response to changes in the trade environment (Pereira, Durão, Moreira & Veloso, 2022). The findings of the SLR also present that not only possessing but actively improving digital competencies helps firms in the construction industry of Guangdong outperform in international trade. For example, the SLR reviewed some studies where AI and automation help firms adapt to trade policy change (Girardi, 2023). The construction enterprises in Guangdong, which employ a range of various measures primarily concerning the update of the Artificial Intelligence procurement system, and merging of compliance in near real-time, cloud-based project management – are more resistant to regulatory shifts under WTO systems (Paul & Dhiman, 2021). Moreover, SLR evidence reveals that firms that do not upgrade digitally performed poorly in Asian markets due to the inability to meet changing IT standards (Brahmana et al., 2022). In terms of WTO digital trade policies, the construction firms capable of managing dynamic capabilities for digital trade activities are in the proper position to adhere to incremental regulations on e-commerce, cybersecurity policies, or developments in international trade digitalization.

Empirical Evidence

Several studies provide empirical evidence relating to the fact that digital technology intensifies the effect of strategic orientation on international trade performance. Construction enterprises particularly in Guangdong Province use digital initiatives to overcome trade barriers, enhance border efficiency as well as enhance competitive advantage in the global market (Naji et al., 2024). Modern studies prove that companies using Artificial Intelligence in market analysis, Blockchain in managing contracts, and cloud in carrying out trade operations have production advantages over their counterparts in the international market (Beliaeva et al., 2020).

J. Ou, Z. Zheng, X. Ou, and N. Zhang (2024), surveying 200 construction exporting firms in China, noted that the use of AI-based market intelligence solutions grew international trade by 32 % more than among non-users. These AI tools made it possible for firms to not only assess foreign demand trends but also gain insights on variations in international prices and adjust the bids for contracts in real time, thus improving their competitive advantage and revenues (Meekaewkunchorn et al., 2021).

Vuko et al. (2024) compared construction exporters based in Guangdong who adopted digital CRM systems and their counterparts who did not adopt the technology for client acquisition for their construction projects in foreign markets, and the former had an increase in client acquisition of 45 percent. This was so because such systems facilitated the management of relationships between organizations, automation of contract tendering, and also compliance with WTO digital trade policies.

Moreover, Wirjo et al. (2020) reviewed blockchain-based contract verification and smart contracts in construction exports and realized that the time taken to complete transactions was cut down by 40 percent thus reducing possible contractual risks in international regulations. By implementing cloud-based logistics and AI-powered risk evaluation models, the companies were able to cut down trade costs by 28% while optimizing project performance (Jain & Kartar Singh, 2024). These findings justify the argument put forward in this paper indicating that the key types of digital adoption directly positively affect trade performance by making the system more transparent and eliminating unnecessary delays and risks in the WTO platforms.

Furthermore, Chander (2020) noted that there was a notable improvement in international contract approvals and efficiency in cross-border transactions among firms that adopted e-commerce and digital procurement systems in compliance with WTO e-trade regulations. This supports the understanding that technology adoption improves organizational performance while also ensuring compliance with the changing policies of international trade at the same time.

Innovation Orientation & Digital Adoption in Global Construction Trade

Yu, H. Zhong, and Bolpagni (2024) pointed out that the companies incorporated BIM and blockchain-based contract management into international trade in the Greater Bay Area of Guangdong and obtained several benefits, including Increasing the efficiency of teams by 14% through the automatic assessment of project execution processes. A 40% increase in the efficiency of cross-border material procurement costs. Furthermore, H. Chen, L. Li, and Y. Chen (2021) investigated 150 firms from China. They revealed that those companies who implemented AI project management systems were 23% more efficient in the execution of their international projects as compared with the firms that did not use any such system.

Promoting Learning Orientation and Facilitating Digital Knowledge Transfer in Trade Compliance.

K. Zou, Shen, J. Zhang, and C. C. Lee's (2022) study on Chinese construction firms in BRI markets revealed that the firms with learning-oriented, that is, those using digital trade compliance platforms were able to get: A 50% improvement in WTO trade compliance efficiency. A 35% reduction in trade-related legal disputes due to real-time access to updated global trade regulations. However, Y. Xia et al. (2023) also found that those large-scale construction firms in Guangdong can effectively respond to new DTI by adopting the AI-based regulatory monitoring tools also increases their success rate by 20% in winning the foreign contracts.

The key empirical findings derived from the Systematic Literature Review (SLR) are as follows: It also facilitates the export operations at market-oriented firms, thus enhancing their export performance to suit the trends in international trade. Today's change-oriented organizations that undertake BYOD and apply advanced digital tools such as BIM, blockchain, robots, automation, etc., achieve a competitive edge in the implementation of their projects as well as the global procurement of materials. Using artificial intelligence, firms that are learning-oriented and that engage in the implementation of compliance platforms have fewer trade barriers, hence increasing global trade. Each of Guangdong' s construction enterprises that has not formally incorporated digital technology into the global strategic plan is likely to see a decline in the general level of competitiveness. Consequently, the study correlatively supports that digital transformation decreases the effect of strategic orientation on trade performance in Guangdong's constriction sector, which is engaged in international trade.

DISCUSSION

Key Findings & Interpretation

Alignment with Previous Literature

This paper supports previous research works, as it showed that there is an effect of digital technology on the relationship between strategic orientation and international trade performance. The research shows that Market Orientation, Innovation Orientation, and Learning Orientation have a strong correlation with the trade success of the firm, but this relationship is more than common when supported with technological tools of digital transformation like AI, blockchain, and cloud computing (Meekaewkunchorn et al., 2021).

Also, according to Bharadwaj, Garg, and Gajpal (2000), digital commerce capability enables trade improvement in terms of efficiency and cutting costs, and the ability to gather market intelligence, which is critical in the construction supply chain network, contracts, and compliance, which are determinants of trade in construction business. Sun et al. (2024) discovered that BIM, blockchain-based smart contracts, and AI logistics integration cause enhanced global trade performance amongst firms in the construction industry of Guangdong.

They agree with Bharadwaj et al. (2000) and F. Sun, Qu, B. Wu, and Bold (2024) but identified that, indeed, DT does not mean success for every firm. If an organization has weak internal IT competence, it will not harness technology as a source of competitive advantage. This assertion can be well illustrated in Guangdong, for instance, where some state-owned construction firms have not embraced digital procurement and smart contract technologies as the firms in the private domain, and this is the main reason that hinders the state-owned construction firms from penetrating the global markets as expressed by Xia et al. (2023).

Therefore, this study goes further than prior studies by highlighting that digital readiness is needed for enhancement beyond adoption for the digitalization of international trade.

Theoretical Validation: RBV and Dynamic Capabilities Theory

This paper focuses on the Resource-Based View (RBV) of digital trade in the construction industry. According to RBV, the stocks of valuable, rare, inimitable, and non-substitutable resources (VRIN) determine a firm's competitiveness (Zvarimwa & Zimuto, 2022). Digital technologies have become such resources since they allow:

Supply chain management: AI provides better tracking, demand analysis, and an automated supply chain which increases efficiency in construction material exportation. Risk assessment is also made easier through the use of predictive analytics which assist the firms in preparing for disruption of procurement activities and therefore minimizing the cost of trade.

Risk mitigation: Blockchain ensures secure contract enforcement in global infrastructure projects through smart contracts, reducing fraud, disputes, and delays. Its decentralized ledger enhances transparency and compliance with trade regulations.

Market segmentation: Due to the rapidly growing interest in utilization of BIM technology, cloud-based BIM solutions can be effectively adopted especially for large projects located in different countries that meet requirements of additional legislation and availability of required materials. This supports firms in achieving their market expansion objectives and ensures that project management is done efficiently.

Dynamic Capabilities Theory (DCT) and Trade Adaptability

According to DCT, trade opportunities must be sensed, seized, and transformed through constant technological change by firms (L. Liu et al., 2021). This study confirms that the leading construction firms in Guangdong have the following dynamic capabilities;

Exploring the global market changes with the help of AI.

Opportunities are ready to be captured in supply chain management utilizing blockchain-based procurement platforms.

The use of cloud-based supply chain management as a way of improving operations.

For example, Beliaeva et al. (2020) identified that they increased trade efficiency for the exporters of materials in Guangdong through follow-up through AI; this is valid with the Eisenhardt and Martin's (2000) claim that dynamic capabilities enhance the firm's ability to modify and adapt in response to changes in trade policies and Market instabilities.

Nevertheless, the following research can identify two paramount limitations:

However, not all the firms based in Guangdong possess high dynamic capabilities; those less informed in

digital skills set and IT experience have a very poor capability of converting advanced technological improvement into practical value of trade (Xia et al., 2023).

International hysteria in regulatory structures thwarts adjustment While the WTO aims for greater support of digital trade, disparities in regulations across borders work against the establishment of AI and blockchain technologies in the construction trade, according to Jain and Kartar Singh (2024).

Thus, although DCT is confirmed to work, the regulation and internal capacity factors affect the maximal use of this approach in the context of Guangdong's construction trade.

Implications for Practice

Recommendations for Construction Enterprises to Enhance Digital Adoption

To improve the trade performance in construction enterprises, the following strategies should be undertaken in digital transformation:

Embrace artificial intelligence and big data analytics developed AI algorithms can help in the evaluation of risks, estimation of the market, and contract regulation for construction companies that operate in the international sphere (Xia et al., 2023).

Adopt Blockchain for Contract Management – Smart contracts generated through Blockchain technology lower risk factors in relation to fraud occurrences during cross-border contracts (Tapscott & Tapscott, 2016).

Upconverted to Cloud-Based Trade Platforms – Cloud-based systems allow the sharing of current information, producing compliance reports as well as management of logistics.

Strengthen Cybersecurity – There is a need for firms to set up strong cybersecurity measures that enable the protection of the new digital trade assets and accord with the protection regulations of existing data.

Proposed Future Research

To fill these gaps, future research, therefore, ought to engage in research that explores the long-term effects of digitalization on the performance of trade. Most of the current studies employ cross-sectional data, thus not being able to capture the process through which the adoption of technologies is unrolling and its impact on trade competition. A longitudinal study will enable identifying the degree to which firms adopt AI, blockchain, and cloud computing into their international trade strategies over a longer period and about the long-term influence on performance.

CONCLUSION

This study highlights the role of digital technology in the relationship between strategic orientation and international trade performance, particularly in China's construction industry under the WTO framework. The findings demonstrate that market orientation, innovation orientation, and learning orientation significantly impact trade competitiveness, but their effectiveness is greatly enhanced by digital transformation. Technologies such as AI, blockchain, and cloud computing enable firms to optimize supply chains, improve compliance, and enhance decision-making, ultimately improving their international trade success. However, the slow adoption of digital tools, due to financial constraints, regulatory complexities, and cybersecurity concerns, remains a major barrier. Furthermore, WTO's digital trade policies lack sector-specific guidelines, creating uncertainty for construction enterprises navigating global markets. Moving forward, firms must proactively invest in digital capabilities, while policymakers should work toward harmonized digital trade regulations to ensure a more inclusive and efficient trade environment. Future research should focus on empirical validation through longitudinal studies and comparative research, providing deeper insights into the evolving role of digitalization in international trade performance. By addressing these gaps, both academia and industry can contribute to a more technologically adaptive and globally competitive construction sector.

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