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Digital Trade and the International Division of Labor: A Literature Review and Analytical Framework from a Global Value Chain Perspective

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Abstract

Driven by the rapid expansion of the digital economy, digital trade has emerged as a pivotal force restructuring international trade and reconfiguring global production networks. Distinct from traditional models centered on trade in goods, digital trade-facilitated by cross-border data flows, digital services, and platform-based transactions-has profoundly reshaped the international industrial division of labor and Global Value Chain (GVC) governance. Based on a systematic review of existing literature, this paper synthesizes key perspectives on the mechanisms through which digital trade reshapes industrial specialization and the resulting governance transformations. The analysis reveals that by reducing transaction costs, facilitating technology diffusion, and amplifying platform network effects, digital trade drives the evolution of international specialization from inter-industry division toward task-based and functional models. Consequently, GVC governance logic is shifting from control-oriented models centered on ownership and contracts toward digital governance based on rules, platforms, and data factors. However, challenges such as constraints on cross-border data flows, value distribution imbalances under platform dominance, the digital divide, and the fragmentation of international rules pose risks to the stability of digital value chains. Finally, this paper discusses future research directions and policy implications to support digital trade governance and the sustainable development of global value chains.

Keywords

digital trade, international division of labor, global value chains, value chain governance, digital platforms

1. Introduction

With the rapid development and pervasive application of next-generation information technologies, the digital economy has emerged as a critical driver of global economic growth and structural transformation. Against this backdrop, digital trade-characterized by data factors, digital technologies, and platform-based transactions-has risen rapidly, profoundly altering the modes of implementation and organizational forms of international trade (Wu, 2022). The extensive embedding of digital technologies into production, circulation, and consumption has enabled cross-border transactions to transcend traditional physical constraints, leading to a systemic reshaping of the international industrial division of labor and global production organization.

It is essential to clarify that the primary analytical thread of this paper focuses on the evolution of the

international industrial division of labor, while Global Value Chains (GVCs) serve as the meso-level analytical framework for understanding this specialization structure and its governance mechanisms. Specifically, the international division of labor reflects the functional allocation and structural positions of different countries and regions within the global production system, representing a macro-level outcome. In contrast, GVCs emphasize the decomposition, reorganization, and coordination mechanisms of production activities across borders, capturing at the meso-level how specialization structures are realized through specific production stages, inter-firm relationships, and governance rules. Consequently, GVC theory provides an indispensable analytical tool for examining the implementation paths, operational logics, and governance foundations of shifts in international specialization.

In the context of digital trade, changes in the international division of labor exhibit new characteristics. On one hand, by reducing information search costs and institutional frictions, digital technology weakens the spatial constraints of traditional comparative advantages, driving the deepening of international specialization from inter-industry division toward task-based and functional specialization. On the other hand, the widespread embedding of digital platforms and data factors ensures that specialization relationships are increasingly facilitated through platform rules, technical interfaces, and data coordination. This implies that structural changes in the international division of labor do not occur in a vacuum but are concretely manifested in the reorganization of GVCs and the adjustment of their governance modes.

Based on these premises, this paper follows a logical analytical path: "Evolution of the division of labor structure -GVC reorganization-Adjustment of governance mechanisms." First, starting with how digital trade reshapes the international industrial specialization structure, we analyze its impact on the depth, hierarchy, and modes of division. Second, leveraging the GVC framework, we explore the specific manifestations of these changes at the value chain level and their impact on governance models. Finally, we discuss the institutional constraints and governance challenges faced in the operation of digital value chains. Following this research logic, this paper systematically reviews domestic and international literature on digital trade, international industrial specialization, and GVC governance, focusing on the underlying mechanisms of specialization reshaping and the resulting transformation of GVC governance and institutional responses. The analysis establishes a clear theoretical and logical foundation for the subsequent systematic discussion of impact mechanisms, governance transitions, and practical challenges.

2. Literature Review: The Relationship between Digital Trade, the International Division of Labor, and GVC Governance

Domestic and international scholars have conducted relatively systematic research on the relationship between digital trade, international industrial division of labor, and the evolution of global value chains from different perspectives. Generally, the relevant literature can be summarized into three interconnected research directions: defining the concepts of digital trade and the digital economy, the impact of digitalization on the international division of labor and the position within global value chains, and the transformation of global value chain governance models in the context of digitalization.

2.1 Defining the Concepts of Digital Trade and the Digital Economy

At the conceptual level, the definitions of digital trade provided by international organizations and academia primarily center on the modes of transaction and forms of delivery. Organizations such as the IMF, OECD, and WTO generally define digital trade as the trade in goods and services enabled by digital technologies, encompassing digitally ordered trade, digitally delivered trade, and emerging trade forms centered on data as a core factor. Related research emphasizes that digital trade is not a single modality but rather a comprehensive system closely intertwined with digital infrastructure, data governance, and the institutional environment.

Chinese scholarship has placed greater emphasis on refining the statistical scope and measurement methodologies of digital trade, advocating for the integration of dimensions such as cross-border data flows, platform services, and digital content transactions into the traditional services trade statistical framework. Overall, existing literature universally recognizes the significance of digital technology as a new factor of production, viewing it as a foundational condition that influences the international division of labor and the structure of value chains. This consensus provides the theoretical point of departure for the subsequent analysis

of the mechanisms through which digital trade operates.

2.2 Digital Investment, International Division of Labor, and Position in the Value Chain

At the level of mechanism analysis, a significant body of research explores the impact of digitalization on the international industrial division of labor from the perspectives of transaction costs and technology diffusion. Theoretical studies generally contend that digital technologies, by mitigating information asymmetry and reducing coordination costs, facilitate the further fragmentation of production processes, thereby creating conditions for the development of task-based and functional specialization. Empirical studies, on the other hand, often utilize country-level or firm-level data to examine the impact of digital inputs on an actor's position within Global Value Chains (GVCs) (Yan, 2025).

Relevant findings suggest that digital inputs can significantly elevate the specialization hierarchy of a country or firm within GVCs by enhancing productivity, fostering technological innovation, and optimizing export structures. Micro-level research further indicates that improvements in internet penetration and corporate investment in informatization are significantly correlated with firm participation in higher value-added production stages. However, some literature emphasizes that the promotional effect of digitalization on specialization upgrading is highly contingent; its effectiveness is constrained by factors such as human capital, the institutional environment, and technological absorption capacity.

2.3 The Digital Transformation of Global Value Chain Governance Models

In the study of Global Value Chain (GVC) governance, early literature primarily focused on types of governance structures, distinguishing between market, modular, relational, and hierarchical governance models. With the advancement of digital trade, academia has increasingly turned its attention to the impact of digital factors on these established governance patterns. Relevant research suggests that the embedding of digital platforms and data factors has imbued value chains with networked and decentralized characteristics, shifting the governance logic from traditional corporate control toward coordination through rules and technology.

Existing studies emphasize that platform-based governance creates new coordination and constraint mechanisms for GVC participants through algorithmic rules, data interfaces, and technical standards. While this model improves transaction efficiency, it may also exacerbate power asymmetries and unequal benefit distribution within the value chain. Collectively, research on digital trade and GVC governance remains largely fragmented, with a relative lack of systematic analysis regarding the evolution of governance power structures and institutional frameworks.

2.4 Literature Review and Research Connections

Drawing upon the aforementioned literature, it is evident that existing studies have elucidated the impact of digital trade on international industrial specialization and Global Value Chain (GVC) positioning from multiple perspectives (Ma and Liu, 2023). However, the logical nexus between the transformation of division structures and the resulting shifts in governance models remains to be further explored. While much of the existing literature focuses on the economic effects of digital trade on the upgrading of specialization, insufficient attention has been paid to the subsequent adjustments in governance mechanisms. Building upon these prior studies, this paper extends the analytical focus from the effects of division of labor to the dimension of governance, exploring the inherent link between the restructuring of international industrial specialization and GVC governance transformation. This inquiry lays the theoretical groundwork for the subsequent systematic analysis of the underlying mechanisms and the evolution of governance paradigms.

3. The Mechanisms by Which Digital Trade Reshapes the International Division of Labor

Building upon the systematic review of the relationship between digital trade, the international division of labor, and GVC governance, this section delves further into the mechanistic level to analyze how digital trade reshapes the structure of international specialization through specific economic and organizational mechanisms. It should be emphasized that this section does not merely restate the findings of existing research

presented in Part II. Instead, it synthesizes various impact pathways based on prior studies, focusing on the core question of "how the international division of labor evolves in the context of digital trade." By distilling the primary transmission mechanisms through which digital trade influences specialization structures, this analysis provides a logical point of departure for the subsequent examination of GVC governance transformation.

In general, digital trade does not alter the landscape of international specialization directly. Rather, it drives systemic adjustments in the depth, hierarchy, and organizational modes of the international division of labor through multiple mechanisms, including the reduction of cross-border transaction costs, the acceleration of technology diffusion and knowledge spillovers, and the reconfiguration of organizational forms. While the aforementioned literature offers valuable insights into these effects, much of the existing research remains at the level of empirical conclusions. Therefore, a systematic integration of these underlying mechanisms is essential.

3.1 The Mechanism of Declining Transaction Costs and Deepening International Division of Labor

Proceeding from foundational economic logic, the primary mechanism through which digital trade influences the international industrial division of labor lies in the significant reduction of cross-border transaction costs. Compared to traditional trade forms, digital technology-through online information search, electronic contracts, digital payment systems, and digitized logistics management-mitigates the constraints imposed by information asymmetry, search costs, and institutional frictions on transnational specialization. This compression occurs across both the temporal and institutional dimensions of transaction costs.

The decline in transaction costs directly expands the 'feasibility frontier' for firm participation in the international division of labor. On one hand, production stages can be fragmented and allocated across a broader spatial scale, driving the evolution of the international division of labor from an integrated industry-based model toward a granular specialization based on specific tasks and functions. On the other hand, the reduction in cross-border coordination costs enhances the matching efficiency between different stages of the value chain, enabling firms to embed themselves into the most comparative-advantageous production nodes on a global scale.

Under the influence of this mechanism, the international division of labor no longer relies solely on traditional factor endowment differences; instead, it increasingly manifests as a dynamic allocation process based on cost, efficiency, and informational advantages. This shift establishes the foundation for the subsequent elevation of specialization hierarchies and the transformation of organizational forms.

3.2 Mechanisms of Technology Diffusion, Knowledge Spillover, and Upgrading of the Division of Labor Hierarchy

Beyond the transaction cost effect, digital trade exerts a profound influence on the hierarchical structure of the international industrial division of labor by accelerating technology diffusion and knowledge spillovers. Digital trade enhances the cross-border flow of data, information, and knowledge, enabling firms to more readily access advanced technologies, production standards, and market demand information. This, in turn, shortens learning cycles and improves the efficiency of technological absorption.

Within the GVC system, this mechanism manifests as the ability of certain countries and firms to progressively transition from low-value-added production stages toward high-value-added segments such as R&D, design, branding, and services. Compared to the slow and incomplete nature of technology diffusion under traditional trade conditions, digital trade lowers the barriers to technology acquisition and increases the mobility of knowledge factors within the value chain, thereby providing a realistic possibility for upgrading the division of labor.

It must be noted that the technology diffusion mechanism does not take effect automatically; its impact is contingent upon factors such as the level of human capital, the institutional environment, and technological absorptive capacity. This implies that the role of digital trade in promoting the upgrade of international specialization is characterized by significant conditionality, leading to marked disparities in the degree to

which different economies benefit from adjustments in the specialization hierarchy.

3.3 Digital Platform Embedding and the Mechanisms of Restructuring International Division of Labor

Beyond transaction costs and technology diffusion mechanisms, the impact of digital trade on international division of labor is also realized through specific organizational structures, among which digital platforms are gradually playing a key role in the coordination and governance of global value chains. In the context of digital trade, the widespread integration of digital platforms constitutes an important organizational foundation for the reshaping of international industrial division of labor. Platforms build transnational production and transaction networks by integrating supply and demand information, providing transaction matching and supporting services, making the division of labor more networked and platform-based. Unlike the traditional international division of labor system primarily based on linear upstream and downstream relationships, the platform-based division of labor structure weakens strict hierarchical control relationships, emphasizing network connections and rule coordination among multiple entities. Platforms lower the entry barriers for small and medium-sized enterprises to participate in the international division of labor, expanding the scope of participating entities, and continuously influencing the mode and location of the division of labor through algorithmic rules, data interfaces, and technical standards.

This coordination method, centered on rules and technology, shifts the mechanism of international division of labor from "internal organizational control" to "platform rule governance." Consequently, the division of labor relationship is no longer solely maintained by corporate ownership or long-term contracts, but relies more on platform institutional arrangements and data control capabilities. This change provides a direct entry point for the subsequent analysis of the transformation of global value chain governance logic.

3.4 The Heterogeneous Characteristics of the Mechanisms of Digital Trade

Overall, the impact of digital trade on international industrial division of labor does not occur equally across different countries, industries, and enterprises, but rather exhibits significant heterogeneous characteristics. At the national level, differences in digital infrastructure development, institutional environment, and technological capabilities determine a country's structural position in the digital division of labor system; at the industry level, technology-intensive industries and knowledge-intensive service industries are more likely to achieve division of labor upgrading through digital trade, while labor-intensive industries benefit to a relatively limited extent; at the enterprise level, differences in resource endowments and rule adaptation capabilities between large multinational corporations and small and medium-sized enterprises also lead to differentiated benefits within the division of labor system.

This heterogeneity indicates that digital trade has not eliminated the existing unequal structure in the international division of labor, but rather reshaped and redistributed it under new technological conditions. The resulting structural differences not only affect the evolutionary path of the international industrial division of labor pattern but also pose higher requirements for the coordination and governance of global value chains.

3.5 The Transition from Division of Labor Mechanisms to Governance Logic

Overall, digital trade, through multiple mechanisms such as reduced transaction costs, technology diffusion, and platform network embedding, has systematically impacted the depth, hierarchy, and organizational structure of international industrial division of labor. This change in the division of labor structure is not merely an adjustment of production layout, but also signifies a transformation in the internal coordination methods and power structures within value chains.

As the international division of labor gradually shifts from a relatively stable hierarchical structure to a more open, platform-based, and rules-driven network structure, the traditional global value chain governance model centered on ownership and contracts begins to face adaptive challenges. It is in this sense that analyzing the mechanisms by which digital trade reshapes the international industrial division of labor constitutes a crucial prerequisite for understanding the transformation of global value chain governance models. When the way in which the division of labor structure is realized changes, the corresponding adjustment of governance mechanisms becomes an inherent necessity.

4. The Digital Transformation of Global Value Chain Governance Models in the Context of Digital Trade

Building upon the previous analysis of how digital trade reshapes the international industrial division of labor through mechanisms such as reduced transaction costs, technology diffusion, and platform embedding, it can be further observed that changes in the division of labor structure are not limited to production layout and division of labor levels, but inevitably lead to a systemic adjustment of internal coordination methods and governance logic within global value chains. As the international division of labor gradually shifts from a relatively stable hierarchical structure to a more open, networked, and platform-based organizational form, traditional governance models centered on ownership control and long-term contracts are becoming increasingly inadequate to meet the operational needs of the digital division of labor system. Against this backdrop, global value chain governance is exhibiting distinct characteristics of digital transformation: on the one hand, the role of digital platforms, data elements, and technical standards in value chain coordination is constantly increasing, and the governance mechanism is gradually shifting from "enterprise-led control" to "rule- and platform-led coordination"; on the other hand, the allocation of governance power, the structure of value distribution, and institutional constraints are also changing accordingly. Therefore, it is necessary to systematically analyze the evolution path and inherent logic of value chain governance models in the context of digital trade within the framework of global value chains.

Based on the above understanding, this section will focus on the digital transformation of global value chain governance models, specifically exploring how digital trade drives the evolution of value chain governance from traditional control-oriented models to rule-based and platform-based models, and further discussing the structural characteristics and potential problems inherent in this transformation process.

4.1 The Impact of Digital Trade on Traditional Value Chain Governance Models

In traditional global value chains, governance power is primarily held by a few multinational corporations, which coordinate and control upstream and downstream enterprises through vertical integration or stable contractual relationships. This governance model is highly adaptable in environments centered on manufacturing and characterized by relatively stable transaction frequencies. However, the development of digital trade has significantly increased transaction frequency and uncertainty, posing challenges to traditional governance mechanisms.

On the one hand, digital trade reduces the costs for companies to enter and exit value chains, making production relationships more flexible and weakening the binding force of long-term contracts in governance. On the other hand, the rise of cross-border data flows and digital service trade has detached some key value activities from the physical production process, making it difficult for traditional control methods based on physical assets to cover these new links. Therefore, the effectiveness of existing governance models in terms of coordination efficiency and risk control is gradually declining.

4.2 The Transformation of Governance Mechanisms Underpinned by Digital Platforms

With the widespread application of digital platforms in global production networks, platforms have gradually become important nodes in value chain governance. By integrating information flow, capital flow, and logistics, platforms provide functions such as transaction matching, standard setting, and credit evaluation, to some extent replacing the coordinating role of traditional multinational corporations.

Existing research indicates that platform-based governance is centered on rules and technical interfaces, regulating participant behavior through algorithms, data standards, and platform protocols. This governance approach is highly flexible and scalable, capable of adapting to the high-frequency, small-batch, and customized transaction needs in the digital trade environment. However, at the same time, the power structure of platform governance is often more implicit, and its rule-making process lacks transparency, which may lead to value chain participants being at a disadvantage in terms of bargaining power and profit distribution.

4.3 The Rise of Data as a Key Element and the Shift in Governance Priorities

In the context of digital trade, data is gradually becoming a strategically important core element in global value chains. This shift significantly impacts governance priorities and methods. Traditional value chain governance primarily revolves around product quality, delivery time, and cost control, while digital value chain governance focuses more on data acquisition, usage, and security issues. Some studies suggest that data control capabilities are becoming a crucial factor influencing the distribution of power in value chain governance. Companies or platforms that possess data collection and analysis capabilities can gain an advantageous position in demand forecasting, production organization, and market entry, thereby strengthening their dominant role in the value chain. This is leading to a gradual shift in global value chain governance from "production control" to "data governance."

4.4 Risks and Inequalities in Digital Governance

Although digital governance offers significant advantages in improving efficiency, its potential risks and inequalities have also attracted widespread attention in academia. On the one hand, platform- and data-driven governance models may exacerbate the concentration of power within value chains, placing small and medium-sized enterprises and developing economies at a disadvantage in rule-making; on the other hand, cross-border data flows involve issues such as privacy protection, data security, and digital sovereignty, which the existing international regulatory framework is currently unable to effectively address. Furthermore, differences in digital regulatory capabilities and institutional systems across different countries may lead to "rule fragmentation" in global value chain governance, increasing uncertainty in cross-border transactions. These issues indicate that digital governance is not simply an upgrade of traditional governance models, but rather a new form of governance accompanied by new risks.

Overall, digital trade, through platform embedding, data element reinforcement, and changes in transaction methods, is driving a profound transformation in global value chain governance models. The governance logic is gradually shifting from a control-oriented model centered on ownership and contracts to a digital governance model based on rules, platforms, and data. While this transformation improves the efficiency of value chain operations, it also raises new governance challenges and institutional needs. The above analysis provides important insights for future research: how to build a global value chain governance system that balances efficiency and fairness in the context of digital trade has become a key issue in international trade research and policy-making. The next section will further explore the real challenges faced by global value chains in the context of digital trade and the corresponding institutional responses.

5. The Real Challenges and Institutional Responses to Global Value Chain Governance in the Context of Digital Trade

While digital trade is driving the deepening of international division of labor and the transformation of global value chain governance models, the practical constraints and institutional challenges it faces are also becoming increasingly apparent. The transformation of governance models, while improving the efficiency of value chain operations, also exposes new institutional tensions and governance risks. Compared to traditional forms of trade, the data elements, platform mechanisms, and algorithmic rules underlying digital trade lead to higher complexity and uncertainty in global value chains, even as efficiency improves. Existing research generally suggests that without appropriate institutional arrangements, digital trade may trigger new risks and inequalities in the process of reshaping value chain structures.

5.1 Cross-border Data Flow Constraints and Value Chain Stability Risks

Cross-border data flow is a core foundation for the operation of digital trade and digital value chains, but it is also one of the areas with the most concentrated international institutional disagreements. Different countries have significant differences in policy objectives regarding data security, privacy protection, and national security, leading to multiple institutional constraints on cross-border data flows (Wu and Li, 2024).

Some studies point out that data localization requirements and strict cross-border data review systems, while contributing to national security and personal privacy protection, may also increase corporate

compliance costs and weaken cross-border collaboration efficiency. For value chains that heavily rely on real-time data exchange and cross-border collaboration, restricted data flow not only increases transaction costs but may also increase the risk of production disruptions, thus affecting the overall stability of the value chain. Therefore, balancing data security and value chain efficiency has become a key issue in digital trade governance.

5.2 Value Distribution and Market Structure Issues under Platform-Led Governance

Against the backdrop of digital technologies being deeply embedded in international trade activities, traditional trade forms are undergoing structural changes, and the issues of value distribution and competitive structure brought about by platform-led governance are becoming increasingly prominent. By controlling data resources, algorithmic rules, and transaction interfaces, platforms occupy a central position in the value chain, profoundly impacting the behavior and profit distribution of upstream and downstream enterprises.

Existing literature generally suggests that while platform-based governance improves matching efficiency and reduces transaction costs, it may also reinforce power asymmetry within the value chain. On the one hand, small and medium-sized enterprises and companies in developing economies are at a disadvantage in terms of rule-making and algorithmic transparency; on the other hand, platforms exert indirect control over the market competitive landscape through fee structures, ranking mechanisms, and data access rights. Without effective regulation, this structural inequality may weaken the potential of digital trade to promote inclusive growth.

5.3 Digital Divide, Capability Gaps, and Limited Upgrading of the Division of Labor

Although digital trade offers developing economies new pathways to participate in global value chains, the digital divide remains a significant constraint on their ability to upgrade their division of labor. Insufficient digital infrastructure, limited human capital, and an inadequate institutional environments have made it difficult for some countries to fully leverage the opportunities for deepening the division of labor offered by digital trade.

Relevant research indicates that, due to insufficient digital capabilities, enterprises in developing economies often only participate in low-value-added or highly standardized digital segments, making it difficult for them to enter core areas such as research and development, design, and platform governance. This “capability-constrained participation” may solidify existing patterns of the division of labor under new technological conditions, or even create new dependencies, thereby weakening the positive role of digital trade in narrowing international disparities in the division of labor.

5.4 Fragmentation of International Digital Trade Rules and the Dilemma of Governance Coordination

At the global level, a unified and systematic multilateral framework for digital trade-related rules has not yet been established. Different countries and regions have significant differences in their institutional arrangements regarding data flow, platform regulation, and digital services trade. The rapid expansion of digital trade provisions in regional trade agreements has, to some extent, filled the gaps in multilateral rules, but it has also exacerbated the problem of institutional fragmentation.

Some literature points out that rule fragmentation increases the uncertainty of cross-border operations for businesses, subjecting them to multiple compliance requirements and institutional conflicts, thereby increasing transaction costs. This problem is particularly significant for small and medium-sized enterprises (SMEs), potentially limiting their ability to participate in the international division of labor through digital trade. Therefore, strengthening international institutional coordination and improving rule compatibility have become important institutional prerequisites for the sustainable operation of digital value chains.

5.5 Institutional Responses and Policy Implications

In response to the challenges mentioned above, existing research has proposed possible institutional responses at multiple levels. At the domestic level, improving data governance frameworks, strengthening platform regulation, and enhancing digital infrastructure can help mitigate the structural risks brought about

by digital trade; at the regional and international levels, promoting the coordination and mutual recognition of digital trade rules can help reduce institutional friction and improve the efficiency of global value chain operations.

Meanwhile, some scholars emphasize the need to pay more attention to capacity building in developing economies, enhancing their participation and governance power in digital value chains through technical assistance, knowledge transfer, and institutional support. Only by balancing efficiency and equity in institutional design can digital trade truly play a role in promoting inclusive growth.

Overall, the challenges faced by global value chains in the context of digital trade stem both from technological changes themselves and from the inadequacy of existing institutional systems in adapting to new forms of trade. Cross-border data flow constraints, platform-dominated governance, the digital divide, and rule fragmentation collectively constitute key constraints in the operation of digital value chains. The above analysis shows that the development of digital trade requires not only technological and market support but also systemic responses at the institutional level. This conclusion provides a realistic basis for subsequent comprehensive reviews and future research prospects, and also lays the logical foundation for the next section on research summary and forward-looking analysis.

6. Comprehensive Review and Future Research Perspectives

Against the backdrop of the rapid development of digital trade, the international division of labor structure and global value chain governance models are undergoing systemic reshaping. Based on a systematic review of relevant literature, this paper provides a comprehensive review of research progress on the impact of digital trade on the evolution of international division of labor and global value chains from three aspects: division of labor mechanisms, governance transformation, and realistic challenges. Overall, existing research has revealed the profound impact of digital trade on the global economic structure from multiple perspectives, but there is still room for further deepening in theoretical integration, empirical testing, and institutional responses.

6.1 Comprehensive Review of Key Research Findings

A comprehensive review of existing literature reveals that digital trade, by reducing transaction costs, promoting technology diffusion, and strengthening platform network effects, is driving the evolution of international division of labor from traditional inter-industry division to task-based and function-based division. This process not only expands the scope of participation in international division of labor but also, to some extent, alters the functional configuration and distribution of benefits within value chains. Compared to traditional trade, digital trade places greater emphasis on the importance of data elements and digital capabilities, resulting in a division of labor structure that is more networked and dynamic.

Based on this, the global value chain governance model is also undergoing a transformation. As digital platforms and data elements become increasingly embedded in value chains, the governance logic is gradually shifting from a control-oriented model centered on ownership and contracts to a digital governance model based on rules, platforms, and algorithms. While this transformation improves coordination efficiency, it also gives rise to new governance risks and institutional challenges, particularly in areas such as value distribution, fair competition, and data security.

6.2 Shortcomings and Controversies in Existing Research

Despite the growing body of research, existing literature still suffers from several shortcomings. First, at the theoretical level, there is no complete consensus on the definition and mechanisms of digital trade. Some studies focus on the transaction cost perspective, while others emphasize technology and platform effects, and the overall theoretical integration still needs improvement. Second, in terms of empirical research, due to the limited availability of digital trade data, different studies vary significantly in their indicator construction and methodology selection, and the comparability and robustness of their conclusions require further verification.

Furthermore, there is no consensus in academia on whether digital trade can narrow or widen the gap in international division of labor. Some studies argue that digital trade provides developing economies with opportunities to “leapfrog” ahead, while others point out that the digital divide and platform monopolies may

entrench existing inequalities. These discrepancies indicate that the effects of digital trade on the international division of labor are clearly context-dependent and need to be explored within a more detailed analytical framework.

6.3 Future Research Directions

Based on the above review, future research can be further deepened in the following aspects. First, at the theoretical level, it is necessary to construct a more systematic analytical framework that organically integrates factors such as transaction costs, technology diffusion, platform governance, and institutional environment to comprehensively explain the intrinsic logic of international division of labor and value chain evolution in the context of digital trade. Second, in terms of empirical research, it is necessary to further improve digital trade measurement methods, combining micro-enterprise data and cross-country comparative analysis to enhance the explanatory power and policy relevance of research conclusions. Third, in terms of governance research, future research can focus more on the interaction between digital platform rules, data governance mechanisms, and global value chain governance, exploring the long-term impact of different governance models on value distribution and industrial upgrading. Fourth, from a development perspective, it is necessary to deeply analyze the heterogeneous impact of digital trade on different countries and types of enterprises, providing a theoretical basis for formulating more inclusive digital trade policies.

7. Conclusions and Policy Implications

7.1 Policy Implications

Based on relevant research, it can be observed that the development of digital trade depends not only on technological progress and market mechanisms, but also on a corresponding institutional environment. Firstly, establishing a coordinated and orderly cross-border data governance framework is a prerequisite for the stable operation of the digital value chain. While ensuring data security and privacy, reducing institutional friction in cross-border data flows through rule coordination and mutual recognition of standards will help improve the efficiency of the digital value chain. Secondly, institutional responses to platform-based governance should be strengthened to mitigate power asymmetries in the digital value chain. While digital platforms improve coordination efficiency, they may also reinforce their dominant position through rules and data control. Increasing the transparency of platform rules and maintaining a fair competitive environment will help prevent digital trade from exacerbating structural inequalities in the international division of labor. Thirdly, narrowing the digital divide and enhancing digital capabilities are crucial guarantees for achieving inclusive upgrading of the division of labor. Relevant research shows that the upgrading effect of digital trade on the division of labor is clearly conditional. Strengthening digital infrastructure construction and capacity building cooperation will help improve the participation level of developing economies and small and medium-sized enterprises in the digital value chain.

Finally, promoting international coordination of digital trade rules will help mitigate governance risks caused by institutional fragmentation. In the context of insufficient multilateral rule-making, strengthening institutional dialogue at the regional and multilateral levels is of great significance for improving the stability of global value chain governance.

7.2 Research Summary and Overall Conclusions

Overall, digital trade is reshaping the structure of international division of labor and driving a transformation in the logic of global value chain governance by reducing transaction costs, promoting technology diffusion, and strengthening platform network effects. Existing research generally agrees that international division of labor is evolving from inter-industry division to task-based and function-based division, and value chain governance is gradually shifting from a control-oriented model centered on ownership and contracts to a digital governance model based on rules, platforms, and data elements.

At the same time, the institutional challenges brought about by digital trade cannot be ignored. Constraints on cross-border data flows, power asymmetry under platform dominance, the digital divide, and rule fragmentation may all affect the inclusiveness and stability of digital value chains. Relevant research shows

that without effective institutional responses, digital trade, while improving efficiency, may exacerbate imbalances within value chains.

Through a systematic review of relevant literature, this paper clarifies the main research lines on how digital trade affects international division of labor and global value chain governance, and summarizes research consensus, points of contention, and future research directions. As digital technology continues to evolve and the institutional environment constantly adjusts, achieving a dynamic balance between efficiency improvement and equitable governance will remain a core issue in the study of digital trade and global value chains.

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