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Activating Information Infrastructure Development in Countries along the Belt and Road with Basic Information Application

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Abstract: Information application plays an inclusive and fundamental role in exchanges and cooperation between countries along the Belt and Road and offers a new perspective for the joint development of information infrastructure. This study analyzes the difficulties experienced by China while participating in information infrastructure construction in countries along the Belt and Road, and depicts the development of information application service enterprises in these countries. The findings reveal that information infrastructure construction in countries along the route is slow due to complex geopolitical, ideological, and national security factors. Information application is an emerging field with adequate market competition and accords with the needs for a social life and appropriate governance, making cooperation an essential component in the field. Using basic information application to activate information infrastructure construction in countries along the route is an effective way to achieve connectivity.
Keywords: basic information application; the Belt and Road; information infrastructure development

For the development of the Belt and Road (B&R) and Digital Silk Road, the concept of construction of information infrastructure must be redefined, and information application must play a fundamental role. Presently, Chinese enterprises participating in the construction of information infrastructure in countries along the B&R face slow progress, substantial difficulties, and great risks. The rise and popularization of basic applications such as e-commerce, mobile payments, and mobile social platforms, through multiple forms of external cooperation, build applications and ecology. This has resulted in the need to meet the demand for network infrastructure at the application level, stimulating investment in the construction of information infrastructure in countries along the B&R. The B&R information infrastructure construction is practical and has far-reaching effects that can be promoted using common basic information applications as an initiation.

1 Chinese information and communication technology (ICT) enterprises participating in the construction of the information infrastructure in countries along the B&R experience various problems

China is actively promoting and participating in the national information infrastructure construction in countries along the B&R. This has played an important role in the development of the Digital Silk Road, narrowing the

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digital gap between countries in the region. In this process, China is facing several challenges and difficulties, mainly in the following areas.

1.1 Chinese ICT enterprises participating in the construction of the information infrastructure in countries along the B&R face containment and disintegration by some countries

The B&R stretches across the continents of Asia and Europe, where most countries have different ideologies, political systems, and development models. Countries not involved in the B&R, such as the United States, EU members, and several others are highly alert to China's rapid rise. Chinese ICT enterprises must deal with the resistance and differentiation of these countries during the construction of information infrastructure in regions along the B&R. If the positions of the various stakeholders are not coordinated, their ability to obstruct cannot be ignored. Information infrastructures, such as land cable, submarine cable, critical communications, and big data defined by many international agencies and experts as critical information infrastructures, are deeply linked to national security, information security, and network security. Since telecommunication is the most critical infrastructure, many countries are increasingly cautious about the role of Chinese companies in this field [1]. In recent years, some countries, led by the United States and Australia, have blocked China's participation in the supply chain of information infrastructure and communication equipment. Due to national security concerns, Australia has banned Huawei from bidding for Australia's national broadband network. In addition, the resistance against the participation of Chinese ICT companies in the Indian telecom market is also strong, with the Indian government banning mobile phone operators from importing and using telecom equipment from Chinese companies [2].

1.2 Natural monopolies and government regulations in information infrastructure in countries along the B&R are becoming more stringent

Most countries implement a negative-list approach in the area of information infrastructure. The information security problems caused by the Prism Gate have caught the attention of all countries, and some have adopted a policy of "information localization" to strengthen information security. In Malaysia, for example, the provision of network equipment and network services through commercial presence requires the acquisition of shares of existing registered providers. There are technical barriers to the Thai telecom market and discrimination barriers to government procurement. Foreign telecom equipment suppliers or operators entering the Thai market need to work with the Communications Authority of Thailand (CAT) and the Telephone Organization of Thailand (TOT) either through a concessional revenue-sharing agreement, or through a telecommunications license. The establishment of telecom services enterprises in the Philippines is also subject to several restrictions. The requirements of market access include a charter by the Philippine Parliament, a certificate of public convenience and necessity (CPCN) issued by the National Telecommunications Commission, a proportion under 40% of foreign investment, no resale of private leased lines, and no access to private leased lines from public networks. Canada's Foreign Investment Review Act and the Investment Canada Act provide for strict restrictions on foreign access or restrictions on foreign ownership in key sensitive areas such as communications. In 2005, France declared 11 industries as protected, including information systems security. In the Middle East, with Arab countries as the main body, the basic network and business of the national telecom industry is dominated by state-owned telecom monopoly companies. In contrast, most developing countries have more restrictions on foreign investment in their own telecom industry; for example, Indonesia, Malaysia, and South Africa among others, have set access barriers for telecom services [3].

1.3 Chinese ICT enterprises are exposed to the risk of policy stability of target countries when participating in the construction of the information infrastructure along the B&R

Presently, due to the slow growth of the world economies, difficult recovery in developed economies, and insufficient momentum in emerging markets, some countries have begun to adopt narrow policies not conducive to international cooperation and mutual benefit. Therefore it is difficult for countries along the B&R to achieve stable policy consensus that can translate into firm policy actions. Information infrastructure was the most important facility associated with national security. It was originally a traditional key industry for national security review, foreign investment review, and government regulation, with restrictions or special provisions on foreign investment in industrial policy and industry access. The current competitive market situation, market potential, entry barriers, cultural distance, and national risks, among others, faced by the information industry increase the

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risk of policy changes in the future construction of information infrastructure in the B&R countries. It may also introduce adverse policies for foreign enterprises such as government procurement, property rights regulations, and equity restrictions. This not only increases the difficulty of coordinating the infrastructure connectivity of these countries but also magnifies the risk for Chinese ICT enterprises participating in the national information infrastructure construction along the route.

2 The status quo of Chinese information application service enterprises in the development of the countries along the B&R

Unlike the challenges in development faced by Chinese ICT enterprises in the countries along the B&R, Chinese Internet application enterprises represented by Alibaba and Tencent, smart city solution providers represented by Huawei Technologies Co., Ltd. and Hikvision Digital Technology Co., Ltd., and Chinese mobile device companies, have risen as a new force, with great success in India, Southeast Asia, the Middle East, and other regions, opening up an alternative construction model for the Digital Silk Road.

2.1 Chinese e-commerce enterprises are accelerating their pace of globalization and gradually growing roots in countries along the B&R

The B&R initiative has promoted the improvement of transportation, electricity, and other infrastructure in relevant countries and brought development opportunities for Chinese e-commerce enterprises. In Southeast Asia, one of the world's largest e-commerce markets, Chinese Internet enterprises continue to capture the market aggressively. Alibaba, in addition to building its only global e-commerce platform AliExpress, acquired Lazada, Southeast Asia's largest e-commerce company in 2016, and continued to increase additional investments by acquiring a majority stake by 2018. In 2018, Alibaba snatched the market share of South Asia, acquiring Daraz, the most popular e-commerce platform in Pakistan, Bangladesh, and Myanmar. In the Middle East, particularly in Saudi Arabia, the JollyChic shopping platform, created by Zhejiang Jolly Information Technology Co., Ltd, went on to become the Middle East's most well-known and comprehensive mobile e-commerce platform, and was ranked No.1. Similarly, Tencent acquired Shapee, a Southeast Asian e-commerce giant, with a 39.7 percent stake in the company as its largest shareholder. JD.com Century Trading Co., Ltd. invested in Tiki, a Vietnamese e-commerce company, as one of its largest shareholders [4].

2.2 Chinese mobile payment applications, as the basis of e-commerce, are welcomed by countries along the B&R

While Alibaba and Tencent, the Chinese Internet giants with advanced mobile payment technology and market experience have captured the markets in Southeast Asia and India, the rapid development of e-commerce in B&R countries is promoting the demand for mobile payments. With technological export as its goal, Alibaba's Ant Financial Services Group, through the "local partner + technology empowerment" model, rooted in countries along the B&R and developed nine local e-wallets services, covering India, Thailand, South Korea, the Philippines, Malaysia, Indonesia, Pakistan, and Bangladesh among others. Alibaba's mobile payment model has largely stabilized in countries along the B&R and served more than 870 million people. Tencent is actively imitating its successful new generation mobile-centric social business model in Southeast Asia, which integrates gaming, mobile payments, and WeChat as its social networking platform. Tencent is using WeChat Payment as the starting point to promote the expansion of its business model combining social networking, travel, online shopping, mobile payments, and other services, by merging and acquiring Southeast Asian unicorns. Meanwhile, the convenience of mobile payments makes them popular in countries along the B&R.

2.3 Chinese mobile social applications and tools are springing up and substantially expanding their market share

Among mobile social applications, Chinese Internet companies have also made significant strides. Social platforms like WeChat are increasingly popular with young people in Southeast Asia. The percentage of WeChat among chat-type instant messaging tools is: 40% in Malaysia, 24% in Singapore, 17% in Thailand, and 14% in Indonesia. In the browser field, Alibaba's UC browser has the largest market share in India and Indonesia. In India, 50% of mobile users choose the UC browser, while 30% use Chrome. In comparison, 41% of internet users in Indonesia choose UC, and 31% use Chrome [5]. In the mobile tools market, Chinese branded mobile phones sell

well in countries along the B&R, dominating the main market. In the Indian market, in the second quarter of 2018, Xiaomi had the largest market share of 29.7%, Samsung with 23.9%, Vivo with 12.6%, and OPPO with 7.6%. In the Southeast Asian market, three of the top 5 smartphones in 2017 were Chinese brands, with the 2nd-ranked OPPO holding a market share of 17%, Vivo with 7.2%, and Huawei with 5.4% [5]. In addition, Huawei mobile phones command a market share of more than 20% in Middle Eastern countries such as the Hashemite Kingdom of Jordan and the Sultanate of Oman. Huawei's handsets also hold a market share of 18.4% and 17.3% in Egypt and Saudi Arabia, respectively. In the Sultanate of Oman, Huawei is the number one mobile phone brand, surpassing Samsung and Apple.

2.4 With the rise of smart cities, Chinese enterprises become the leading force

A smart city is an urban city supported by the new generation of information technology and the next generation of innovation (Innovation 2.0). Smart cities are sustainable with innovative ecological solutions and are characterized by user innovation, open innovation, mass innovation, and collaborative innovation. Many countries along the B&R are integrating smart cities into their national strategy and investing in its implementation. As a global leader in the development and supply of smart city solutions, Huawei's Smart City Solutions have been deployed in more than 140 cities of more than 40 countries and regions. Huawei has won the trust of many city managers and companies around the world, including London, Milan, Paris, Singapore, New Delhi, Thimphu, and Gizan. Hikvision Digital Technology Co., Ltd., a Chinese provider of smart city products, has its digital, networked, and high-definition intelligent products and solutions widely used in more than 150 countries and regions, playing an important role in the construction of smart cities in counties along the B&R.

3 Opportunities for Chinese information application enterprises in the B&R development

3.1 Meeting the needs of people in countries along the B&R

Development of the social economy, growth in peoples' income, the improvement of transportation, electricity and other infrastructure, and the development of national information technology—particularly the gradual popularization of the Internet and mobile Internet in the countries along the B&R—has resulted in a fundamental change in the lifestyle of the general public. In particular, the youth use these social platforms for purchasing, consuming, paying, traveling, entertainment, and dating. The great success of Chinese Internet giants and industry leaders is guiding changes in lifestyle and economic behavior of the Chinese public, especially the youth. This will undoubtedly be a model and benchmark for the individuals and entrepreneurs in countries along the B&R and will promote similar changes in lifestyles of people in these regions.

From the perspective of Southeast Asia, the growing economic power of the Internet and the increasing proportion of the younger generation consuming the information have enhanced the online market potential of this region. In Southeast Asia, 200 million people buy or rent online services, and 230 million people have used the online search facility for items. Online sales channels and services are changing the way people consume. Many Chinese mobile services and tools have become popular globally and in countries along the B&R, fulfilling the daily needs of people. These include e-commerce models such as Alibaba and JD.com; mobile payment models such as Ant Financial Services Group and WeChat Red Packet; the one-stop consumption model of Tencent, integrating WeChat, games, and payments; the cost-effective mobile devices of Xiaomi Technology Co., Ltd., and Huawei Technologies Co., Ltd.; and Chinese mobile applications represented by Tiktok.

3.2 Adapting to needs of government governance in countries along the B&R

The innovation of ICT and the coming of a new era of intelligent Internet will promote the digital transformation of economic and social governance in various countries and bring revolutionary changes to national economic development and government governance. In order to meet the challenges, many countries along the B&R have shifted national infrastructure construction from the traditional model of "concrete and steel" such as transportation, hydropower, energy, and urban construction to focusing on the construction of national information and intelligent infrastructure. Several countries have introduced "smart cities" to enhance urban modernization. Egypt, for example, was the first to establish a digital transformation and e-commerce strategy within the Middle East and Africa. In 2018, the Egyptian government proposed that all national services would be available electronically by the end of 2019, and that all government services would be available through an online portal. In

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June 2015, the Indian government launched the "Smart City Mission," a five-year urban modernization program with a USD 7.5 billion investment in 100 smart cities across the country.

The success of the Chinese Internet economy and smart city construction has attracted many countries along the B&R to learn from the Chinese experience and copy the Chinese model. This, in turn, requires financial and technical aid from the Chinese government and enterprises. In particular, the Lao government looks forward to increased cooperation with China on ICT, especially in the facilities of WeChat Payment and Alipay, hoping to make them available to users in Lao. The Thai government is also inviting Huawei Technologies Co., Ltd. to take advantage of opportunities of digital transformation in industries such as public health, education, production, manufacturing, development, and tourism as a critical partner in Thailand's 4.0 strategy.

3.3 Integrating into fully-competitive emerging areas of countries along the B&R

At present, Chinese Internet giants like Alibaba, Tencent, and Huawei who are entering the market with smart city construction and smartphone sales, are concentrated in emerging markets such as Southeast Asia, South Asia, and the Middle East to develop new digital economies closely related to daily life. The introduction of a new digital economy is bound to bring potential and healthy competition to emerging markets. This provides excellent development opportunities for Chinese Internet companies with capital advantages and experiences in technology and market competition.

In the communication market, mobile communication in most Southeast Asian countries and in the Middle East has gradually moved from perfect government monopoly to competition, and the market environment is becoming open. The open and competitive mobile communications market in India, as well as in Southeast Asia and the Middle East, provides a natural stimulant for the development and growth of Chinese information application companies in these regions.

4 Countermeasures and suggestions to activate the information infrastructure of countries along the B&R with basic information application

The development of e-commerce, mobile social platforms, and smart cities along the B&R has promoted the construction of a national backbone communication network, optical fibers, cloud computing, big data, and other infrastructure. This has raised the level of national information technology, and created alternative ways of association for China and countries along the B&R to jointly promote the construction of the information infrastructure of the Digital Silk Road.

4.1 Promoting construction of information infrastructure: Moving from active help to join promotion

Advanced and universal information infrastructure is required to support the development of e-commerce, mobile social platforms, and smart cities. The Chinese cross-border development experience in e-commerce, mobile payment, and smart cities in the B&R region has been successful. The promotion of the construction of information infrastructure along the B&R is dependent on the initiative and urgency of the local governments in need of e-commerce and smart city construction. Therefore, to promote national information infrastructure along the B&R, the Chinese government should consider moving from the position of aid and promoting the interconnected information infrastructure of relevant countries, to the relevant countries proposing that China participate and guide the construction for the development of their digital economy and modern urban governance. It is but logical that many countries along the B&R hope that Chinese Internet and information application enterprises would participate in their e-commerce, mobile payment, and smart city construction, thus jointly contributing to their digital economic development.

The infrastructure construction of the Digital Silk Road must reflect certain common interests of all stakeholders and include the application of common concern. Relevant countries could be encouraged to be enthusiastic to construct the Digital Silk Road by providing more information application technologies, products, and services that are better adapted to their needs and in the process, address common concerns.

4.2 Imitate Chinese solutions and business models rapidly with cross-border e-commerce and mobile social as a breakthrough for the Digital Silk Road

Alibaba's industry-wide business model of e-commerce and Tencent's mobile social business model effectively display the Chinese technology & business solutions, presenting an option to countries along the B&R to develop

the Digital Silk Road, helping countries willing to learn from and copy Chinese technology solutions and business models realize their shortcomings in information technology, software, infrastructure construction, and arousing their awareness of cooperation with Chinese enterprises. By exporting technology solutions and business models along the B&R, Chinese enterprises have helped relevant countries improve e-commerce, and small-medium enterprises (SMEs) in these countries tend to develop smoothly. The construction of information infrastructure, will not only promote the shared prosperity and development of the B&R countries but also build a bridge of friendship among countries and people along the B&R through cross-border e-commerce services, mobile social platforms, and information-sharing platforms.

4.3 Promote infrastructure construction of the Digital Silk Road with smart cities

Smart city construction is the booster of the implementation of the Digital Silk Road initiative. It needs a country with a relatively perfect communication backbone, fiber optics, cloud computing, big data, and other infrastructure. More technological innovation-oriented enterprises and Internet companies should be encouraged to participate in the construction of national smart cities along the B&R. These initiatives should start with the construction of "smart" infrastructure, and focus not only on national information infrastructure, but also on the construction, development, and application of cloud computing, big data, artificial intelligence, and other new infrastructure. This will result in the promotion of construction of information infrastructure through the construction of basic information applications.

4.4 Strengthen top-level design at the national stage and strengthen communication and collaboration with countries and international organizations along the B&R

Concerning the "go global" strategy of Chinese information application enterprises, the state should further strengthen top-level design and support it by means of policy, capital, and law. First, the state should study and formulate a policy of fiscal incentive support for information application enterprises to "go global." Second, the state should improve and establish relevant policy proposals about supervising cross-border e-commerce. Third, the state should urge the key countries along the B&R to imitate the construction of a "digital free trade zone." Fourth, the state should facilitate the customs clearance of e-commerce products in various countries under the framework of the World Trade Organization (WTO), and establish and improve industry rules and standards.

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