RESEARCH ARTICLE

Digital Communication and Economic Interdependence between China and the European Union

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Abstract

This paper examines the impact of digital communication technologies on economic interdependence between China and the European Union. Drawing on a global communication theoretical framework, the study argues that information flows, digital platforms, and communication infrastructures play a crucial role in facilitating cross-border economic activities. By reducing transaction costs, improving market accessibility, and accelerating the exchange of information, digital communication technologies contribute to the expansion of trade and investment relations between the two economies.

At the same time, the study recognizes that economic integration in the digital era is influenced not only by technological developments but also by institutional and regulatory factors. Differences in data governance frameworks, privacy regulations, and digital policies between China and the European Union may create barriers to information exchange and limit the potential benefits of digital connectivity. Accordingly, the research hypothesizes that increased digital communication connectivity strengthens economic interdependence, while greater regulatory divergence constrains the growth of digital economic cooperation.

Using a mixed-method approach that combines quantitative trade indicators with qualitative analysis of digital governance frameworks, this study seeks to explore the relationship between technological integration and institutional constraints. The findings are expected to demonstrate that digital communication technologies have become an important driver of China–EU economic interdependence, but their impact remains conditioned by differences in regulatory and governance structures.

Keywords: Digital Communication; Economic Interdependence; China–EU Relations; Global Communication Theory; Digital Governance; International Political Economy

1. Introduction

The accelerating pace of digital transformation has fundamentally reshaped the structure of the global economy, redefining how governments, firms, and consumers interact across national borders. Advances in digital communication technologies—including broadband networks, cloud computing, artificial intelligence (AI), big data analytics, and digital platforms—have significantly reduced communication costs and increased the speed, efficiency, and scale of international economic activities. Unlike previous stages of globalization that relied primarily on the movement of physical goods and capital, contemporary globalization increasingly depends upon the rapid circulation of digital information and cross-border data flows, making digital communication a strategic driver of international economic integration (Baldwin, 2016; Castells, 2010). Consequently, digital communication has evolved beyond a supporting technological infrastructure to become an essential component of global production networks, digital services, and international trade.

The rapid growth of the digital economy has also transformed the nature of economic interdependence. Traditional theories of international political economy emphasize trade, foreign direct investment, and financial integration as the principal sources of interdependence among states (Keohane & Nye, 2001). However, the emergence of digital platforms and global communication networks has introduced new forms of connectivity in which data, digital services, and information have become critical economic resources. Cross-border e-commerce, online financial services, digital logistics, and cloud-based business operations increasingly rely on uninterrupted data transmission and integrated communication infrastructures. As a result, digital communication technologies have become indispensable for coordinating global value chains and supporting international economic cooperation in the twenty-first century (OECD, 2024; World Bank, 2021).

2. Literature Review

Despite the economic opportunities created by digital communication technologies, the expansion of digital economic cooperation has also generated new governance challenges. As digital information becomes a strategic economic resource, governments have increasingly adopted regulatory frameworks to address concerns related to data privacy, cybersecurity, digital sovereignty, and platform governance. Consequently, international economic integration is no longer determined solely by technological innovation but also by the compatibility of national regulatory systems. Divergent approaches to digital governance may facilitate or

constrain cross-border economic activities by influencing the movement of data, the operation of digital platforms, and the regulatory environment faced by multinational enterprises (Farrell & Newman, 2019; UNCTAD, 2021). These developments suggest that digital communication should be understood not merely as a technological phenomenon but as an institutional process shaped by legal, political, and regulatory considerations.

The relationship between China and the European Union provides an important context for examining these issues. As two of the world's largest economies, China and the EU have developed extensive economic ties through trade, investment, and technological cooperation. Bilateral economic relations have increasingly expanded into the digital domain, encompassing cross-border e-commerce, cloud services, digital finance, artificial intelligence, and smart manufacturing. Nevertheless, both parties have adopted significantly different approaches to digital governance. The European Union has established a regulatory framework emphasizing data privacy, consumer protection, market competition, and platform accountability through legislation such as the General Data Protection Regulation (GDPR), the Digital Services Act (DSA), and the Digital Markets Act (DMA). In contrast, China's regulatory framework—including the Cybersecurity Law, the Data Security Law, and the Personal Information Protection Law (PIPL)—places greater emphasis on data sovereignty, national security, and state supervision of digital infrastructure. These institutional differences have become increasingly important determinants of China–EU digital economic relations (European Commission, 2020; European Parliament & Council of the European Union, 2016).

3. Mechanisms of Digital Interdependence

Digital interdependence is constructed through a combination of technological infrastructure, economic networks, institutional arrangements, and cross-border information flows. Unlike traditional economic interdependence, which primarily relies on trade in physical goods and financial investment, digital interdependence is increasingly shaped by intangible assets, including data, algorithms, digital platforms, cloud computing capacity, and artificial intelligence technologies. These digital resources have become essential components of contemporary globalization because they enable firms, governments, and individuals to coordinate activities across geographical boundaries with unprecedented speed and efficiency. Digital platforms such as e-commerce marketplaces, cloud infrastructure providers, online payment systems, and real-time communication networks have significantly reduced barriers to international transactions by improving information accessibility, lowering coordination costs, and increasing market connectivity. As a result, digital technologies have transformed the structure of global economic relationships and created new forms of interdependence among countries and regions.

One important mechanism of digital interdependence is the integration of global value chains through digital technologies. Modern supply chains increasingly depend on real-time data exchange, automated production systems, and digital management platforms to coordinate manufacturing, transportation, and distribution processes. Companies operating across multiple countries rely on digital networks to monitor inventory levels, predict consumer demand, manage logistics, and optimize production decisions. This digital coordination allows firms to improve efficiency and respond rapidly to changes in global markets. For example, multinational enterprises increasingly utilize cloud-based systems and artificial intelligence tools to integrate operations across different regions, demonstrating how digital infrastructure has become a critical foundation of international economic cooperation. Therefore, digital connectivity does not simply facilitate communication; it actively reshapes the organization of production and trade by linking economic actors through interconnected technological systems.

Another significant mechanism involves the expansion of cross-border data flows. Data has become a strategic resource in the digital economy, often described as a fundamental input for innovation, business development, and technological competition. The collection and analysis of large-scale data enable companies to improve products, personalize services, and develop new business models. At the international level, the movement of data across borders supports digital trade and strengthens economic relationships between countries. However, differences in data governance frameworks, privacy regulations, and cybersecurity standards can create obstacles to digital cooperation. Countries may adopt different approaches toward data sovereignty, national security, and personal information protection, resulting in regulatory fragmentation. These differences demonstrate that digital interdependence is not solely determined by technological capability but is also influenced by political institutions and governance structures.

Furthermore, digital interdependence depends heavily on the compatibility of international regulations and technological standards. Effective digital cooperation requires shared rules regarding cybersecurity protection,

intellectual property rights, digital taxation, artificial intelligence governance, and online consumer protection. When countries establish compatible regulatory environments, businesses can operate more efficiently across borders and reduce uncertainty in international digital transactions. Conversely, regulatory conflicts may increase barriers to digital integration and create strategic competition between major economies. Farrell and Newman (2019) argue that global networks can become sources of both cooperation and vulnerability because countries that control key technological infrastructures may gain significant influence over others. This perspective highlights the importance of digital infrastructure as a component of geopolitical power.

At the same time, digital interdependence creates new challenges related to security and dependency. Although digital networks promote economic cooperation, they may also generate risks when critical technologies, platforms, or infrastructure are concentrated in a limited number of countries or companies. Dependence on foreign providers for cloud computing services, semiconductor technologies, or digital platforms may expose countries to external disruptions, technological restrictions, or political pressure. Recent debates surrounding digital sovereignty and technological competition reflect growing concerns that economic openness in the digital era must be balanced with security considerations. Therefore, governments increasingly attempt to develop domestic technological capabilities while maintaining international digital cooperation.

4. Case Discussion: China and the European Union

China and the European Union (EU) represent two of the world's largest economic actors and provide an important case for examining the opportunities and challenges of digital interdependence. Both sides have experienced rapid digital transformation and have become increasingly connected through trade, investment, technological exchange, and digital infrastructure development. China has developed one of the world's largest digital economies, supported by extensive e-commerce platforms, mobile payment systems, artificial intelligence development, and large-scale digital infrastructure projects. Meanwhile, the European Union has emphasized digital innovation, data governance, cybersecurity, and the creation of a unified digital market through regulatory frameworks. The interaction between China and the EU demonstrates how digital interdependence can simultaneously promote economic cooperation while generating tensions related to regulation, technological competition, and strategic autonomy.

The economic relationship between China and the EU has historically been characterized by strong trade and investment connections. Digital technologies have further strengthened this relationship by enabling more efficient cross-border commerce and expanding opportunities for cooperation in areas such as electronic payments, smart manufacturing, logistics, and artificial intelligence applications. Chinese companies have increasingly participated in European digital markets, while European firms have benefited from access to China's large consumer market and advanced digital infrastructure. E-commerce platforms and digital supply chain systems have facilitated the exchange of goods and services, allowing businesses from both regions to reach international consumers more effectively. In this sense, digital connectivity has become an important driver of economic integration between China and the EU.

However, the development of digital interdependence between China and the EU is also shaped by significant institutional and political differences. One major area of divergence concerns data governance and digital regulation. The European Union has adopted a rights-based approach that emphasizes individual privacy protection, transparency, and strict control over personal data. The implementation of regulations such as the General Data Protection Regulation (GDPR) reflects the EU's attempt to establish global standards for digital governance. In contrast, China has developed a digital governance model that places greater emphasis on state coordination, cybersecurity, and data sovereignty. These different approaches have created challenges for cross-border data flows and digital cooperation because companies operating between the two markets must navigate different regulatory expectations.

The issue of technological dependence has also become increasingly important in China–EU digital relations. While digital interdependence creates economic benefits, it may also produce vulnerabilities when critical technologies and infrastructure depend heavily on external actors. Areas such as telecommunications equipment, semiconductor supply chains, cloud computing, and artificial intelligence have become central to debates about technological security. The EU has increasingly promoted the concept of "strategic autonomy," seeking to reduce excessive dependence on external technology providers while maintaining international cooperation. Similarly, China has emphasized technological self-reliance and domestic innovation in response to external restrictions and geopolitical competition. These developments illustrate how digital interdependence can shift from a purely economic relationship toward a broader issue of national security and geopolitical strategy.

The role of digital infrastructure provides another important perspective for understanding China–EU relations. China's international digital expansion, including investments in telecommunications networks and digital connectivity projects, has increased its influence in global technology ecosystems. At the same time, European policymakers have expressed concerns regarding cybersecurity, data protection, and the potential political implications of foreign-controlled digital infrastructure. These concerns have encouraged the EU to strengthen regulatory oversight and promote secure digital networks. The debate demonstrates that digital infrastructure is not only an economic resource but also a strategic asset that influences power relations among states.

Despite these challenges, China and the EU continue to maintain significant opportunities for digital cooperation. Areas such as green technology, artificial intelligence research, digital trade, and industrial digitalization provide potential fields for collaboration. Both sides share interests in improving technological innovation, enhancing economic efficiency, and addressing global challenges through digital solutions. However, sustainable cooperation requires greater efforts to establish mutual trust, improve regulatory communication, and develop compatible governance mechanisms. Rather than eliminating interdependence, China and the EU need to manage their digital relationship through balanced policies that protect security interests while preserving the economic benefits of technological connectivity.

Overall, the China–EU case illustrates the complex nature of digital interdependence in the twenty-first century. Digital networks have created deep economic connections that encourage cooperation, but they have also introduced new forms of competition and strategic uncertainty. The relationship between China and the EU demonstrates that digital interdependence is neither purely beneficial nor inherently risky; instead, its outcomes depend on how governments, companies, and international institutions manage technological integration. Effective governance, regulatory coordination, and trust-building mechanisms will therefore be essential for ensuring that digital interdependence contributes to stable and sustainable global development (Farrell & Newman, 2019; Goldfarb & Tucker, 2019).

5. Digital Governance and Strategic Competition

The development of digital interdependence has transformed the nature of international economic competition and cooperation. While digital technologies create new opportunities for connectivity and economic growth, they have also introduced complex governance challenges. In the traditional global economy, power was often associated with control over physical resources, industrial capacity, and financial institutions. However, in the digital era, influence increasingly depends on the ability to control critical technologies, digital infrastructures, data resources, and technological standards. As a result, digital governance has become a central issue in international relations, shaping not only economic interactions but also geopolitical competition among major powers.

Digital governance refers to the development of rules, institutions, and policies that regulate the use of digital technologies and the movement of digital resources across borders. These governance mechanisms include regulations concerning data protection, cybersecurity, artificial intelligence, digital trade, online platforms, and technological standards. Because digital networks operate across national boundaries, effective governance requires international coordination. However, countries often have different political systems, economic interests, and security priorities, resulting in competing approaches toward digital regulation. The lack of universally accepted digital governance principles has created tensions among major economies and contributed to the emergence of competing digital models.

The competition between China, the European Union, and the United States demonstrates the growing importance of digital governance in global affairs. Each actor has developed a distinct approach based on its institutional environment and strategic objectives. The United States has traditionally emphasized market-driven innovation and the global expansion of technology companies, particularly in areas such as cloud computing, artificial intelligence, and digital platforms. American technology firms have played a dominant role in shaping global digital ecosystems, giving the United States significant influence over international technological development. However, concerns regarding data privacy, platform regulation, and the concentration of technological power have encouraged other actors to develop alternative governance frameworks.

The European Union has positioned itself as a regulatory leader in the digital economy. Rather than competing primarily through technological dominance, the EU has sought to influence global digital governance through regulatory standards. Policies such as the General Data Protection Regulation (GDPR)

demonstrate the EU's emphasis on privacy protection, individual rights, and responsible technology development. Through what is sometimes described as the "Brussels effect," European regulations can influence international companies because firms seeking access to the European market must often comply with EU standards. This regulatory approach allows the EU to exercise influence in global digital governance despite having fewer dominant technology companies compared with the United States or China.

China, meanwhile, has developed a distinctive digital governance model characterized by strong state involvement, technological development strategies, and emphasis on cybersecurity and digital sovereignty. Through substantial investment in digital infrastructure, artificial intelligence, telecommunications, and e-commerce ecosystems, China has rapidly expanded its digital capabilities. Chinese technology companies have become major global actors in areas such as mobile payment systems, online platforms, and telecommunications equipment. At the same time, China's approach places significant importance on state oversight of data and digital networks, reflecting broader national strategies concerning economic development and security.

These different governance models have contributed to strategic competition over digital standards and technological influence. Control over technical standards is particularly important because standards determine how technologies are developed, implemented, and interconnected across countries. Countries that successfully promote their technological standards can gain economic advantages and shape the future direction of global digital development. For example, competition in areas such as fifth-generation telecommunications networks, artificial intelligence systems, and semiconductor technologies reflects broader struggles over technological leadership. Digital competition is therefore not only about commercial success but also about political influence and international power.

Furthermore, digital governance has become closely connected with national security concerns. As economies become increasingly dependent on digital infrastructure, vulnerabilities in cyberspace can affect economic stability, public services, and strategic industries. Governments have therefore increased attention toward cybersecurity, supply chain security, and protection of critical technologies. However, security-based restrictions may also limit international cooperation and contribute to technological fragmentation. The challenge for policymakers is to balance the need for security protection with the economic benefits of global digital connectivity.

6. Conclusion: Digital Communication Technologies and the Future of

China–EU Economic Interdependence

This study has examined the role of digital communication technologies in shaping economic interdependence between China and the European Union. By applying a global communication perspective, the analysis demonstrates that digital technologies have become a fundamental factor influencing contemporary international economic relations. Unlike traditional forms of economic integration that were primarily based on the exchange of physical goods, capital investment, and industrial cooperation, digital interdependence is increasingly driven by the movement of information, data, technological knowledge, and digital services. Digital communication infrastructures have transformed the speed, scale, and structure of cross-border economic activities, creating new possibilities for cooperation while simultaneously generating new forms of dependence and competition.

The findings of this study indicate that digital communication technologies contribute to China–EU economic interdependence through several interconnected mechanisms. First, digital platforms and communication networks reduce transaction costs by enabling faster information exchange and more efficient coordination among businesses, governments, and consumers. Second, digital technologies enhance the operation of global value chains by allowing companies to manage production, logistics, and distribution processes across different regions. Third, cross-border data flows support innovation, digital trade, and the development of new economic models. Through these mechanisms, digital communication technologies have strengthened economic connections between China and the European Union and have become an essential foundation of contemporary globalization.

However, this study also highlights that digital interdependence is not a purely economic phenomenon. The increasing importance of data, digital infrastructure, and technological standards has transformed digital networks into strategic resources that influence international power relations. The relationship between China and the European Union demonstrates that digital connectivity can produce both cooperation and tension. While both sides benefit from technological exchange, trade integration, and digital innovation, differences in

regulatory systems, data governance approaches, and security concerns create challenges for deeper cooperation. Therefore, digital interdependence should be understood as a complex process involving economic interests, institutional arrangements, and geopolitical considerations.

The case of China and the European Union also reveals the importance of digital governance in managing the future development of the global digital economy. Effective governance requires cooperation in areas such as data protection, cybersecurity, artificial intelligence regulation, and technological standards. Without appropriate governance mechanisms, digital interdependence may increase vulnerabilities and contribute to technological fragmentation. Conversely, through greater regulatory dialogue and institutional cooperation, digital technologies can serve as a platform for sustainable economic development and international collaboration. From a theoretical perspective, this research contributes to the understanding of globalization by demonstrating that contemporary economic interdependence is increasingly shaped by communication networks and digital infrastructures. Traditional theories of international political economy often emphasize trade, finance, and production systems as the primary sources of interdependence. However, the digital transformation of the global economy suggests that information flows and communication technologies have become equally important sources of international connectivity. Digital communication technologies do not merely support existing economic relationships; they actively reshape the organization of markets, production systems, and international cooperation.

Future research could further explore the long-term effects of digital interdependence by examining additional cases across different regions and economic systems. Comparative studies involving emerging economies, multinational technology companies, and international digital institutions could provide deeper insights into how digital networks reshape global economic structures. Moreover, future research should investigate how emerging technologies, including artificial intelligence, blockchain, and quantum computing, may influence patterns of international cooperation and competition.

In conclusion, digital communication technologies have become a central force shaping the economic relationship between China and the European Union. They have expanded opportunities for trade, innovation, and cooperation while also creating new challenges related to governance, security, and strategic competition. The future of China–EU economic interdependence will depend not only on technological development but also on the ability of international actors to establish effective governance frameworks that balance openness, security, and mutual benefit. In an increasingly digitalized world, managing digital interdependence will be essential for achieving stable and sustainable global economic relations.

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