Digital Trade Competitiveness and Impact Factors Analysis - Based on Digital Economy Development Level Perspective

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Abstract. The popularization of digital technology and the vigorous development of the global Internet have promoted the rapid growth of digital trade and become one of the engines of international trade. Digital trade, which includes e-commerce, cross-border digital services, and digital payment, has become an important part of international trade, providing enterprises with unlimited opportunities in the global market and consumers with more choices. This study examines China, the United States, the United Kingdom, and the European Union's (27) trade competitiveness and scope of digital commerce from 2015 to 2022. First, based on scale patterns, the globe has developed a digital economic pattern that consists of China, the European Union, and the United States. Second, the European Union and the United States also have greater advantages than China's digital economy from a structural standpoint. Third, according to the dynamic trend, the difference between the EU and the US in terms of the scale of the digital economy is steadily closing. Fourth, from the standpoint of the competition landscape, China and the EU hold the top positions in the trade of digital products and services, respectively.

Keywords: Digital Trade, Digital Economy, Trade Competitiveness.

1. Introduction

The digital economy is a broad concept that refers to an emerging economic form that promotes economic activities through digital, networked and intelligent means with information and communication technology (ICT) as its core [1]. It proposed a three-layer conceptual framework: the digital sector, the digital economy and the digitalized economy. The digital economy is comprised of the following primary characteristics and elements: The digitization of conventional business and economic processes, including collecting, processing, transmission, and storage of digital data. The Internet's enormous expansion has enabled many economic players to engage online, fostering globalization, cooperation and innovation. Intelligentization, including technology such as big data analytics, machine learning, and artificial intelligence (AI), makes the economic system more intelligent, allowing for greater decision support and automated services. Innovation, which encompasses technological innovation, business model innovation, and product/service innovation, is what propels the growth of the digital economy [2]. The digital ecosystem, or digital economy, encompasses not only corporations, but also government, academia, social groups, and other disciplines, resulting in a complex digital environment. E-commerce, cloud computing, digital payments, online media and social media are all manifestations of the deep integration of digital technology and economic activities.

Over the past few years, "digital trade" has emerged as a concept that summarizes trade flows in which the Internet plays a central role [3]. The objects of digital trade include physical goods and Services [4]. Digital trade index refers to the net export scale of goods and digital services, that is, the difference between a country's digital exports and digital imports indicates how integrated into or dependent a region's digital economy is on the global market [5].

The total value of global digital service trade expanded from US $4,080.2 billion to US $5,890.4 billion from 2011 to 2020, according to the pertinent statistics in the United Nations Conference on Trade and Development report and the proportion of global digital service trade in service trade increased from 46.5% to 61.2% in 2020. It is expected that by 2030, the scale of global digital service trade will account for 75% of service trade.

The import and export of digital trade is divided into two categories: digital goods and digital services, according the WTO industry segmentation data. Digital goods that are related to ICT production are among them and include telecommunications equipment, integrated circuits and electronic components, and electronic data processing and office equipment. Digital services are related to ICT services and include telecommunications, computers and information services among other business services.

The start of the era of the digital economy has certain positive effects on international coordination and collaboration. The national trade pattern will continue to evolve as trade's importance to each country's economic growth grows.

Therefore, an in-depth study of the pattern and trajectory of commerce against the background of the digital economy is necessary. The role of the digital economy in advancing digital trade is clear, and it provides significant incentives for the growth of the industry in many ways [6]. Looking at the current international trade pattern from the viewpoint of digital economy, it can be found that trade related to digital economy develops rapidly and accounts for a large proportion in economic development. By using an empirical model to examine the relationship between the digital economy and trade openness and the economic growth of nations along the Belt and Road, discovered that high-level trade openness and improved digital economy development may both contribute to a nation's economic growth [7]. It adopts the heterogeneous introductory gravity model to study and finds that the development of digital economy in importing countries can improve the efficiency of China's export trade, but at the same time, it will lead to intensified competition among importing countries [8].

2. Digital Trade Competitiveness

The international competitiveness of a country's trade in goods or services is frequently assessed in academia using the Trade Competitive Index (TC), Revealed Comparative Advantage Index (RCA), International Market Share Index (MS), and Michaely Volatility Index (MI). The four types of indexes take a country's foreign trade and import and export scale, and the import and export scale of global trade as the benchmark data, respectively focusing on the import and export structure, stability and export scale to assess a nation's trade's degree of global competitiveness.

2.1. Digital Goods Competitiveness

This paper chooses TC index and MI index to analyze the competitiveness of digital goods trade of a country or region. Since both TC index and MI index evaluate a country's trade competitive advantage from the perspective of import and export, they are put together for comparative analysis.

At the national level, if the exports of digital goods of i countries are recorded as Xij, imports as Mij, total exports to foreign trade as Xi, and total imports to external trade as Mi, the TC index, the MI index is calculated according to the Equation (1) and (2):

$$TC = \frac{X_{ij} - M_{ij}}{X_{ij} + M_{ij}} \tag{1}$$

The range of TC index is [−1,1]. Generally, 0.8≤TC≤1 indicates that the country's digital goods trade has strong trade competitiveness; 0.5≤TC<0.8, with strong competitiveness; 0≤TC<0.5, with strong competitiveness; TC=0, with general competitiveness; -0.5 ≤TC<0, with low competitiveness; -0.8≤TC<-0.5, with low competitiveness; -1≤TC<-0.8, with extremely low competitiveness.

$$MI = \left(\frac{X_{ij}}{X_i}\right) - \left(\frac{M_{ij}}{M_i}\right) \tag{2}$$

The value range of MI index is between [-1.1], when MI>0, it indicates that country i is in a relatively advantageous position in the international market of digital goods trade. WhenMI< 0, it indicates that country i is at a relative disadvantage in the international market of digital goods trade.

Table 1. 2016-2021 Comparison of digital commodity trade competitiveness based on TC and MI

Country/region	TC			MI		
	2016	2021	Mean	2016	2021	Mean
China	0.1887	0.1464	0.1718	-0.1052	-0.1015	-0.0963
European (27)	-0.1127	-0.1465	-0.1269	0.0081	0.0138	0.0107
United Kingdom	-0.4536	-0.4890	-0.4696	0.0410	0.0370	0.0403
United States of America	-0.3876	-0.4382	-0.4097	0.0912	0.1152	0.1000

Note: the mean value is calculated from data for each country or region from 2016 to 2021

Table 2. 2016-2020 Comparison of digital commodity trade competitiveness based on TC and MI

Country/region	TC			MI		
	2016	2021	Mean	2016	2021	Mean
Ausria	0.1194	0.1986	0.1541	0.0103	0.0191	0.0137
Belgium	0.1263	0.2584	0.1855	0.0045	0.0099	0.0069
Bulgaria	0.3688	0.3333	0.3241	0.0219	0.0241	0.0206
Croatia	0.5120	0.5474	0.5358	0.0275	0.0282	0.0289
Cyprus	0.3318	0.7174	0.5112	0.0094	0.0164	0.0125
Czech Republic	-0.0079	0.0060	-0.0054	-0.0178	-0.0095	-0.0169
Denmark	0.2845	0.2444	0.2625	0.0161	0.0135	0.0141
Estonia	0.0015	-0.1102	-0.0199	0.0003	-0.0120	-0.0020
Finland	0.4940	0.4932	0.4971	0.0353	0.0333	0.0336
France	0.3110	0.3481	0.3142	0.0246	0.0280	0.0249
Germany	-0.1622	-0.1734	-0.1634	-0.0262	-0.0300	-0.0264
Greece	0.4042	0.4933	0.4361	0.0210	0.0315	0.0244
Hungary	-0.0171	-0.0145	-0.0233	-0.0159	-0.0063	-0.0133
Ireland	-0.3012	-0.1449	-0.2294	-0.0162	-0.0129	-0.0127
Italy	0.4265	0.3895	0.3946	0.0213	0.0210	0.0200
Latvia	0.0594	0.0936	0.0844	0.0078	0.0162	0.0125
Lithuania	0.2189	0.2385	0.2131	0.0165	0.0151	0.0135
Luxembourg	0.0486	0.5078	0.3113	-0.0019	0.0037	0.0027
Malta	-0.1689	0.0685	-0.1043	-0.0094	0.0023	-0.0062
Netherlands	-0.0427	0.0133	-0.0083	-0.0244	-0.0066	-0.0138
Poland	0.1044	0.1286	0.1113	0.0081	0.0114	0.0084
Portugal	0.2817	0.4116	0.3405	0.0185	0.0375	0.0265
Romania	0.4493	0.5292	0.5048	0.0380	0.0463	0.0427
Slovak Republic	-0.0820	0.0183	-0.0222	-0.0270	0.0033	-0.0089
Slovenia	0.2784	0.2066	0.2613	0.0112	0.0108	0.0106
Spain	0.6003	0.5984	0.6041	0.0259	0.0314	0.0284
Sweden	0.1794	0.2371	0.2053	0.0177	0.0240	0.0205

Tables 1 and 2 respectively present the TC index and MI index of each country or region from the global perspective and the EU perspective. From the index performance in Table 1, China's TC index is positive, indicating that China has an advantage in digital goods trade compared with these countries. The TC indices of the United Kingdom, the United States, and the European Union are all less than 0, indicating that these three countries show a deficit in the trade of digital goods. When looking at the trade balance, China's trade surplus in digital goods shows a tendency of progressive expansion, while the trade deficits of the EU and the US also show a trend of gradual growth. However, in terms of the pace of growth of the TC index, except for China, the growth rate of TC

index in the other three countries or regions is greater than 100%. China's MI index is negative, which means that the proportion of China's digital goods export in China's total foreign trade export is less than the proportion of digital goods import in China's total foreign trade import. Although the two indexes show inconsistent trends, it can still be seen that China has a great advantage in the trade of digital goods.

Among the EU countries presented in Table 2, the TC and MI indexes of Spain and Croatia are both greater than 0, and compared with other countries, the indexes are closer to 1, belonging to the first ranking of digital goods export.

The TC index of Bulgaria, Cyprus, Finland, France, Greece, Italy and Romania is positive and within the range of 0.5-0.8, which belongs to the second ranking. Hungary, Ireland and Germany have TC index and MI index less than 0, which belong to the third Ranking. Combined with the changes of the index from 2016 to 2021, most countries showed varying degrees of growth in TC and MI, The Czech Republic and the Netherlands saw significant decreases in TC. This is mainly because its trade deficit increased significantly from 2016 to 2020, and then turned into a trade surplus in 2021, but it is still difficult to make up for it. Estonia's TC index grew by an average of 780 per cent, mainly thanks to a sharp reduction in its imports of digital goods in 2017.This conclusion can also be drawn from the average growth rate of its MI index reaching 254%.

The above analysis shows that the export of digital service trade in Spain and Croatia is significantly greater than the import, and the proportion of export in foreign trade is also greater than the proportion of import, so there is a surplus advantage in digital trade. It has certain competitiveness in the international market. Czech Repbulic, Hungary, Ireland, Netherlands, Malta, Slovak Republic have a significant deficit in digital goods trade and the deficit in the Czech Repbulic, Netherlands, Malta, Slovak Republic showed a narrowing trend.

2.2. Competitiveness of Digital Service Trade

This paper selects RCA index and MS index to measure the competitiveness of a country's digital service trade. Since both RCA index and MS index measure the competitiveness level of digital service trade from the perspective of export, they are put together for comparison.

At the global level, the export of global digital service trade is denoted as X_{gj}, and the import volume of foreign trade is denoted as X_g.

$$\mathrm{RCA} = \frac{\frac{X_{ij}}{X_i}}{\frac{X_{ij}}{X_g}} \tag{3}$$

The range of the RCA index can be divided into 4 ranges, when RCA >2.5 indicates that the international competitiveness of the digital services trade in i countries is very strong; RCA between [1.25, 2.5] indicates the strong international competitive power of the trade in digital services of i countries; and RCA at [0.8, 1.25] indicates a relatively strong competitive capacity of the international trade of digital services in i nations.

$$MS = \frac{X_{ij}}{X_{gj}} \tag{4}$$

The MS index range is in the range of [0,1], where MS=0 indicates that i countries do not have exports in the digital services trade and have no competitive advantage at all; and when MS=1 the exports of i countries in the trade in digital services are the world's main source of exports for that trade, with an absolute advantage or with a total advantage.

Table 3. 2015-2022 Comparison of competitiveness of digital services trade based on RCA and MS indices

Country/region	RCA			MS		
	2015	2022	Mean Value	2015	2022	Mean Value
China	0.4621	0.6830	0.5959	0.0534	0.0856	0.0696
European	1.4974	1.5501	1.4953	0.4643	0.4757	0.4764
United Kingdom	1.6158	1.3747	1.4851	0.0636	0.0439	0.0525
United States of America	0.8143	0.7323	0.7900	0.0857	0.0684	0.0781

Table 4. 2015-2022 Comparison of competitiveness of digital services trade based on RCA and MS indices

Country/region	RCA			MS		
	2015	2022	Mean Value	2015	2022	Mean Value
Ausria	1.1727	1.1394	1.1682	0.0115	0.0104	0.0117
Belgium	0.9609	0.7869	0.8988	0.0225	0.0190	0.0215
Bulgaria	1.1662	1.5920	1.4073	0.0018	0.0031	0.0024
Croatia	0.9778	1.0959	1.0782	0.0011	0.0016	0.0014
Cyprus	4.2230	7.5997	5.6810	0.0027	0.0061	0.0042
Czech Republic	0.6764	0.8266	0.7471	0.0057	0.0071	0.0066
Denmark	1.0864	0.9579	1.0891	0.0080	0.0077	0.0084
Estonia	1.2181	2.3960	1.6330	0.0011	0.0025	0.0015
Finland	4.4531	3.4013	3.8429	0.0173	0.0127	0.0160
France	1.0096	0.8445	0.9188	0.0357	0.0252	0.0317
Germany	0.8431	0.6598	0.6898	0.0628	0.0426	0.0505
Greece	0.6257	0.4048	0.5763	0.0018	0.0014	0.0018
Hungary	0.6715	0.5644	0.6482	0.0038	0.0032	0.0039
Ireland	9.8575	12.0182	10.8738	0.1173	0.2133	0.1696
Italy	0.6680	0.4076	0.5384	0.0172	0.0099	0.0145
Latvia	1.0398	1.3672	1.4098	0.0008	0.0013	0.0012
Lithuania	0.3717	0.9428	0.6318	0.0006	0.0019	0.0011
Luxembourg	1.9295	0.9446	1.4044	0.0099	0.0045	0.0077
Malta	0.2719	0.1187	0.1976	0.0002	0.0001	0.0002
Netherlands	1.8663	0.9967	1.2282	0.0665	0.0385	0.0473
Poland	0.8072	0.9732	0.9017	0.0091	0.0139	0.0117
Portugal	0.7253	1.0107	0.8681	0.0028	0.0041	0.0034
Romania	1.7016	2.3932	2.0721	0.0063	0.0101	0.0083
Slovak Republic	0.4575	0.5352	0.5855	0.0018	0.0020	0.0024
Slovenia	0.6664	0.3992	0.5083	0.0012	0.0010	0.0011
Spain	1.1999	0.9034	1.0643	0.0225	0.0165	0.0207
Sweden	3.3092	2.3360	2.5174	0.0326	0.0213	0.0247

From the RCA index from the global perspective presented in Table 3, it can be seen that European and the United Kingdom have strong competitiveness in digital service trade compared with the other two countries. At the same time, European has the highest MS index. In terms of the average growth rate of RCA index, both China and the EU reached a growth rate of more than 100%.

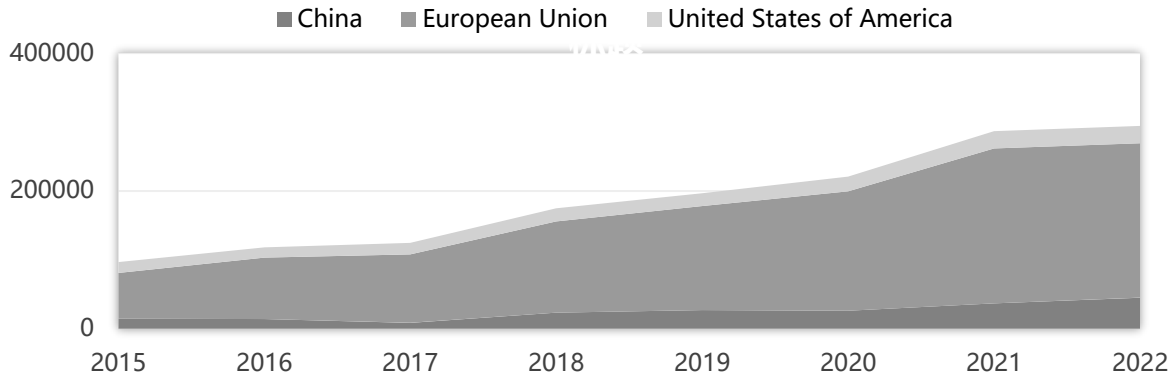

Figure 1. China, US, EU Trade Surplus in Digital Services

Fig.1 shows the trade surplus of digital service export of China, the United States and the European Union from 2015 to 2022.As may be observed from the graph, the trade surplus of digital services in China, the United States and the European Union is gradually expanding, and the competitiveness of export trade is gradually improving.

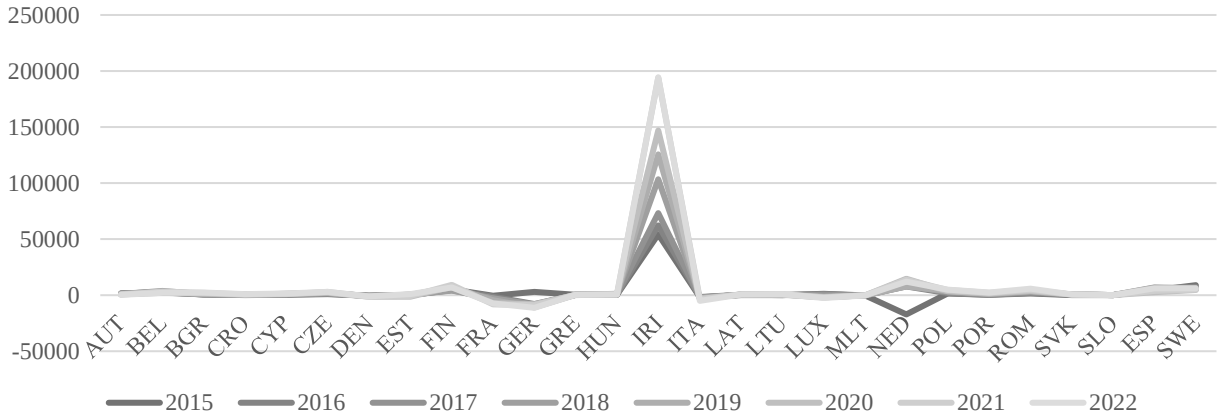

Figure 2. The EU (27) Trade Surplus in Digital Services

Fig.2 shows the scale of digital service trade (export-import) of the 27 EU countries. It can be clearly seen that Ireland shows a great advantage of trade surplus during 2015-2022, while Greece and Nerlands show a significant trade deficit.

3. Analysis of influencing factors of digital trade competitiveness

Digital trade competitiveness refers to the ability of a country or region to gain a competitive advantage in digital trade. As global digital trade grows, competition between countries is becoming more intense. In this competition, some countries have been successful, while others have faced challenges. Therefore, it becomes crucial to understand digital trade competitiveness and the factors that influence its development.

This paper will analyze the competitiveness of digital trade from digital policy, digital technology, digital business environment, combined with the basic national conditions of the discussed countries.

3.1. Digital Policy

3.1.1. Digital Trade Policy

The government's policy measures can significantly affect the competitiveness of digital trade [9]. These can include trade policy, tax policy, data privacy and cybersecurity regulations, among others. In terms of sub-areas, the main trade restrictive measures are concentrated in infrastructure and connectivity, electronic payment, payment system and intellectual property. China has the highest

score in the index of restrictions on trade in digital services, which means the most restrictive measures [10].

The government promotes the development of digital trade by formulating trade policies, and then reducing trade barriers and trade costs, canceling or reducing tariffs, providing export subsidies and other policies to expand the market and encourage more enterprises to participate in digital trade.

Tax policy can affect the profitability of digital trade. Lowering taxes related to digital trade, such as VAT or tariffs, can encourage more businesses to participate and facilitate market expansion.

Government data privacy regulations can improve the trust of consumers and businesses. Regulations to protect personal data can help prevent data breaches and cyberattacks and enhance the sustainability of digital trade.

Digital trade involves transactions that cross national borders, so there is a need for harmonized regulation and policy internationally. However, regulations and policies on the digital economy and digital trade vary widely across countries, which can lead to inconsistency and uncertainty. The lack of cross-border regulatory and policy coordination can lead to the collision of laws and rules, hindering the development of digital trade.

3.1.2. Data privacy and security Policy

Digital trade involves a large amount of data transfer and storage, so data privacy and cybersecurity policies are critical. Countries have varying policies on data circulation due to their security and interests. On the one hand, the exchange and flow of data inevitably generates concerns about privacy and security [11]; On the other hand, the increasing value of data as a resource and factor of production will inevitably lead to disputes over interests and breed digital protectionism. Europe has long attached great importance to data protection, with France and Germany having the strictest data regulatory policies. Sweden has strict regulations on data privacy, enhancing consumer trust in digital trading platforms. At the same time, Sweden has advanced network security technology, which helps prevent cyber-attacks. Policies differ across the EU. This is one of the reasons why the digital trade competition index varies considerably across EU countries in the above analysis. The UK government agreement on digital governance permits unrestricted data exchange between the UK and Asia-Pacific nations. As one of the most active countries in the world's digital trade, the United States has export controls on commercial communication satellites and technologies that use encryption, high government procurement barriers for digital products, and obvious discrimination against some countries [12]. It suggests that policies that excessively block access to websites and regulate cross-border data flows could have serious implications for trade. Similarly, the research suggests that strict data restrictions, including intermediary liability and content access, could significantly impact the economies of exporting countries if countries transition from liberal policies [13].

3.2. Digital Technology

3.2.1. Digital infrastructure

Digital trade requires strong digital infrastructure, and high-speed Internet connection is the foundation of digital trade, which can ensure fast and stable data transmission and provide better customer experience. Enterprises can easily set up online stores, digital payment systems as well as global supply chain management systems, making cross-border trade more convenient and efficient. Cloud computing technology can provide the ability to store and process large-scale data, which can help analyze customer behavior and market trends. It found that Internet penetration has a significant positive impact on US service imports, but no significant impact on US service exports [14]. This suggests that the development of the Internet has facilitated the US to acquire more services from abroad, but not to provide more services abroad. The article argues that this may be because US service exports are restricted by foreign trade policies, or because the quality and reputation of US service exports are higher than foreign service exports, so there is no need to rely on the Internet to reduce transaction costs.

The EU's economy is highly digital. Data from the European Commission shows that in 2021, 80 % of individual EU residents went online every day, 94 % of EU enterprises used fixed broadband Internet, 41% used cloud computing services, and 10% used artificial intelligence. Digital solutions save time and resources through rapid execution, enabling unused resources to be reallocated to other tasks and activities, which speeds up production operation cycles and economic systems, contributing to potential transfer to other areas [15]. The gradual rejection of manual labor in areas where process uniqueness is not required can reduce the number of operational errors and allow freeing up workers for creative activities; All of these contribute to realizing employees' potential and improving their productivity. The growth of the digital economy has also improved logistics and supply chain management, which are essential for digital trade. Advanced tracking and logistics technologies enable enterprises to better manage inventory, forecast demand and optimize goods transportation [16]. The application of digital technology has reduced trade costs and shortened delivery time, it improves the traceability of goods, thus increasing the reliability and efficiency of digital trade [16-18]. Estonia has made great progress toward digitization, which has promoted the rise of digital trading. The country has implemented electronic identification and digital signatures, increasing the security of digital trade.

E-commerce platforms and digital payments are crucial for digital trade, enabling consumers to purchase international goods and services. However, challenges include market access and competition, with large digital platforms monopolizing markets. Countries are strengthening anti-monopoly regulations to protect market competition.

The rise of the digital economy has also promoted the popularity of digital payments. Innovative financial services such as online payment tools, virtual currencies and digital banks provide convenient and secure payment methods for digital trade. This reduces the payment risk of international transactions and facilitates the growth of cross-border trade.

In addition, the digital economy offers rich opportunities for financial technology (FinTech) companies to finance digital trade by providing services such as cross-border payments, remittances and financing.

3.2.2. Digital business environment

Business environment factors play a key role in digital trade competitiveness. These include the e-commerce ecosystem and business partnerships, which directly affect the sustainability and success of digital trade. The following is a detailed analysis of these factors and the mechanisms behind them.

3.2.3. E-commerce ecosystem

An e-commerce ecosystem is a set of interconnected components, including online marketplaces, payment systems, logistics services, etc., that provide infrastructure and support for digital trade. Its influence mechanism can be discussed from the following aspects.

Degree of competition in online markets: Competitive online markets provide consumers with more choices, as well as more attractive prices and services. This competition motivates firms to continuously improve product quality and lower prices, thereby enhancing the attractiveness of digital trade.

Convenience of payment system: Convenient payment system, such as e-wallet, credit card payment and Alipay, can improve the convenience of transaction. Consumers are more willing to use trusted and convenient systems in the payment process, thereby driving the growth of digital trade.

Efficiency of logistics services: Efficient logistics services are essential for digital trade. Timely delivery and reliability of the logistics network can improve consumer satisfaction, reduce the shopping refund rate, and promote the success of online retailers.

The UK has a mature e-commerce market, including large online retailers and cross-border e-commerce platforms, such as Amazon, ebay and Tesco, as well as highly developed payment systems and logistics services. Germany is one of the largest e-commerce markets in Europe, with a rich online marketplace and a robust payment system. The logistics network is efficient and conducive to the development of digital trade. France has a gradually growing e-commerce market with a number of

well-known online marketplaces and payment systems. The government has strict regulations on data privacy that help build consumer trust.

3.3. Business partnership

Business partnerships involve cooperation between firms and suppliers, partners and distributors. Such collaboration can help make digital trade more efficient and competitive. Close cooperation with suppliers and logistics companies can improve the efficiency of the supply chain. Sharing real-time information, managing inventory and orders collaborates, and reducing transportation time and costs are key factors for the success of digital trade. Cross-border cooperation between enterprises can expand the market, increase market share and promote business growth.

Partnerships can provide strategic advantages in product development, marketing, and cross-border sales. Corporate partners can work together on R&D and innovation to drive technological and product innovation in digital trade. This helps to improve the competitiveness of firms and enables them to meet changing market demands. Partnerships can help companies enter new markets and expand their businesses. This collaboration can provide support for market insights, channel distribution and marketing. As an international logistics and distribution center, the Netherlands has attracted many international businesses and facilitated cross-border digital trade. Business partnerships in the Netherlands have helped drive the growth of digital trade. Ireland has attracted a number of technology companies, and this cross-border collaboration has driven innovation in digital trade. In addition, Ireland has superior data center infrastructure that supports digital trade.

4. Conclusion

This paper analyzes the scale of import and export of digital product and services in different countries from 2015 to 2022, and uses four trade competition indexes TC, RCA, MI and MS to measure the international competitiveness and growth level of different countries. On this basis, combined with the actual national conditions of different countries' digital economy development levels, exploring the impact of digital economy development levels on digital trade from policy factors, technical factors and business environment factors.

According to the data analysis: the world has formed a digital economic pattern, consisting of the United States, the European Union, and China from a scale pattern perspective; the digital economies of the United States and the European Union have stronger structural advantages than China's; the digital economy gap between the EU and the US is gradually narrowing in terms of dynamic patterns; China and the EU occupy the dominant position of digital goods trade and digital service trade respectively.

The limitation of this study is the availability of data. Digital trade data for some countries have statistical caliber errors. In addition, focusing on the data related to digital trade competition in the EU does not separate the trade data between EU member states, and due to the limited research time, the research fails to fully capture in the long run trend of digital trade development. Future research can consider longer time span analysis.

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