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DIGITAL ECONOMY'S ROLE IN SHAPING CHINA'S OUTWARD INVESTMENT IN BELT AND ROAD COUNTRIES

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Abstract. Previous international investment-related literature is less likely to include host country digital economy as an influential factor in the analysis framework. Meanwhile digital economy-related literature mainly focuses on the concept and characteristics of digital economy, and few scholars explore the impact and mechanism of China's OFDI in the context of digital economy. Based on the theory and mechanism analysis, this article first constructs a comprehensive digital economy indicator system using data from 46 B&R countries from 2004 to 2020 and then constructs extended investment gravity model, technological innovation intermediary impact and trade cost moderating effect to thoroughly investigate the effect and fundamental mechanism of digital economy on China's OFDI. The conclusions are as follows: First, digital economy indicators' computation reveals significant disparities among B&R countries. Second, baseline regression finds that B&R countries' digital economy considerably boosts China's OFDI. Third, regional heterogeneity reveals that digital economy in ASEAN countries plays a more visible role in boosting China's OFDI. Fourth, mechanism analysis reveals that B&R countries' digital economy can encourage China's OFDI by improving technological innovation and reducing trade costs.

Keywords: Belt and Road countries, digital economy, outward foreign direct investment, mechanism analysis.

JEL Classification: C43, C82, C87, F21.

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1. Introduction

Digital economy transfers different types of social and economic activities to the electronic environment of the Internet with information and communication technologies (Berdykulova et al., 2014), and the economic activity and economic behavior of the subjects of market transactions depend on the information network, which is significantly different from the industrial economy era. The expansion of digital economy and its connected disciplines creates both opportunities and challenges for individual countries. According to Pradhan et al. (2019), digital economy promotes economic growth by broadening the range of resources and markets and improving products and services to achieve economies of scale; on the other hand, digital economy alters global value chains, causing changes in resource allocation and posing challenges to many aspects of society. Meanwhile, the heterogeneity, diversity, and dynamism of digital advancements make associated research more difficult (Horoshko et al., 2021). As an emerging economic form, digital economy has given rise to new business models and modes, accelerated the development of multinational corporations (MNCs) toward digitalization and intelligence, increased market sensitivity, provided favorable conditions for MNCs' outward direct investment, and brought new development opportunities. Changes in investment patterns, investment content, and investment efficiency have also resulted, driving the spatial expansion of multinational investment activities, and enhancing the dynamics of international market expansion (Arvin et al., 2021; Cao et al., 2022; Choi, 2010; Wang et al., 2014).It has been proposed that the extensive use of digital technology will alter a country's ownership advantage, locational advantage, and MNC internalization advantage, hence affecting the development of OFDI from that country (Gao & Lu, 2020). MNCs with faster digitalization favor "asset-light" international investment and business models, and they continue to reduce their share of overseas assets and sales (Casella & Formenti, 2018).

Some academics claim that digital economy is not favorable to OFDI and may restrict the scale of investment since it allows multinational corporations to compete in international marketplaces without the presence of the real economy (Banalieva & Dhanaraj, 2019; Liu & Mao, 2016). Casella and Formenti (2018) point out that in the context of digital economy, enterprises' non-core value chains can be partially outsourced and operate online through Internet platforms, thus reducing the need for foreign investment. Cao and Qiu (2023) further find that the digital economic development gap between China and the host country has a dampening effect on the expansion of the size of OFDI. Meanwhile, it has been argued that deepening cooperation in digital economy is also an important part of the high-quality development of the Belt and Road (B&R), (Lun & Liu, 2023). Meanwhile, the digital infrastructure, digital innovation development environment, and international competitiveness of the digital industry in the B&R countries have significant effects on the host countries' attraction of China's OFDI, with the growth effect of China's investment attracted by the increased level of digital economy development in the high-income countries being significantly higher than that in the low-and middle-income B&R countries (Chaisse & Kirkwood, 2020). To summarize, digital economy is an important component that cannot be overlooked by businesses engaged in OFDI. Previous literature on the factors influencing international investment rarely considered the inclusion of host country digital economy as an influencing factor in the analytical framework. In the digitalized, networked, and intelligent era with the vigorous development of information and communication technologies and the Internet, the scale of the digital economy accounts for about 40% of the world economy, which has a profound impact on the transformation and upgrading of traditional industries and the cultivation and growth of emerging industries. Therefore, when making OFDI, the development level of the host country's digital economy should not be ignored (Chaisse, 2023; Chaisse & Bauer, 2020; Horváth & Klinkmüller, 2019)

Digital economy was hardly ever considered as an influencing element in the analytical framework in prior research on the factors influencing foreign investment (Slawotsky, 2022). In the era of digitization, networking, and intelligence with the flourishing development of information and communication technology and the Internet, the scale of digital economy accounts for about 40% of the world's economic volume, which profoundly affects the transformation and upgrading of traditional industries and the cultivation and growth of new industries. Although many scholars have explored the impact of host country digital economy on OFDI from various perspectives, including factors such as resource endowment, geographical distance, institutional quality, and host country export trade (Ji et al., 2018; Wang et al., 2014), there are still insufficient theoretical explanations and empirical tests on how the host country's digital economy affects OFDI. Simultaneously, prior research mostly concentrates on the state of development and features of digital economy, and few examine the mechanism and effects of China's OFDI against the backdrop of digital economy (Chaisse & Bauer, 2020). Especially, under the BRI, China has actively promoted the construction of the Digital Silk Road, and digital economy has become a key area of cooperation between China and the B&R countries (Wang et al., 2024). Therefore, it is of great significance to investigate the impact and mechanism of host countries' digital economy development levels on China's direct investment in them to optimize the strategic layout and policy design of China's overseas investment, accelerate the integration and open sharing of digital resources in countries along the routes, and gradually eliminate the "digital divide" in B&R countries (Zhang et al., 2024a). The host countries' digital economy was hardly ever considered as an influencing element in the analytical framework in prior research on the factors influencing foreign investment. Meanwhile, most research concentrate on the development state and characteristics of digital economy, the mechanism of digital economy affecting OFDI against the backdrop of the digital economy have not received as much attention as they could.

Will the development of digital economy in the nations along the route become a new driving force for China's OFDI in the context of the globalization of digital economy and the construction of the B&R as an important link of OFDI? When Chinese enterprises invest in the B&R countries, will the development of digital economy of the B&R countries become an important reference factor in investment decisions? How will the development of digital economy in the B&R countries affect China's outward direct investment? Is there an intrinsic mechanism? These questions are important questions that must be clarified and answered to promote the construction of the "Digital Silk Road" and deserve in-depth research and exploration. Therefore, this article will focus on the theory and mechanism of the impact of the B&R countries' development of digital economy on OFDI, propose research hypotheses, build an evaluation index system for the B&R countries' development of digital economy, and further explore the heterogeneity and mechanism of influencing factors from the perspective of geographical location. Therefore, this article focuses on the theory of digital economy affecting China's OFDI and puts forward the main research hypothesis, namely, *Hypothesis 1*: *The improvement of digital economy in B&R countries can promote China's OFDI*. Then, this article puts forward hypotheses 2 and 3 from the mechanism of digital economy affecting China's OFDI, namely, *Hypothesis 2 and 3*: *The digital economy in B&R countries can promote China's OFDI by improving technological innovation and reducing trade costs*.

The innovations and contributions of this article are as follows. This article innovatively integrates the host country's digital economy development into the analytical framework, using the digital economy development level of 46 B&R countries as the core explanatory variables. It then examines the ways in which the host country's digital economy influences China's OFDI from the perspectives of both trade costs and technological innovation, conducting a more thorough and detailed analysis based on regional differences. This article makes up the gap of the existing research in this aspect. Through multiple perspectives analysis, we can more comprehensively understand the impact of B&R countries' digital economy development on attracting China's OFDI. The marginal contribution is to summarize the background, current situation, and influencing factors of China's OFDI in conjunction with the development of the B&R countries' digital economy, to further supplement and enrich relevant theories of China's OFDI, and to provide certain references for future research on China's OFDI with digital economy as the starting point.

2. Theoretical model and mechanism analysis

2.1. Theoretical model construction

The theoretical effect of digital economic development on attracting foreign direct investment from both consumers and producers in B&R countries is deduced in this article. The cost of investment in the B&R countries is believed to be the sunk cost, represented by. The cost is assumed to meet the first-order function of the *NRI* of the B&R nations' digital economy development (Wen & Hu, 2019), implying that the B&R countries' digital economy supports trade cost reduction, and the following formula is obtained.

$$\tau = \gamma_0 - \gamma_1 NRI. \tag{1}$$

Where γ_0 is the fixed sunk cost; γ_1 is transaction cost elastic and $\gamma_1 > 0$.

2.1.1. Consumer behavior

First, assuming that the outward investing enterprise meets the utility function in the form of CES and needs to meet the budget constraint in the investment process, the following formula is obtained.

$$\mu = \left[\int_{\omega\in\Omega} q(\omega)^{(\sigma-1)/\sigma} d\omega\right]^{\sigma/\sigma-1}; \tag{2}$$

$$s \cdot t \quad \int_{\Omega} p(w) q(w) dw \leq Y; \tag{3}$$

$$Y_i = \int_{\omega\in\Omega} p(\omega) q(\omega) d\omega; \tag{4}$$

$$P_i = \left[\int_{\omega\in\Omega} p(\omega)^{1-\varepsilon} d\omega\right]^{1/1-\varepsilon}. \tag{5}$$

μ is the total consumer utility, $q(w)$ is the quantity of the good, $p(w)$ denotes the price of the good, and σ is the elasticity of substitution between different goods. $\sigma = \frac{1}{1-\rho} > 0$. Y_i is the country's total consumption expenditure, and p_i is the country's price index. Under the condition of efficiency maximization, the consumer demand function for the class of goods is:

$$q(\omega) = p(\omega)^{-\varepsilon} \, Y_i / P_i^{1-\varepsilon}. \tag{6}$$

2.1.2. Producer behavior

Assuming that firm productivity φ satisfies the Pareto distribution, the wage in country i is denoted by ω_i, and the monopoly manufacturer maximizes the revenue requirement of MR = MC, the commodity pricing can be derived.

f_i^d is the fixed cost of domestic production of the firm. Assuming that the development of digital economy in the B&R countries can promote technological innovation, at this time (1+e) π is the profit of the existence of technological innovation, and assuming that the development of digital economy can promote industrial upgrading, at this time (1+g) π is the profit of the existence of industrial upgrading, so the expression of total profit $\pi_d^i\left(\varphi\right)$ is as follows:

$$p(\omega) = {}^{\omega_i}\!\big/_{\partial\varphi}; \tag{7}$$

$$TC = f_i^d + q(\omega)\,{}^{\omega_i}\!\big/_{\varphi}; \tag{8}$$

$$\pi_d^i\left(\varphi\right) = (1+e+g)\Big[\left(1-\alpha\right)(\alpha P_i)^{1-\sigma} Y_i \left({}^{1}\!\big/_{\omega_i}\right)^{\sigma-1} - f_i^d. \tag{9}$$

Using M_i to measure the market size of country i, that is, $M_i = \left(1-\alpha\right)(\alpha P_i)^{1-\sigma} Y_i$. Assume that the cost of domestic production in country m is f_m^d and the cost of OFDI to country n is f_n^b. f_n^b includes sunk costs τ and transportation costs of C, then the cost of investment into country n can be expressed as:

$$f_n^b = C + (\gamma_0 - \gamma_1 \text{NRI}). \tag{10}$$

Assuming that the capital to be invested in OFDI activities is θf_n^b and the cost of foreign financing is $\left(1-\theta\right) f_n^b$, the search cost, decision cost and information cost required to obtain external financing are collectively referred to as transaction cost, denoted as $A\left(1-\theta\right) f_n^b$. A denotes the difficulty of obtaining the transaction, thus, the profit gained by the firm when taking OFDI is:

$$\pi_n^m == \left(1+e+g\right)\left({}^{1}\!\big/_{\omega_n}\right)^{\sigma-1} M_n \varphi^{\sigma-1} - \theta f_n^b - \left(1-\theta\right) f_n^b - A\left(1-\theta\right) f_n^b. \tag{11}$$

In the case of market clearing, it is usually difficult for OFDI firms to earn excess profits. Letting $\pi_n^m = 0$, the productivity threshold condition for firms to make OFDI can be found.

$$\Phi = \left[\frac{\theta f_n^b + (1-\theta) f_n^b + A(1-\theta) f_n^b}{\left(1+e+g\right) * M_n}\right]^{\frac{1}{\sigma-1}} * \omega_n. \tag{12}$$

Considering the relationship between the productivity threshold and enterprises' OFDI transaction acquisition difficulty, technological innovation and industrial upgrading, partial derivatives of A, e and g are obtained respectively, and the following formula is obtained:

$$\frac{\partial\varphi}{\partial A} = \frac{1}{\sigma-1}\left[\frac{\theta f_n^b + (1-\theta) f_n^b + A(1-\theta) f_n^b}{\left(1+e+g\right) * M_n}\right]^{\frac{1}{\sigma-1}-1} * \omega_n * \frac{(1-\theta) f_n^b}{\left(1+e+g\right) * M_n}. \tag{13}$$

Since θ < 1, σ > 1, and (1 – θ) [C + (γ_0 – γ_1 NRI)] > 0, we can see:

$$\frac{\partial \varphi}{\partial A} > 0; \tag{14}$$

$$\frac{\partial \varphi}{\partial e} = \frac{\partial \varphi}{\partial g} = \frac{1}{\sigma - 1}\left[\frac{\theta f_n^b + (1-\theta) f_n^b + A(1-\theta) f_n^b}{(1+e+g) * M_n}\right]^{\frac{1}{\sigma-1}-1} * \omega_n * {}^{-M_n}\Big/_{(1+e+g)^2 * M_n^2}. \tag{15}$$

Since θ < 1, σ > 1, and (1 – θ) [C + (γ_0 – γ_1 NRI)] > 0, we can see:

$$\frac{\partial \varphi}{\partial a} = \frac{\partial \varphi}{\partial b} < 0. \tag{16}$$

Formula 14 shows that the productivity threshold is an increasing function of transaction costs generated in the development of digital economy. The higher the transaction cost, the higher the productivity threshold and the higher the investment threshold of enterprises. With the development of digital technology, the transaction costs generated by both sides are also reduced, and the corresponding productivity threshold is also reduced, that is, the threshold for enterprises to invest along the country will be lowered. At the national level, the digital technology in countries along the route reduces transaction costs in favor of outbound direct investment by Chinese enterprises.

From Equation 16, it can be seen that the productivity threshold is a decreasing function of the development of digital economy to promote technological innovation and industrial upgrading, and the faster the progress of technological innovation and industrial upgrading, the lower the productivity threshold and the lower the threshold for enterprises to make investment, which indicates that the threshold for Chinese enterprises to invest the B&R countries is lower, and the development of digital economy in the B&R countries can attract more Chinese enterprises to invest here by promoting technological progress and industrial upgrading. In summary, the first hypothesis is put forth as follows:

H1: *The improvement of digital economy development in B&R countries can promote China's OFDI.*

2.2. Mechanism analysis

2.2.1. Technological innovation

Science and technology are critical factors in the struggle for total national strength, and digital technology is the primary source of innovation advantage. The higher a country's degree of scientific and technological development, the greater its potential to innovate, and the greater its ability to attract foreign direct investment. The academic community argues that digital economy has improved innovation capability at the micro, medium, and macro levels of influence (seen in Figure 1).

(1) The development of digital economy empowers technological innovation

Digital economy offers chances and tools for firms and individuals to develop at the micro level. On the one hand, as digital economy has grown, innovative businesses have also grown, giving rise to numerous businesses with technology and innovation at their core.

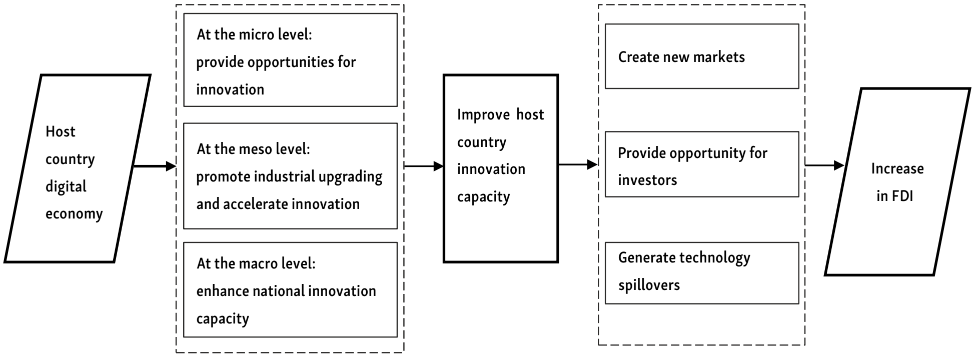

Figure 1. Digital economy improves OFDI mechanism through technological innovation

On the other hand, the market demand pattern has changed because of digital economy. Consumers are placing greater demands on digital goods and services, and forward-thinking businesses are better able to respond to market shifts, satisfy new wants, and improve solutions through ongoing innovation and iteration (Xu et al., 2024). At the meso level, digital economy has increased innovative integration and international cooperation while supporting industry transformation and upgrading. Digital economy has eliminated barriers between conventional industries and encouraged cross-industry innovation. Traditional industries can optimize production processes, increase production efficiency and quality, realize intelligent manufacturing and intelligent supply chain management, and improve industrial competitiveness and innovation capabilities to better adapt to changes in market demand through the introduction of digital technology and data analysis (Xiao et al., 2023). At the macro level, the impact of digital economy on the overall economic system has boosted the innovation capacity of countries and regions. Digital economy has not only given rise to new businesses and job prospects but has also given the nation and the region a new innovative energy that is a key driver of economic progress.

(2) Innovation can enhance foreign direct investment opportunities

The growth of the host nation's digital economy encourages the expansion of its capacity for innovation, which draws and fuels the ability of foreign direct investment (Zhang et al., 2024b). Host nations can entice foreign investors to invest in innovative businesses and achieve shared economic growth and development by creating markets, offering opportunities for cooperation and win-win results, enhancing competitive advantages, transferring technology and knowledge, and providing policy support. First, the improvement of innovation ability enables enterprises to develop new products, new services, or new technologies, creating new market opportunities. Companies with strong innovation skills can quickly address unmet market demands, close market gaps, and support the growth of developing industries by launching new products, services, or technologies. Second, the development of innovation skills typically goes hand in hand with the development and use of technology and knowledge. Foreign investors can acquire the technological expertise and professional skill of firms with significant innovative capabilities through partnership or investment, thereby raising their own technical level and competitiveness.

In summary, the second hypothesis is put forth as follows:

H2: *The development of digital economy in B&R countries can promote China's OFDI by improving technological innovation.*

2.2.2. Trade cost

(1) The development of digital economy provides solutions to reduce trade cost

On the one hand, digital economy has decreased trade costs for businesses, extended trade channels, and given more chances to conduct international trade through innovative technology and business models. By offering e-commerce platforms and online marketplaces, digital economy first gets beyond traditional trade barriers by giving companies direct access to customers. Second, digital economy lowers the expenses associated with transportation in traditional trade with technology like supply chain management systems, online logistics, and electronic payments. On the other hand, digital economy has successfully lowered the costs of the supply chain through real-time information sharing, supply chain visualization, ease of cross-border trade, supply chain collaboration, and automation (seen in Figure 2). First, digital economy provides a real-time information exchange platform and technology tools that allow supply chain actors to instantaneously access and share information on inventory, demand, production progress, and so on. This assists in reducing information asymmetry, improving supply chain visibility and coordination, reducing inventory backlog and overproduction, and thereby lowering operational costs. Second, the widespread promotion of digital technologies such as the Internet and artificial intelligence will greatly reduce the cost of international trade. Tangible products rely heavily on traditional logistics channels, while electronic games, information services and other digital products under the background of digital economy have negligible trade costs, especially intangible products derived from digital economy, which can greatly weaken the constraints of spatial distance on international trade (Shi, 2016). Third, digital economy relies on the development of information and communication technology, and the supply and demand of both sides of international trade can achieve instant and accurate matching, greatly simplifying the intermediate links of international trade, and effectively reducing the communication cost between enterprises (Hagiu, 2012; Jullien, 2012; Liu & Nath, 2013).

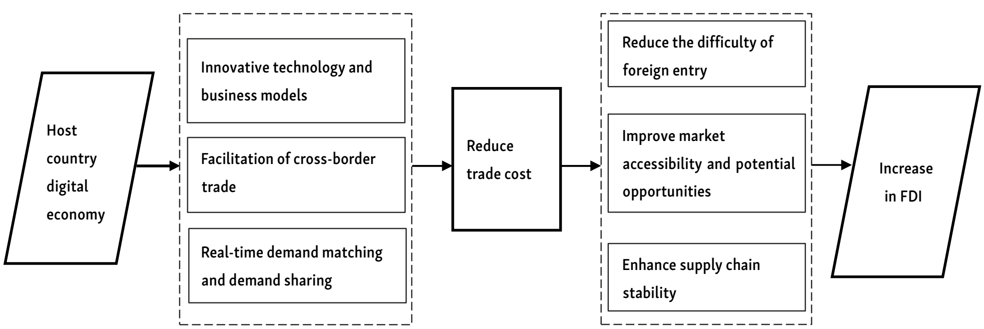

Figure 2. Digital economy improves OFDI mechanism through trade cost

(2) The reduction of trade costs significantly promotes the growth of OFDI

Trade expenses are critical in attracting foreign direct investment. MNEs can boost market access, improve cost-effectiveness, improve connectivity between value chain nodes, expand market size and opportunity, and increase supply chain reliability by lowering trade costs, attracting more foreign direct investment. In terms of market access, trade expenses have a direct impact on the degree of difficulty for foreign investors to enter the market. High trade costs may result in higher tariffs, transportation costs, or other trade barriers when importing items, lowering foreign investors' interest in the market. Furthermore, lower trade costs will increase the size of the market, improve market accessibility, and possible opportunities. Therefore, improving the host country's digital economy can significantly reduce the trade costs that cannot be ignored in international economic activities, promote the coordination and communication of enterprise information, improve the coordination efficiency of nodes of the international trade value chain, and fully exploit the host country's location advantage due to different prices of production factors such as labor cost. This has become a significant driving force in the growth of China's outbound direct investment (seen in Figure 2).

In summary, the third hypothesis is put forth as follows:

H3: *The development of digital economy in B&R countries can promote China's OFDI by reducing trade cost.*

3. Model setting and index construction

3.1. Model setting

Tinbergen (1962) and Poyhonen (1963) are the principal proponents of the gravitational model. Subsequently, more scholars begin to pay attention to gravity models, and many novel types of extension emerged. According to the background and content of this article, digital economy is introduced as the core explanatory variable, and the gravity model of investment form expansion is created, based on the previous extended form of gravity model. Meanwhile, the original model is transformed into the natural logarithmic linear form to control the heteroscedasticity problem and improve regression analysis. The following is the unique regression model.

$$\begin{aligned}\ln OFDI_{ijt} &= \beta_0 + \beta_1 \ln NRI_{jt} + \beta_2 \ln EGDP_{jt} + \beta_3 \ln DIST_{ijt} + \beta_4 \ln RES_{jt} + \\ &\beta_5 \ln PGNI_{jt} + \beta_6 \ln INF_{jt} + \beta_7 \ln TECH_{jt} + \beta_8 \ln RISK_{jt} + \upsilon_j + \upsilon_t + \varepsilon_{ijt}.\end{aligned} \tag{17}$$

3.2. Construction of digital economy

The academic community has not established a standardized and unified system for the measurement of digital economy. The Digital Economy and Society Index (DESI) of the European Union, the Information and Communication Technology Development Index (IDI) of the International Telecommunication Union, and the Network Readiness Index (*NRI*) of the World Economic Forum (2020), although the measurement range and measurement techniques are different, their measurement work is mainly focused on digital infrastructure construction and digital industry development, less reflects the digital governance situation (Guo et al., 2022). Therefore, referring to Guo et al. (2022) and considering the availability of data, this paper selects three dimensions of digital infrastructure construction, digital economy openness, institutional guarantee, and innovation environment to build a comprehensive evaluation system for the development level of digital economy, including 3 first-level indicators and 9 second-level indicators, and uses the entropy weight method basing the stata17 software to calculate the comprehensive index. It is used as a proxy variable for the development level of digital economy in 46 B&R countries from 2004 to 2020. The specific comprehensive evaluation index system of the development level of digital economy is shown in Table 1. Data are mainly from the World Bank (n.d.) and the World Economic Forum (2020).

Table1. Digital economy indicators (source: World Bank (WDI), n.d. and World Economic Forum (WEF), 2020)

Primary indicators	Secondary indicators	Attribute	Data source
Digital infrastructure	Mobile network coverage	Positive	World Bank database (n.d.)
	Number of Internet users	Positive	
	Secure Internet Servers (per million people)	Positive	
Digital economy openness	The proportion of ICT products exported	Positive	World Bank database (n.d.)
	Proportion of exports of high-tech products	Positive	World Bank database (n.d.)
System guarantees and innovation environment	Availability of venture capital	Positive	World Economic Forum (2020)
	ICT development legal environment	Positive	World Bank database (n.d.)
	Degree of intellectual property protection	Positive	World Economic Forum (2020)
	ICT applications and government service efficiency	Positive	World Bank database (n.d.)

To ensure more trustworthy and effective indicator evaluation outcomes, the entropy weight approach is utilized in this chapter to determine the weight of each indicator to evaluate the B&R countries' digital economy development level. The entropy weight technique determines the associated information entropy of each index data through the dispersion degree, and then obtains the weight of each index. The higher the variation degree of an index value, the lower the information entropy and the higher the weight of the index; conversely, the lower the variation degree of an index value, the higher the information entropy and the lower the weight of the index.

The steps of entropy weight method are as following:

Data standardization. To eliminate the difference in the data magnitude of different initial indicators, the standardized method is first selected to process the data. The extreme value method is selected to standardize the original data. The specific expression is as follows:

$$y_{ij} = \frac{x_{ij} - x_{\min}}{x_{\max} - x_{\min}}. \tag{18}$$

In the above expression, x_{ij} represents the initial indicator of digital economy in *year_i* and *item_j*, $x_{\max}$ and $x_{\min}$ respectively represent the maximum and minimum values of x_{ij}, and y_{ij} is the standardized indicator.

The gravity matrix is obtained, and the information entropy is measured. Calculate the gravity of the *jth* index of *year_i* in the standardized matrix to obtain the gravity matrix Z between the data, and then calculate the information entropy e_j of the index. The specific calculation formula is:

$$Z_{ij} = \frac{y_{ij}}{\sum_{i=1}^{m} y_{ij}}; \tag{19}$$

$$e_j = -k\sum_{i=1}^{m}(Z_{ij} * lnZ_{ij}), \tag{20}$$

where k is a constant and $k = 1/\ln m$, $\ln Z_{ij} = 0$ is defined when $Z_{ij} = 0$.

Information entropy measurement index weight matrix W, the specific formula is:

$$W_j = \frac{1-e_j}{\sum_{i=1}^{m} 1-e_j}. \tag{21}$$

Positivizing negative indicators. In the system evaluation, the smaller the better part of the indicators. To maintain the consistency of the evaluation direction of the indicators, the inverse processing is carried out for the negative indicators, at which time the negative indicators are transformed into positive indicators.

Construct the weighting matrix. Multiply the index weight matrix with the index to get the weighted index matrix. The specific formula is as follows:

$$S_{ij} = W_j * Y_{ij}. \tag{22}$$

Find the best and worst solution. Measure the positive and negative ideal solutions of each evaluation indicator, that is, the maximum and minimum values of each indicator.

$$I_j^+ = \max\left(S_{i1}, S_{i2}, S_{i3} \ldots S_{im}\right); \tag{23}$$

$$I_j^- = \min\left(S_{i1}, S_{i2}, S_{i3} \ldots S_{im}\right). \tag{24}$$

Calculate the Euclidean distance between each index and the positive and negative ideal solution, the specific formula is as follows:

$$D_i^- = \sqrt{\sum_{j=1}^{n}\left(i_j^- - z_{ij}\right)^2}; \tag{25}$$

$$D_i^+ = \sqrt{\sum_{j=1}^{n}\left(i_j^+ - z_{ij}\right)^2}. \tag{26}$$

Calculate the comprehensive evaluation value C. Measure the proximity between each evaluation object and the ideal solution, which is positively correlated with the development level of digital economy. When C is 1, the evaluation object is in the optimal state, and the specific calculation formula is as follows:

$$C_i = \frac{D_i^-}{D_i^- + D_i^+}. \tag{27}$$

The average of the comprehensive level of digital economy of 46 B&R countries is ranked in descending order, and the specific ranking of countries is shown in Table 2. The top five countries in the overall digital economy score are Singapore, Malaysia, Israel, India, and Russia. Singapore's digital economy outperformed the other 46 sample countries, with strong advances in digital infrastructure, the innovation environment, digital government services, and talent development. Malaysia is at the vanguard of digital economy development, with the government devoted to digital transformation and innovation, yielding positive results in digital infrastructure, the e-commerce sector, the innovation ecosystem, and digital government services. Israel's level of digital economy development is unique in the Middle East and around the world, and the country has made tremendous advances in technology innovation, entrepreneurship, and digital transformation. The lowest five countries are in Central and Eastern Europe, Central Asia, ASEAN, and South Asia, with South Asia accounting for two, indicating that South Asian countries are comparatively backward in terms of digital economy development.

Table 2. Measurement of digital economy of B&R countries

Country	Digital economy score	Country	Digital economy score
Singapore	0.3063	Lithuania	0.0882
Malaysia	0.2751	Kazakhstan	0.0726
Israel	0.2672	Bahrain	0.0700
India	0.2649	Bangladesh	0.0670
Russia	0.2549	Jordan	0.0658
Thailand	0.1934	Kuwait	0.0651
Indonesia	0.1837	Montenegro	0.0650
Turkey	0.1658	Pakistan	0.0615
Philippines	0.1621	Qatar	0.0615
Hungary	0.1619	Moldova	0.0589
Czech Republic	0.1568	Armenia	0.0571
Poland	0.1542	Georgia	0.0563
Greece	0.1397	Brunei	0.0546
Slovakia	0.1380	North Macedonia	0.0543
Estonia	0.1317	Azerbaijan	0.0534
Cyprus	0.1202	Bosnia and Herzegovina	0.0533
Ukraine	0.1121	Oman	0.0532
Romania	0.1054	Mongolia	0.0455
Latvia	0.1039	Albania	0.0437
Saudi Arabia	0.0983	Sri Lanka	0.0401
Slovenia	0.0949	Kyrgyzstan	0.0347
Croatia	0.0908	Nepal	0.0233
Bulgaria	0.0889	Cambodia	0.0215

3.3. Indicator selection

3.3.1. Explained variable

The stock of foreign direct investment (*FDI*) in China. This report represents the scale of China's investment in the B&R countries using data from China's FDI stock across time.

3.3.2. Explanatory variable

The Comprehensive Level of digital Economy development index of the B&R countries (*NRI*).

3.3.3. Intermediary variable

Technological innovation (*Patent*). Based on Bi and Yu's (2019) selection of national technological innovation measurement indicators, this paper considers the quality and quantity of relevant indicator data before settling on the number of patent applications in different countries as a proxy variable for technological innovation.

3.3.4. Moderating variable

Trade cost (*TC*). The main principle of comparing domestic trade flow with international trade flow is utilized to estimate trade cost, according to Chen and Novy (2012)'s generic algorithm of trade cost. The calculation expression in question is presented below.

$$TC_{ijt} = \left(\frac{X_{iit} X_{jjt}}{X_{ijt} X_{jit}} \right)^{\frac{1}{2(\rho-1)}} - 1, \tag{28}$$

where, i represents China, j represents the B&R countries, and t represents time (year). X_{iit} represents China's domestic trade flow in period t, measured by the difference between China's GDP and China's total export value. X_{jjt} represents the domestic trade flow of the B&R countries in the period t, and the difference between the gross domestic product of the B&R countries and the total export value of the country is chosen to measure. X_{ijt} represents China's trade flow to the B&R countries and chooses the total value of China's exports to the B&R countries to measure. X_{jit} represents the trade flow of the B&R countries to China, and the total export value of the B&R countries to China is chosen to measure. ρ represents the elasticity of product replacement, and its value is generally between 5 and 10. With reference to previous literature, the final setting is 8.

3.3.5. Control variable

According to the existing theoretical analysis and relevant literature research (Buckley, 2009; Ge et al., 2022; Li et al., 2016; Song & Xu, 2012; Yan, 2013), the main control variables selected include the GDP of the host country (*EGDP*, Ge et al., 2022), the distance cost between the two capitals (*DIST*), and the natural resources endowment of the B&R countries (*RES*, Buckley, 2009; Li et al., 2016), the wage level of the B&R countries (*PGNI*, Song & Xu, 2012), the freedom of investment the B&R countries (*INF*, Yan, 2013), the strategic assets level of host countries (*TECH*, Zhou & Liu, 2017), and the investment risk of the B&R countries (*RISK*).

Table 3 displays the description of variables. The data sources for those variables are different, among which, the data for five variables: *PGNI*, *EGDP*, *INF*, *TECH* and *RES* are all from

World Bank database. The data sources for *RISK* are derived from the Global Governance Indicators database (WGI). The data sources for *DIST* are derived from Centre d'études prospectives et d'informations internationals [CEPII] Database (n.d.) and International Monetary Fund [IMF] database. *OFDI* are collected and aggregated from Statistical Communique on China's Outward Foreign Direct Investment. *TC* are collected from World Bank database (n.d.) and UN-COM trade database (n.d.).

According to the total number of samples statistics, 782 samples are chosen. The minimum and maximum values of China's OFDI among the main variables are 2.996 and 14.4, respectively, reflecting the obvious disparity in China's investment stock in nations. The mean and standard deviation of *NRI* is –2.44 and 0.684, respectively. The high standard deviation

Table 3. Description of variables

Variable type	Variable symbol	Variable name	Description	Data source
Explained variable	$OFDI_{ijt}$	China's foreign direct investment stock	The stock of China's foreign direct investment in country *j* during period *t*	Ministry of Commerce of the People's Republic of China, National Bureau of Statistics & State Administration of Foreign Exchange (2020)
Explanatory variable	NRI_{jt}	Development level of digital economy	The development of digital economy in country *j* during period *t*	See Table 1
Intermediate variable	$Patent_{jt}$	Technological innovation	The level of digital technology innovation in country *j* during period *t*	World Bank database (n.d.)
Regulating variable	TC_{jt}	Trade cost	The cost level of digital trade in country *j* during period *t*	World Bank database (n.d.) and UN-COM trade database
Control variable	$PGNI_{jt}$	Wage levels of host country	The wage level in country *j* during period *t*	World Bank database (n.d.)
	$EGDP_{jt}$	Gross domestic product of host country	GDP of country *j* during period *t*	World Bank database (n.d.)
	INF_{jt}	Freedom of investment of host country	Investment freedom in country *j* during period *t*	World Bank database (n.d.)
	$TECH_{jt}$	Level of strategic assets of host country	The level of strategic assets in country *j* during period *t*	World Bank database (n.d.)
	RES_{jt}	Natural resource endowments of host country	The natural resource endowments in country *j* during period *t*	World Bank database (n.d.)
	$RISK_{jt}$	Investment risks of host country	Investment risk in country *j* during period *t*	Global Governance Indicators Database (WGI)
	$DIST_{ijt}$	Cost of distance between capitals	The cost of distance between the capitals of countries *i* and *j*	CEPII Database (n.d.) and International Monetary Fund Database

Table 4. Descriptive statistics

Variable name	Mean	Stv	Min	Max	Sample size
OFDI	8.838	2.832	2.996	14.4	782
NRI	–2.44	0.684	–4.447	–0.886	782
PGNI	8.835	1.189	6.109	11.061	782
EGDP	24.946	1.571	21.725	28.375	782
INF	3.84	0.183	3.634	5.013	782
TECH	4.086	0.197	3.623	4.675	782
RES	2.732	1.229	0	4.577	782
RISK	1	0.377	–0.66	1.475	782
DIST	12.81	0.497	11.186	13.612	782

suggests that the overall degree of digital economy development in many countries is highly volatile. Table 4 displays the mean, standard deviation, lowest, and maximum values of the other control variables.

4. Empirical analysis

4.1. Baseline regression results

The panel data model is employed to undertake an empirical examination of the baseline model. Table 5 displays the baseline model's regression results, and columns (1) to (8) denote the results after gradually adding control variables. Column (8) shows that the regression coefficient of *NRI* is 0.477, and this coefficient is significant at the 1% significance level, indicating that *NRI* has a significant positive promoting effect on China's OFDI. The greater the breadth of B&R countries' digital economy development, the greater their investment attractiveness to China. This also demonstrates that as B&R countries' digital economies improve, their increasingly perfect digital infrastructure and corresponding institutional measures, combined with the application of digital technology, can effectively eliminate the barriers of foreign investment information asymmetry, reduce operating costs, and create more opportunities to attract more high-quality foreign investment. As a result, digital economy promotes China's OFDI, which adheres to the universal law of facts, supporting *Hypothesis 1*: *The improvement of digital economy development in B&R countries can promote China's OFDI.*

4.2. Robustness test

This section conducts a robustness test from the following aspects to ensure the authenticity and validity of the conclusion that the digital economy has a positive promoting effect on China's OFDI in the baseline regression results and the reliability of the research results: replacing core explanatory variables, changing the sample year, tailing processing, and changing sample countries (Liu et al., 2022). To begin, in accordance with Liu et al. (2022), this research employs the strategy of changing the primary explanatory variables to perform robustness tests. Given that mobile cellular subscription can accurately reflect the popularity of digital technology and indirectly reflect the digital economy development, this subsection replaces the original digital economy system indicator with mobile cellular subscription (*Honey*) as a proxy for digital economy and runs model regression. Table 6 reports the model regression results, and the coefficient of Honey remains significantly positive, which is largely consistent with the previous baseline regression results, indicating that the model is robust and valid. Second, since the BRI was introduced in 2013, it has produced enormous economic results in just a few years and has become one of the most important initiatives in international economic cooperation. Given the high growth of China's external investment after the BRI from 2013 to 2020, we further select data from 2013 to 2020 as the research sample and conduct model regression. Again, the project preference and risk preference of Chinese outbound investment are destined to result in large variability in investment amounts across countries, potentially resulting in extreme and outlier values of the explanatory variable China's OFDI, affecting the model's credibility. To eliminate the effect of outliers and conduct model regression, this subsection selects to undertake an upper and lower 5% tail-shrinking process on China's OFDI. Finally, the adjacent country samples are used for the model regressions. Russia, Mongolia, Kazakhstan, Kyrgyzstan, Pakistan, India, and Nepal are its land neighbors; the Philippines, Malaysia, Indonesia, and Brunei are its sea neighbors. Table 6 reports the model regression results, and the coefficient of *NRI* remains significantly positive, which is largely consistent with the previous baseline regression results, indicating that the model is robust and valid.

Table 5. Baseline regression results

Variable	(1) OFDI	(2) OFDI	(3) OFDI	(4) OFDI	(5) OFDI	(6) OFDI	(7) OFDI	(8) OFDI
NRI	0.176 (1.094)	0.475*** (2.768)	0.436** (2.530)	0.437** (2.537)	0.468*** (2.717)	0.489*** (2.848)	0.472*** (2.763)	0.477*** (2.795)
PGNI		–0.968*** (–4.592)	–1.493*** (–4.552)	–1.475*** (-4.492)	–1.584*** (–4.791)	–1.639*** (-4.977)	–1.767*** (–5.346)	–1.803*** (–5.437)
EGDP			0.613** (2.085)	0.608** (2.068)	0.685** (2.324)	0.768*** (2.610)	0.659** (2.233)	0.675** (2.286)
INF				0.253 (0.964)	0.282 (1.077)	0.373 (1.422)	0.315 (1.202)	0.276 (1.047)
TECH					1.031** (2.355)	0.920** (2.107)	1.016** (2.331)	0.985** (2.258)
RES						0.170*** (3.011)	0.154*** (2.718)	0.166*** (2.890)
RISK							0.703*** (2.887)	0.715*** (2.935)
DIST								–1.698 (–1.276)
_cons	6.585*** (14.503)	15.304*** (7.845)	4.641 (0.848)	3.647 (0.655)	–1.522 (–0.255)	–3.377 (–0.566)	–0.535 (–0.089)	20.230 (1.166)
Year-fixed	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-fixed	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	782	782	782	782	782	782	782	782
R^2	0.727	0.735	0.736	0.737	0.739	0.742	0.745	0.746

Note: *, **, and *** represent 10%, 5%, and 1% significance levels respectively, with t statistics in parentheses. The same below.

Table 6. Robustness test

Variable	Replace core explanatory variables	Change the sample year	Tail processing	Change sample
Honey	0.191* (1.834)	0.282** (2.470)	0.451*** (2.699)	0.477*** (2.795)
PGNI	–1.544*** (–4.632)	–0.352 (–0.628)	1.680*** (-5.184)	1.803*** (–5.437)
EGDP	0.473 (1.428)	2.072*** (4.047)	0.717** (2.482)	0.675** (2.286)
INF	0.238 (0.899)	–0.387 (–1.317)	0.299 (1.162)	0.276 (1.047)
TECH	1.025** (2.321)	0.944 (1.122)	0.691 (1.621)	0.985** (2.258)
RES	0.144** (2.476)	0.006 (0.079)	0.178*** (3.170)	0.166*** (2.890)
RISK	0.686*** (2.790)	0.718* (1.879)	0.593** (2.490)	0.715*** (2.935)
DIST	–1.440 (–1.076)	–0.981*** (–8.367)	–1.804 (–1.386)	–1.698 (–1.276)
_cons	15.816 (0.914)	–30.142*** (–2.974)	20.740 (1.223)	20.230 (1.166)
Year-fixed	Yes	Yes	Yes	Yes
Country-fixed	Yes	Yes	Yes	Yes
N	782	414	782	782
R^2	0.744	0.274	0.737	0.746

4.3. Endogeneity test

Endogeneity has always been the focus of academic research and discussion, and its causes can be summarized as follows: sample selection bias, mutual causality, missing variable deviation and Measurement error.

4.3.1. Propensity score matching

To begin, with reference to prior literature, this paper chooses the propensity score matching (PSM) method to solve the potential sample bias problem and improve the comparability of control and study samples. The high digital economic development level and low digital economic development level are divided based on the median digital economic development level, with the high digital economic development level sample serving as the experimental group and the low digital economic development level sample serving as the control group, and the nearest neighbor matching method used to match the experimental and control groups. Table 7 displays the balance test results.

From the balance test results before and after covariate matching in Table 7, it can be found that t-values of the five covariates, *PGNI*, *EGDP*, *TECH*, *RISK* and *DIST* all plummeted before and after matching. That is to say, the covariates of the experimental group and the control group reached a very close level, which further controlled the difference of the covariates leading to the difference of the explained variables. Moreover, the small deviation rate after matching indicates that the matching is very effective. At the same time, the model regression is performed on the matched sample as a robustness check of the baseline regression model. Table 8 shows the results of the model regression after matching the propensity scores.

Table 7. Balance test

Variable	Matching condition	Mean		Deviation rate	Deviation reduction rate	T-value	P -value
		Experimental group	Control group				
PGNI	Before matchmaking	9.192	8.4775	63	94.7	8.81	0
	After matchmaking	9.1408	9.1028	3.4		0.5	0.618
EGDP	Before matchmaking	25.89	24.002	150.4	88.2	21.03	0
	After matchmaking	25.801	25.579	17.7		2.52	0.012
TECH	Before matchmaking	4.1766	3.9949	103.9	64.4	14.52	0
	After matchmaking	4.1293	4.1939	–36.9		–4.61	0
RISK	Before matchmaking	1.0426	0.95798	22.6	32.8	3.16	0.002
	After matchmaking	1.033	1.0899	–15.2		–2.44	0.015
DIST	Before matchmaking	12.892	12.728	33.4	–31.9	4.67	0
	After matchmaking	12.919	12.703	44		6.1	0

Table 8. Regression results after propensity score matching

Variable	(1) OFDI	(2) OFDI	(3) OFDI	(4) OFDI	(5) OFDI	(6) OFDI	(7) OFDI	(8) OFDI
NRI	0.213 (1.059)	0.563** (2.538)	0.494** (2.229)	0.493** (2.231)	0.491** (2.216)	0.526** (2.383)	0.515** (2.337)	0.509** (2.309)
PGNI		–1.017*** (–3.527)	–1.937*** (–4.485)	–1.900*** (–4.402)	–1.884*** (–4.322)	–1.964*** (–4.520)	–2.038*** (–4.669)	2.043*** (–4.678)
EGDP			1.097*** (2.844)	1.119*** (2.906)	1.109*** (2.864)	1.232*** (3.176)	1.149*** (2.936)	1.185*** (3.012)
INF				0.567* (1.738)	0.563* (1.721)	0.597* (1.834)	0.554* (1.699)	0.561* (1.719)
TECH					–0.167 (–0.276)	–0.174 (–0.290)	–0.053 (–0.087)	0.012 (0.019)
RES						0.204** (2.507)	0.193** (2.370)	0.213** (2.522)
RISK							0.505 (1.524)	0.497 (1.498)
DIST								–11.950 (–0.897)
_cons	6.402*** (11.405)	15.819*** (5.801)	–3.452 (–0.473)	–6.476 (–0.865)	–5.680 (–0.708)	–8.585 (–1.065)	–6.754 (–0.830)	137.637 (0.854)
Year-fixed	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-fixed	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	513	513	513	513	513	513	513	513
R^2	0.701	0.709	0.714	0.716	0.716	0.720	0.721	0.722

It can be found that the coefficient of *NRI* is still significantly positive, indicating that digital economy development improves the level of China's foreign investment, and this finding is basically consistent with the results of the previous baseline regression, indicating that the model is robust and valid.

4.3.2. GMM

China's OFDI stock is likely to suffer from dynamic delay. Given that the dynamic panel model will include lag explanatory variables to capture the dynamic lag effect and alleviate potential inherent difficulties in the model, the relationship between the development of digital economy and China's OFDI will be better demonstrated. Based on previous literature, we choose the GMM estimation method of dynamic panel model for model regression analysis, first to overcome the influence of a lack of relevant explanatory variables, and second to eliminate the influence of various dynamic factors, to solve potential endogeneity problems.

Furthermore, we continue to monitor the influence of digital economy development on China's OFDI. The results are shown in Table 9. First, to enhance the reliability of regression results, the rationality of model setting, and the validity of instrumental variables are tested.

Table 9. GMM estimation results

Variable	(1) OFDI	(2) OFDI
L.OFDI	0.606*** (5.556)	0.450*** (2.652)
NRI	0.389 (0.331)	3.722* (1.696)
PGNI		2.568 (1.168)
EGDP		–1.808 (–1.043)
INF		0.290 (0.653)
TECH		2.731 (1.178)
RES		0.101 (0.224)
RISK		0.617 (0.202)
DIST		–2.423 (–1.186)
_cons		55.456 (0.928)
Year-fixed	Yes	Yes
Country-fixed	Yes	Yes
N	736	736
AR(1)	0.002	0.044
AR(2)	0.706	0.398
Hansen test	1.000	1.000

The AR test results demonstrate that the first difference of the perturbation term has autocorrelation, while the second difference does not, accepting the null hypothesis that the disturbed term has no autocorrelation, indicating that the AR test passes the fundamental conditions. Second, the P-value of the Hansen test is greater than 0.1, showing that the exogenous and legitimate instrumental variable is present. Finally, the regression results for the entire set of variables in column (2) reveal that the coefficient of *NRI* remains highly positive, which is broadly consistent with the baseline regression results above.

4.4. Heterogeneity analysis

To explore the difference of the effect of digital economy on China's direct investment in major countries in different regions, this section further divides the sample countries into the following regions by referring to Liu and Guo (2020): East and Central Asia, ASEAN, South Asia, Commonwealth of Independent States (CIS), West Asia, and Central and Eastern European countries. Through model regression of these regional samples, the panel fixed effect model regression results of different regions are comprehensively reported, as shown in Table 10. It can be clearly seen from the table that in the regression results of ASEAN, East

Table 10. Regression results of regional heterogeneity

Variable	(1) East and Central Asia	(2) ASEAN	(3) South Asia	(4) CIS	(5) West Asia	(6) Central and Eastern Europe
NRI	0.232 (0.200)	0.646*** (2.727)	0.290 (1.011)	0.572 (1.088)	–1.074 (–1.617)	1.093 (1.583)
PGNI	0.710 (0.572)	–0.248 (–0.347)	2.889** (2.585)	1.440 (1.088)	0.750 (0.698)	–6.381*** (–4.082)
EGDP	–0.409 (–0.389)	–0.927 (–1.550)	–1.204 (–1.239)	–0.599 (–0.465)	–2.020** (–2.608)	3.360* (1.946)
INF	–0.665 (–1.374)	–1.448* (–1.740)	–0.452 (–0.078)	2.106** (2.225)	0.156 (0.306)	–0.998* (–1.940)
TECH	0.513 (0.807)	2.088*** (5.142)	–7.562** (–2.141)	–1.436 (–1.562)	1.276 (1.130)	3.466*** (2.602)
RES	–0.116* (–1.897)	–0.154 (–1.641)	0.533*** (3.004)	–0.119 (–0.507)	0.145 (1.217)	0.352* (1.844)
RISK	–0.448 (–0.505)	0.357 (0.960)	0.046 (0.129)	–0.350 (–0.704)	2.192** (2.471)	1.335 (1.357)
DIST	1.075 (1.443)	10.754*** (15.372)	5.317*** (3.435)	4.653*** (2.771)	14.124*** (9.959)	32.698 (1.442)
_cons	2.284 (0.143)	–95.286*** (–9.970)	–12.062 (–0.351)	–47.582 (–1.651)	–136.869*** (–9.924)	–436.124 (–1.534)
Year-fixed	Yes	Yes	Yes	Yes	Yes	Yes
Country-fixed	Yes	Yes	Yes	Yes	Yes	Yes
N	51	119	85	102	153	272
R^2	0.978	0.961	0.934	0.823	0.806	0.704

and Central Asia, South Asia, CIS and Central and Eastern Europe, the coefficient of *NRI* is positive, but only the coefficient of ASEAN sample is significant at the 1% significance level. As good neighbors and good partners, ASEAN and China have many advantages in natural environment, cultural environment, and policy environment, including a series of agreements conducive to bilateral mutual benefit such as "ASEAN-China" strategic partnership, "ASEAN-China, Japan and South Korea 10+3 Mechanism" and "RECP Agreement" signed between them. It further increases the convenience of investment and trade between the two sides, and deepens the multi-channel, multi-product and multi-level exchanges and cooperation between the two sides.

4.5. Mechanism test

The mechanism analysis elaborates on the theoretical of technical innovation as well as trade costs affecting China's OFDI, highlighting the importance of these two elements in influencing China's OFDI as digital economy. This section will empirically evaluate the fundamental mechanism of digital economy and its affecting China's OFDI from these two transmission channels to further verify whether the above transmission mechanism is valid. In a comprehensive examination of the B&R countries' current development status, technological innovation (*patent*) is chosen as the mediating variable and *NRI* as the core explanatory variable, and an extended gravity model is built for empirical research analysis. Meanwhile, the original model is transformed into a natural log-linear form to control the heteroskedasticity problem and facilitate the regression, and the specific regression model is set as follows:

$$\begin{aligned} \ln Patent_{ijt} &= \beta_0 + \beta_1 \ln NRI_{jt-1} + \beta_2 \ln EGDP_{jt-1} + \beta_3 \ln DIST_{ijt-1} + \beta_4 \ln RES_{jt-1} + \\ &\beta_5 \ln PGNI_{jt-1} + \beta_6 \ln INF_{jt-1} + \beta_7 \ln TECH_{jt-1} + \beta_8 \ln RISK_{jt-1} + \upsilon_j + \upsilon_t + \varepsilon_{ijt}. \end{aligned} \tag{29}$$

Second, investigate the impact of both digital economy and technical innovation on China's OFDI. We build an extended gravity model of investment with China's OFDI as the explanatory variable, *NRI* as the core explanatory variable, and *patent* as the moderating variable. Meanwhile, the original model is converted to a natural log-linear form, and the specific regression model is specified as follows:

$$\begin{aligned} \ln OFDI_{ijt} &= \beta_0 + \beta_1 \ln NRI_{jt-1} + \beta_2 \ln Patent_{jt} + \beta_3 \ln EGDP_{jt-1} + \beta_4 \ln DIST_{ijt-1} + \\ &\beta_5 \ln RES_{jt-1} + \beta_6 \ln PGNI_{jt-1} + \beta_7 \ln INF_{jt-1} + \beta_8 \ln TECH_{jt-1} + \beta_9 \ln RISK_{jt-1} + \upsilon_j + \upsilon_t + \varepsilon_{ijt}. \end{aligned} \tag{30}$$

Finally, the stock of China's OFDI is chosen as the explanatory variable to investigate the effect of trade cost on the investment effect of digital economy, and three core explanatory variables, namely *NRI*, *TC*, and the interaction term (*NRI_TC*), as well as other control variables, are introduced to construct an extended gravity model of trade cost and the stock of China's OFDI. Simultaneously, the original model is translated into a natural log-linear form, and the specific regression model is specified as follows:

$$\begin{aligned} \ln OFDI_{ijt} &= \beta_0 + \beta_1 \ln NRI_{jt} + \beta_2 \ln TC_{jt} + \beta_3 \ln NRI\_TC_{jt} + \beta_4 \ln EGDP_{jt} + \beta_5 \ln DIST_{ijt} + \\ &\beta_6 \ln RES_{jt} + \beta_7 \ln PGNI_{jt} + \beta_8 \ln INF_{jt} + \beta_9 \ln TECH_{jt} + \beta_{10} \ln RISK_{jt} + \upsilon_j + \upsilon_t + \varepsilon_{ijt}. \end{aligned} \tag{31}$$

4.5.1. Mediating effect of technological innovation

Higher standards for scientific and technological innovation are required due to the rapid development of digital economy. However, there will be a delay in the promotion of digital economy on the economic industry due to the lengthy process, high capital requirements, and human resource requirements associated with technical innovation realization. Based on the above analysis, this section conducts regression estimation based on one-stage lag processing of digital economy and other controls. Given that the future technological innovation capacity of regions and countries may play a channel effect and a media role in the process of digital economy affecting China's investment effect, the variables listed above are treated with lag to assess the time lag effect of digital economy driving technological innovation. Table11 shows the regression results. Columns (1) to (3) are the results of the effect of *L.NRI* on *Patent* after the stepwise addition of control variables. Columns (4) to (6) show the regression results of the effect of *L.NRI* and *Patent* on China's OFDI after the stepwise addition of control variables. The results show that *L.NRI* and *Patent* are positively significant at the 1% level, indicating that digital economy can influence technological innovation in the future period. After that, *Patent* is substituted into the model as an explanatory variable to obtain

Table 11. Results of the impact of technological innovation on digital economy

Variable	(1) Patent	(2) Patent	(3) Patent	(4) OFDI	(5) OFDI	(6) OFDI
L.NRI	0.654*** (4.597)	0.475*** (3.102)	0.491*** (3.194)	–0.065 (–0.411)	0.181 (1.085)	0.240 (1.464)
Patent				0.055 (1.300)	0.065* (1.846)	0.064* (1.764)
L.PGNI		–0.107 (–0.370)	–0.127 (–0.429)		–1.417*** (–4.545)	–1.686*** (–5.369)
L.EGDP		0.660** (2.572)	0.759*** (2.898)		0.555** (1.987)	0.597** (2.140)
L.INF			–0.134 (–0.535)			0.494* (1.869)
L.TECH			0.348 (0.893)			0.835** (2.025)
L.RES			0.048 (0.898)			0.210*** (3.671)
L.RISK			–0.267 (–1.222)			0.773*** (3.345)
L.DIST			–0.419 (–0.363)			–1.734 (–1.417)
_cons	7.125*** (17.831)	–8.475* (–1.768)	–6.334 (–0.418)	6.049*** (11.419)	4.804 (0.924)	20.631 (1.287)
Year-fixed	Yes	Yes	Yes	Yes	Yes	Yes
Country-fixed	Yes	Yes	Yes	Yes	Yes	Yes
N	736	736	736	736	736	736
R^2	0.063	0.080	0.085	0.721	0.731	0.745

the regression results column (6). Both *Patent* and *OFDI* are found to be positively significant at the 10% level. The column (3) and column (6) show that digital economy can promote future technological innovation capability and thus influence China's OFDI. This supports *Hypothesis 2: The development of digital economy in B&R countries can promote China's OFDI by improving technological innovation.*

(1) PSM

To overcome possible sample bias and improve the comparability of control samples and study samples, the PSM method is selected. Table 12 displays the regression results. From the balance test results before and after covariate matching in Table 13, it can be found that the absolute T-values of seven covariates, *PGNI*, *EGDP*, *TECH*, *RES*, *RISK*, *DIST*, and *INF* mostly plummeted before and after matching, i.e., indicating that the covariates in the experimental and control groups reached very close levels, further controlling for differences in the covariates leading to differences in the explanatory variables, which further controls the differences in covariates leading to differences in explained variables. Moreover, the small deviation rate after matching indicates that the matching is very effective.

Table 12. Regression results

Variable	(1) Patent	(2) Patent	(3) Patent	(4) OFDI	(5) OFDI	(6) OFDI
L.NRI	0.654*** (4.597)	0.475*** (3.102)	0.491*** (3.194)	–0.065 (–0.411)	0.181 (1.085)	0.240 (1.464)
Patent				0.055 (1.300)	0.065 (1.546)	0.064 (1.564)
L.PGNI		–0.107 (–0.370)	–0.127 (–0.429)		–1.417*** (–4.545)	–1.686*** (–5.369)
L.EGDP		0.660** (2.572)	0.759*** (2.898)		0.555** (1.987)	0.597** (2.140)
L.INF			–0.134 (–0.535)			0.494* (1.869)
L.TECH			0.348 (0.893)			0.835** (2.025)
L.RES			0.048 (0.898)			0.210*** (3.671)
L.RISK			–0.267 (–1.222)			0.773*** (3.345)
L.DIST			–0.419 (–0.363)			–1.734 (–1.417)
_cons	7.125*** (17.831)	–8.475* (–1.768)	–6.334 (–0.418)	6.049*** (11.419)	4.804 (0.924)	20.631 (1.287)
Year-fixed	Yes	Yes	Yes	Yes	Yes	Yes
Country-fixed	Yes	Yes	Yes	Yes	Yes	Yes
N	736	736	736	736	736	736
R^2	0.063	0.080	0.085	0.721	0.731	0.745

Note: *, **, and *** represent 10%, 5%, and 1% significance levels respectively, with t statistics in parentheses.

Simultaneously, model regressions on matched samples are run as a robustness test of the effect of technology innovation on digital economy investment. The results after matching the propensity scores are shown in Table 14. The coefficient of *L.NRI* remains significantly positive in the regression results of column (3), and the coefficients of *L.NRI* and *Patent* remain significantly positive in column (6), indicating the existence of the mediating effect mediated by technological innovation. This is broadly consistent with the prior baseline regression of the effect of technological innovation on digital economy, demonstrating that the model is resilient and valid.

Table 13. PSM matching effect test

Variable	Type	Mean		Standardized Deviation	Percentage change in standardized deviation	t	p > |t|
		Experimental group	Control group				
PGNI	Before matchmaking	9.1173	9.2009	–7.6		–0.52	0.607
	After matchmaking	9.129	8.4194	64.1	–748	3.69	0
EGDP	Before matchmaking	25.081	25.101	–1.7		–0.12	0.907
	After matchmaking	24.92	24.885	3.1	–76.2	0.19	0.85
INF	Before matchmaking	3.8706	3.8077	31.2		2.1	0.037
	After matchmaking	3.8306	3.8372	–3.3	89.6	–0.22	0.823
TECH	Before matchmaking	4.0839	4.0725	6.9		0.47	0.64
	After matchmaking	4.0791	4.0588	12.2	–77.9	0.76	0.451
RES	Before matchmaking	2.4186	3.482	–92.1		–6.3	0
	After matchmaking	2.5701	2.2897	24.3	73.6	1.37	0.173
RISK	Before matchmaking	1.0461	1.0757	–8.5		–0.58	0.564
	After matchmaking	1.1107	0.96726	41.3	–385.8	2.18	0.031
DIST	Before matchmaking	12.796	12.857	–15.2		–1.04	0.301
	After matchmaking	12.806	12.812	–1.5	90.2	–0.09	0.927

Table 14. Regression results after propensity score matching

Variable	(1) Patent	(2) Patent	(3) Patent	(4) OFDI	(5) OFDI	(6) OFDI
L.NRI	1.196* (1.687)	1.319 (1.639)	–0.648 (–0.640)	–1.345 (–1.335)	0.003 (0.003)	–0.151 (–0.106)
Patent				0.703*** (3.277)	0.607*** (2.972)	0.602** (2.543)
L.PGNI		–1.367 (–1.385)	–2.074** (–2.098)		–3.409** (–2.641)	–3.649** (–2.485)

End of Table 14

Variable	(1) Patent	(2) Patent	(3) Patent	(4) OFDI	(5) OFDI	(6) OFDI
L.EGDP		1.596 (1.417)	3.119** (2.611)		1.949 (1.323)	2.080 (1.138)
L.INF			0.481 (1.035)			–0.675 (–1.021)
L.TECH			2.455 (1.597)			0.851 (0.382)
L.RES			0.044 (0.329)			0.033 (0.175)
L.RISK			–2.161** (–2.426)			–0.054 (–0.040)
L.DIST			–4.678*** (–3.559)			7.357*** (3.427)
_cons	8.614*** (4.581)	–18.462 (–0.837)	–6.912 (–0.348)	0.283 (0.089)	–14.162 (–0.499)	–105.969*** (–3.809)
Year-fixed	Yes	Yes	Yes	Yes	Yes	Yes
Country-fixed	Yes	Yes	Yes	Yes	Yes	Yes
N	81	81	81	81	81	81
R^2	0.443	0.473	0.580	0.745	0.792	0.801

(2) Instrumental variable

It is considered that the mediating effect model of technological innovation may produce endogenous problems due to measurement errors, missing variables, and mutual causation. Consequently, the regression analysis in this part will be conducted using the instrumental variable method. Two prerequisites should be met by instrumental variables: first, instrumental variables are related to endogenous explanatory variables; second, there is no connection between random disturbance terms and instrumental variables. Referring to Xu et al. (2020) and Yang et al. (2020), we choose the following two instrumental variables in this Section: the mobile phone subscription and the mobile phone subscription with a lag of two periods. Table 15 shows 2SLS estimation results, where columns (1) and (3) represent the one-stage regression results. When estimating the endogenous problem between digital economy and technological innovation, considering that there is a correlation between the current period before and after mobile cellular phone subscription, but it does not directly affect technological innovation, this part chooses mobile cellular phone subscription as an instrumental variable for estimation. According to Column (1), the coefficient of *Honey* is significantly positive at the 1% level, indicating that mobile cellular phone subscriptions will affect the current digital economy and meet the correlation requirements of instrumental variables. Then, according to column (2), the coefficient of *NRI* is 1.819, which is significant at the 1% level, indicating that the relationship between the two is still positively correlated after the addition of instrumental variables. Among them, the statistical value of Kleibergen-Paap rk LM is 13.799 and the statistical value of Cragg-Donald Wald F is 275.163, both of which are significant at 1% level. The Cragg-Donald Wald F statistic and the Kleibergen-Paap Wald rk

F statistic show that the current instrumental variable is robust and satisfies the condition of instrumental variable, which demonstrates that technological innovation can still be fostered by digital economy. When estimating the endogenous problem between digital economy and China's OFDI, considering that the mobile cellular phone subscriptions with a lag of two periods are correlated with the current digital economy, but the mobile cellular phone subscriptions with a lag of two periods will not directly affect China's OFDI, this part selects

Table 15. Instrumental variable regression results

Variable	(1) NRI	(2) Patent	(3) NRI	(4) OFDI
Honey	0.0001^{***} (16.588)			
L2. Honey			0.0001^{***} (10.516)	
Patent				0.098^{**} (2.005)
NRI		1.819^{***} (5.784)		1.114^{***} (3.923)
PGNI	0.166^{***} (2.696)	-0.788^{**} (–2.350)	0.169^{**} (2.488)	-1.944^{***} (–4.543)
EGDP	0.181^{***} (3.289)	0.986^{***} (3.177)	0.219^{***} (3.690)	0.498 (1.500)
INF	–0.060 (–1.219)	–0.178 (–0.996)	–0.033 (–0.702)	0.192 (0.492)
TECH	0.114 (1.379)	0.916^{**} (2.354)	0.087 (0.910)	0.576 (0.778)
RES	–0.015 (–1.403)	0.081 (1.394)	–0.013 (–1.205)	0.086 (1.459)
RISK	0.025 (0.556)	-0.500^{**} (–2.231)	0.036 (0.777)	0.786^{***} (3.278)
DIST	0.109 (0.440)	–0.828 (–1.441)	–0.314 (–0.885)	–0.350 (–0.381)
_cons	-10.044^{***} (–3.000)		–5.664 (–1.236)	
Year	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes
N	782	782	690	690
R^2	0.575	0.063	0.520	0.693
F statistic (p-value)	89.86 (0.0000)		29.23 (0.0000)	
Wald test (p-value)		21.20 (0.0000)		11.15 (0.0008)
Kleibergen-Paap rk LM statistic		13.799 (0.0002)		11.634 (0.0006)
Cragg-Donald Wald F statistic		275.163 (0.0000)		106.140 (0.0000)

the mobile cellular phone subscriptions with a lag of two periods as the instrumental variable for estimation. According to column (3), the coefficient of *L2*. *Honey* is significantly positive at the 1% level, indicating that the two-stage lag in mobile cellular phone subscriptions will affect the current digital economy. Then, according to column (4), the coefficient of *Patent* and *NRI* are 0.098 and 1.114, and are significant at 5% and 1% respectively, indicating that the relationship between the two is still positively correlated after the addition of instrumental variables. The statistical value of Kleibergen-Paap rk LM is 11.634, and the statistical value of Cragg-Donald Wald F is 106.140, both of which are significant at the 1% level, indicating that the current instrumental variable is robust and satisfies the condition of instrumental variable.

In summary, China's OFDI can still be enhanced by the digital economy through the promotion of technical innovation, which is essentially in line with the previous conclusion.

4.5.2. Moderating effects of trade costs

Distance, tariffs, and foreign trade regulations differ between the B&R countries and China, resulting in considerable disparities in trade costs between countries and China. Given that trade costs may play a reverse inhibitory function in the effects of the digital economy on China's investment effect, this research undertakes an empirical analysis using the previous paper's model of the moderating effect of trade costs. Table 16 shows the regression results for the effect of trade costs on the investment effect in digital economy. Columns (1) to (3) show the results after adding control variables gradually. The coefficient of *NRI_TC* is -0.678, which is significant at the 5% significance level, indicating that the development of digital economy in the B&R countries can reduce the cost of international trade through the application of digital technology, promoting the increase of China's investment flows. Therefore, trade expenses have a major reverse moderating effect on digital economy's impact on China's OFDI. This supports *Hypothesis 3*: *The development of digital economy in B&R countries can promote China's OFDI by reducing trade cost*.

(1) PSM

From the results in Table 17, it can be found that most of the T-values of the four covariates, *PGNI*, *EGDP*, *TECH and INF*, all dropped sharply before and after matching. That is, the covariates of the experimental and control groups became relatively similar, which further controlled the difference in covariates, resulting in the difference in explained variables. Furthermore, the low deviation rate after matching suggests that the matching is quite effective. Simultaneously, model regression on matched samples is performed to examine the resilience of trade cost on the investment effect of digital economy. Table 18 shows the results after matching propensity scores. The coefficient of *NRI_TC* in column (3) remains significantly negative, indicating that there is a negative adjustment effect regulated by trade cost in the investment effect of digital economy, which is essentially consistent with the baseline results of the influence of trade cost on the investment effect of digital economy mentioned above, indicating that the model is robust and effective.

Table 16. Regression results of the impact of trade costs on investment in digital economy

Variable	(1) OFDI	(2) OFDI	(3) OFDI
NRI	0.396** (2.290)	0.603*** (3.348)	0.611*** (3.425)
TC	–2.088*** (-2.729)	–1.525** (–1.990)	–1.422* (–1.875)
NRI_TC	–0.954*** (–3.450)	–0.786*** (–2.850)	–0.678** (-2.474)
PGNI		–1.442*** (–4.411)	–1.735*** (–5.234)
EGDP		0.615** (2.109)	0.665** (2.258)
INF		0.292 (1.116)	0.283 (1.077)
TECH			0.798* (1.810)
RES			0.145** (2.506)
RISK			0.681*** (2.803)
DIST			–1.762 (–1.329)
_cons	6.860*** (14.256)	3.157 (0.571)	21.616 (1.250)
Year-fixed	Yes	Yes	Yes
Country-fixed	Yes	Yes	Yes
N	782	782	782
R^2	0.733	0.742	0.749

Note: *, **, and *** represent 10%, 5%, and 1% significance levels respectively, with t statistics in parentheses.

Table 17. Balance test

Variable	Type	Mean		Standardized Deviation	Percentage change in standardized deviation	t-value	p-value
		Experimental group	Control group				
PGNI	Before matchmaking	9.192	8.4775	63	95.5	8.81	0
	After matchmaking	9.1125	9.0801	2.9		0.37	0.708
EGDP	Before matchmaking	25.89	24.002	150.4	92.2	21.03	0
	After matchmaking	25.775	25.627	11.8		1.53	0.125

End of Table 17

Variable	Type	Mean		Standardized Deviation	Percentage change in standardized deviation	t-value	p-value
		Experimental group	Control group				
TECH	Before matchmaking	4.1766	3.9949	103.9	84.7	14.52	0
	After matchmaking	4.1184	4.1461	–15.9		–1.99	0.047
INF	Before matchmaking	3.8465	3.8342	6.7	62.8	0.94	0.346
	After matchmaking	3.8244	3.829	–2.5		–0.36	0.718

Table 18. Regression results after matching propensity scores

Variable	(1) OFDI	(2) OFDI	(3) OFDI
NRI	0.844^{***} (3.235)	0.896^{***} (3.407)	0.911^{***} (3.450)
TC	-8.668^{***} (–4.841)	-7.975^{***} (–4.344)	-7.484^{***} (–3.992)
NRI_TC	-2.731^{***} (–4.305)	-2.485^{***} (–3.859)	-2.345^{***} (–3.574)
PGNI		-1.496^{***} (–3.781)	-1.693^{***} (–4.156)
EGDP		1.172^{***} (3.432)	1.239^{***} (3.535)
INF		0.896^{**} (2.338)	1.003^{**} (2.532)
TECH			0.599 (0.934)
RES			0.134^{*} (1.748)
RISK			0.372 (1.198)
DIST			0.554 (0.230)
_cons	8.791^{***} (11.318)	–10.674 (–1.558)	–21.001 (–0.688)
Year-fixed	Yes	Yes	Yes
Country-fixed	Yes	Yes	Yes
N	503	503	503
R^2	0.722	0.736	0.739

(2) IV

It is considered that trade cost adjustment effect model may produce endogenous problems due to measurement errors, missing variables, and mutual causation. We choose the number of fixed telephone subscribers as the instrumental variable for regression analysis (Xu et al., 2020; Yang et al., 2020). The regression results are shown in Table 19, and column (1) is the one-stage regression result. According to column (2), the coefficient of *NRI_TC* is still

Table 19. Instrumental variable regression results

Variable	(1) NRI_TC	(2) OFDI
Tel	0.0001*** (3.972)	
NRI_TC		–3.260** (–2.501)
NRI	0.227*** (9.435)	1.125*** (3.851)
TC	–2.623*** (–81.871)	–8.206** (–2.378)
PGNI	0.121*** (2.702)	–1.455*** (–3.635)
EGDP	–0.007 (–0.168)	0.713** (2.135)
INF	–0.023 (–0.644)	0.214 (0.700)
TECH	–0.127** (–2.133)	0.494 (0.821)
RES	–0.013 (–1.623)	0.113* (1.838)
RISK	–0.045 (–1.362)	0.597** (2.509)
DIST	–0.039 (–0.217)	–1.855** (–2.508)
_cons	0.695 (0.285)	
Year	Yes	Yes
Country	Yes	Yes
N	782	782
R^2	0.919	0.717
F statistic (p-value)	9.24 (0.0025)	
Wald test (p-value)		7.12 (0.0076)
Kleibergen-Paap rk LM statistic		10.982 (0.0009)
Cragg-Donald Wald F statistic		15.780 (0.0000)

significantly negative, indicating that there is a negative trade cost adjustment effect in the investment effect of digital economy, which is basically consistent with the baseline regression results mentioned above. In addition, there is no issue with over-identification or weak instrumental variables, according to Kleibergen-Paap rk LM statistics and Cragg-Donald Wald F statistics, which indicate a certain connection between instrumental variable and explanatory variables. In conclusion, the instrumental variable is sensible, and the instrumental variable estimation results are extremely trustworthy.

5. Main conclusions

The emergence of digital economy will have a profound impact on how a nation get foreign direct investment, and it will even affect how capital moves internationally. Countries along the route, which are at the early stage of digital economy development, have an urgent development vision and demand for digital infrastructure construction and digital transformation. Therefore, grasping the opportunities for digital economy development and optimizing the layout of China's OFDI is the core content of promoting the construction of the "Digital Silk Road". What state of development does the B&R countries' digital economy now stand at? Will China's OFDI be encouraged by its growth? What then is the mechanism by which China's OFDI is impacted by digital economy? Therefore, three hypotheses are proposed in this paper, which are as follows: *Hypothesis 1*: *The improvement of digital economy development in B&R countries can promote China's OFDI*. *Hypothesis 2*: *The development of digital economy in B&R countries can promote China's OFDI by improving technological innovation*. *Hypothesis 3*: *The development of digital economy in B&R countries can promote China's OFDI by reducing trade cost*. Therefore, to test whether the three hypotheses are correct and reasonable, this article firstly analyzes the current situation of B&R countries' digital economy development. Secondly, an expanded investment attraction model is constructed to explore the impact of B&R countries' digital economy on China's OFDI. Finally, the technological innovation intermediation effect and trade cost adjustment effect model is respectively constructed to analyze the internal mechanism of digital economy affecting China's OFDI. The results show that the above three hypotheses are verified. Specifically, the main conclusions of this paper are as follows.

First, there are big differences in the development level of the digital economy among the B&R countries. Singapore, Malaysia, Israel, India, and the Russian Federation are the top five countries, with reasonably robust digital infrastructure that can create a firm foundation for the development of the digital economy. The last five countries are in Central and Eastern Europe, Central Asia, ASEAN, and South Asia, with South Asia accounting for two, indicating that the digital economy development level of South Asian countries is relatively low and must be vigorously developed in the future. Second, the development of digital economy in the B&R countries has a positive promoting role in attracting China's OFDI. Thus, *hypothesis 1 is verified*: *The improvement of digital economy development in B&R countries can promote China's OFDI*. From the results of heterogeneity analysis, among all the B&R countries, the development of digital economy in ASEAN region has the most obvious pulling effect on China's OFDI. Third, according to the results of the intermediary effect model and the moderating effect model of the digital economy development of the B&R countries on the mechanism of China's OFDI, the digital economy development can promote the inflow of China's OFDI by improving the level of technological innovation and reducing trade costs. Through the intermediary effect of technological innovation lag, that is, the future technological innovation ability may play a channel effect and media role in the process of digital economy affecting China's investment effect. Thus, *hypothesis 2 is verified*: *The development of digital economy in B&R countries can promote China's OFDI by improving technological innovation*. Meanwhile, trade cost has a significant reverse regulating effect on the effect of digital economy on China's OFDI, indicating that the development of digital economy will attract the inflow of China's OFDI by reducing trade cost. Thus, *hypothesis 3 is verified*: *The development of digital economy in B&R countries can promote China's OFDI by reducing trade cost*.

6. Policy recommendations

The government is a driving force behind outbound direct investment and a key player in international collaboration in the digital economy. To accelerate the construction of the "Digital Silk Road" connectivity, the country must improve strategic mutual trust, perform well in top-level design, strengthen communication and coordination, guide enterprises to conduct outbound direct investment in a scientific and rational manner, and further improve investment quality and efficiency. First, improve the direction of digital economy investment planning rules. Incorporate digital economy investment cooperation into bilateral or multilateral cooperation frameworks, generate ideological consensus, create convergence of interests, strengthen data security, and support long-term growth of foreign direct investment in the digital economy. Second, improving governance capability for direct digital economy investment. First, develop an outward investment information service platform, cultivate overseas investment intermediary service institutions, and support and promote accounting, legal, evaluation, and other third-party institutions to provide professional services. To decrease frictions in outbound investment, the second step is to develop a digital economy investment dispute settlement mechanism in B&R countries, set up investment arbitration and resolve investment disputes with authority. Third, promoting distinctive and high-quality overseas investment development. To begin, encourage the establishment of large-scale commercial cloud computing centers along the "Digital Silk Road," fully exploit the development characteristics and needs of the digital economies of nations through big data. Second, jointly build digital ecological industries, promote new digital infrastructure interconnection and connectivity; clarify the advantages of various industries, data, technology, and other factor endowments, invest according to local conditions.

There are some aspects that can be expanded in the future. While all the B&R countries are essentially developing nations, each has a distinct degree of economic development, and subjective preferences for FDI exist. Our in-depth research direction on the theme of this paper is to classify the B&R countries into resource-dependent, inward developing, small competitive and integrated value chain economies, and to analyze the impact of digital economy development of different types of economies along the route on China's OFDI in a targeted manner.

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