

Chinese ICT on the Digital Silk Road: A Case Study of Infrastructure Building in Pakistan

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Abstract

China's increasing efforts for establishing a digital silk road under the framework of the Belt and Road Initiative (BRI) are bound to conflict with the global hegemony and geopolitical interests of U.S. Information and Communication Technologies (ICT). Pakistan, as a crucial BRI-partner country, is a prime case to study such a conflict in the global communications field. By using extensive literature analysis and drawing from a political economy of communication approach, this study explores China's ICT in Pakistan. I argue that China is reshaping and challenging the U.S.-centered ICT infrastructure in three ways: by building all-weather communication channels, extracting and controlling data, and creating a safe and stable social environment for its ruling elites. Are these initiatives made by China exacerbating Pakistan's pre-existing authoritarian and military power relations? Are they also relevant to the imperialist expansion of a resurgent China in the South Asian region and beyond? But at the same time, we can also see how the China-led digital infrastructures in Pakistan also translates to the potential to counter-balance the dominance of the US-led digital platforms in this region.

Keywords: Belt and Road Initiative, Digital Silk Road, Information and Communication Technologies, Infrastructure, United States, Pakistan, South Asia.

To my friends who work for a more balanced and democratic global communication order.

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List of Acronyms

AIIB	Asian Infrastructure Investment Bank
BDS	BeiDou Navigation System
BRI	Belt and Road Initiative
CPEC	China-Pakistan Economic Corridor
CPFOP	China-Pakistan Fiber Optic Project
DSR	Digital Silk Road
ICT	Information and Communication Technologies
IoT	Internet of Things
MoU	Memorandum of Understanding
NTC	National Telecommunications Corporation
NWICO	New World Information and Communication order
PEACE	Pakistan & East Africa Connecting Europe
SDGs	Sustainable Development Goals
SOEs	State Owned Enterprises
WSIS	World Summit on Information Society

Chapter 1.

Introduction

In 2013, President of People's Republic of China, Xi Jinping, announced that China would build 'the Silk Road Economic Belt' and 'the 21st Century Maritime Silk Road' in the next few decades or even centuries (Fallon, 2015). Now, these two visions are known as the 'Belt and Road Initiative' (BRI), initially known as 'One Belt, One Road' (OBOR). In recent years, the BRI has turned into China's most important diplomatic strategy. As the Chinese state media CGTN media claims, China is building a 'Community with a Shared Future of Mankind' by promoting the BRI (CGTN, 2020). The dreams of every BRI-partner country is linked by the BRI with the 'Chinese Dream' (Xinhua, 2016), which refers to the 'Chinese Dream of Rejuvenation of the Chinese Nation'. For Xi, investing directly or indirectly in infrastructure including railways, roads, pipelines, energy, ports, and Information and Communication Technologies (ICT) in countries along the routes is a key part of his foreign policy through which he hopes to expand China's influence in its neighbourhood and beyond. (MERICS, 2018). In 2017, this project promised a total of more than \$1 trillion in investments and involves more than 60 countries (Perlez & Huang, 2017). By 2018, China's investment in infrastructure construction in this project had exceeded \$100 billion (MERICS, 2018). The sources of these funds include loans provided by China's two policy banks and China's leading Asian Infrastructure Investment Bank (AIIB), the Silk Road Fund, loans from international financial organizations such as the World Bank and the International Monetary Fund, as well as private capital and commercial loans (HSBC, 2018). China is, on the one hand, trying to open up faster and safer trade routes, and on the other hand, effectively eliminating its domestic surplus and mitigating industrial overcapacity (Shen, 2018). The BRI is not only a diplomatic project, but also a project to promote China's local development, as highlighted in China's 13th Five-Year Plan. The five-year plan is an economic development plan formulated by the Chinese government every five years, reflecting the government's development strategy and macro thinking for the next five years. For local areas, the BRI's goal is to encourage the development of the poorest region in China by expanding the opening up of western provinces (Koleski, 2017). For thousands of years, China's economic and population centers have been concentrated

in the eastern region, while the western provinces, which account for 71.4% of the country's land area, have had less development opportunities. This goal can be seen as a continuation of the grand western development program (*Xibudakaifa zhanlüe*) proposed by China in 1999. Since the BRI was proposed, the Chinese government has always emphasized that this plan is to achieve the goal of common development between China and the international community, especially for developing countries in Asia and Africa. In the face of growing criticism of the BRI from the U.S. and its allies, the Chinese authority explicitly states that China is not to challenge the United States' world hegemony, and will always insist on a "not seeking hegemony" principle (Liu, 2018; Xinhua, 2019).

Although China does not regard itself as a challenger to the global order, the BRI has indeed brought challenges and changes to the world's political, economic, and cultural order since 2013. This has prompted us to ask, will this potentially result in the reshaping of the current American-Western European dominated international order? If so, will China become the next U.S. or Germany? If yes, will it fuel more geopolitical tensions and conflicts such as what we have witnessed in this decade? If not, where will China go? What will happen to the BRI? An excellent research question would be to study what the post-Covid-19 BRI will look like, but that would be too broad to address in this study. The impacts of the pandemic on economic globalization may take years to unfold. In order to understand China's contemporary political, economic, cultural, and even technological engagements with other countries, one must address the BRI. This study provides a starting point, not a conclusive one. The answer to this question is composed of research results in different subjects. To study the BRI from the lens of communication, we can mainly start from two aspects: communication as infrastructure, and communication as storytelling. The latter refers to the research of China's use of the BRI to expand its influence on the world's media and culture in order to figure out how China's media and cultural industries tell the "Chinese story" and explain the concept of globalization with Chinese characteristics in the BRI. The former refers to the research of a series of ICT infrastructure constructions carried out by China in the BRI. China regards these ICT infrastructures as pioneering and fundamental to the BRI, and has proposed the concept of the Digital Silk Road (DSR) based on these infrastructure projects (Zhao, 2018).

1.1. What is the Digital Silk Road and why is it important?

In 2015, in a white paper jointly issued by the National Development and Reform Commission, the Ministry of Foreign Affairs, and the Ministry of Commerce explaining the overall vision of the BRI, the Digital Silk Road (DSR) was described for the first time (National Development and Reform Commission, 2015). The name used at the time was the Information Silk Road. In this document, the Chinese government emphasized several communication cables under construction or planning at that time. International optical cable and satellite communication channels were used to smooth up the Information Silk Road. In the past five years of practice, the purpose and scope of the DSR have far exceeded the content of the initial white paper. Adding to building communication channels between the BRI partner countries, the purpose of the DSR is considered to include creating China-centered digital infrastructure, mitigating industrial overcapacity, enabling infrastructure to help other Chinese companies go overseas, accessing large pools of data, and promoting Internet-Enabled inclusive globalization (Cheney, 2019; Shen, 2018). In achieving these goals, China has done more than just build a few cross-border optical cables or satellite ground stations. The Chinese government has cooperated with domestic ICT giants to build more ICT infrastructure in the BRI partner countries, invest or acquire local ICT companies, and assist local governments in digital planning and provide technical training. Today, the Chinese government defines itself as a leader in digital development. In fact, China has indeed made significant progress in multiple technological frontiers, including next-generation mobile communication technology (5G), satellite systems, big data, artificial intelligence, and Internet of Things (IoT) technologies. China hopes that it can use the DSR applications and its own digital development achievements to cooperate and collaborate with developing countries in realizing the Sustainable Development Goals (SDGs) proposed by the United Nations (Arcesati, 2020).

In recent times, academic research on the DSR mainly focuses on the following aspects: first is to examine the origin and purpose of the DSR proposed by China. For example, Shen (2018) combined other scholars' research on the origin of the BRI and research on China's domestic Internet policy and argues that the reason for the Chinese government putting Internet companies at the center of the DSR is to reduce domestic industrial overcapacity, promote Chinese companies to go global, support RMB

internationalization, build China-centered cross-border network infrastructure, and promote Internet-driven inclusive globalization. Second, is how China's propaganda strategies aid in the construction of the DSR. Whether it is the BRI or the DSR, since China proposed these policies, they have been criticized by the Western media for their neo-colonialism and neo-imperialism implications. In order to reverse this image, China vies to respond and propagate accordingly in the BRI partner countries. Noort (2020) conducted a discourse analysis of the political communication strategies adopted by China, revealing the relationship between strategic narratives, visuality, and infrastructure. Third, is the impact of the DSR on regional politics and economy and how countries in the region should respond. These studies include studies on how regional countries, as competitors of China, should deal with the impact of the DSR, such as Mochinaga's (2020) study on Japan's countermeasures. There are also studies on the possible impact of the BRI on regional countries as DSR participants, such as Lou's (2019) study on Latin America, and Brown and Burjanadze's (2020) study on 16 European countries. Finally, is the DSR's impact on the world communication order or its challenges to the United States. Gong and Li (2019) believe that based on China's development history, digital connectivity and digital economy may have a positive impact on the development of developing countries in the BRI, but whether China's experience can be transferred remains to be seen. To achieve sustainable development, this development of developing countries should be the joint development of the virtual digital economy and the real economy. Hemmings (2020) believes that if the DSR is allowed to develop, it may undermine the "free and open" international order created by the United States and its allies after the war. He believes that China's development has the appearance of neo-imperialism from the beginning. He also uses Churchill's famous "Iron Curtain Speech" to warn the United States and its allies. In contrast, other studies believe that the "united nations of media" proposed in the BRI context inherits the legacy of the New World Information and Communication order (NWICO) and World Summit on Information Society (WSIS). However, the Chinese globalization contained in the BRI will prevent it from repeating the mistakes of NWICO and WSIS, and it will become the main way to narrow the global spread between the North and South (Shi, 2019).

The discussion of NWICO is partly relevant to understanding why the DSR matters. Attempts to establish NWICO – as an international movement of governments and scholars - occurred in the 1970s. As Ulla Carlsson (2017) wrote in historical

research of NWICO, a large number of colonial countries gained independence and established their own nation-states in the 1960s. These countries constitute the "Third World" (whereas the First World was the Euro-American capitalist countries and the Second World was the Soviet-led communist block). In the aftermath of World War II, the U.S. took advantage of the blows that the war brought to European countries and began to dominate the world order, including the information order. Based on the principle of the 'free flow of information' proposed by the U.S., it has expanded its information and media industries globally. The countries of the third world believed that the international information order at that time was 'one-way-flow'; 'the lack of respect for third-world peoples' cultural identity that such imbalances reflected, the monopoly positions of transnational communications corporations, which were perceived as a threat to the countries' national independence; and the inequitable distribution of communications resources in the world" (p. 38). Out of this dissatisfaction, the third world countries, taking UNESCO as their main area, began to discuss the establishment of NWICO. These attempts have formed the famous document *Many Voices, One World* (*International Commission for the Study of Communication Problems et al., 1980*), which contains much consensus that are conducive to the third world countries to obtain a more equal international information order. However, apart from political consensus NWICO has brought very few substantial changes. In the 1980s, Western countries generally believed that the third world's yearning for this new order undermined the threat of the "free world". The United States and the United Kingdom both threatened to withdraw from UNESCO and provided some economic development assistance to change the attitude of the third world countries, of course, not out of good intentions. The failure of NWICO shows that the beginning of a bright vision may evolve into a futile political game due to the lack of pragmatic discussions and actions and the broad consensus of ordinary people (Padovani & Nordenstreng, 2005).

The question remains whether the DSR can bring back the spirit of the NWICO movement by offering a more multilateral communication order or if it will create a new hegemonic order at a regional and international level. This study will show that the DSR may have some potential to equip the Third World countries (such as Pakistan in this case) with a variety of digital infrastructures, but this may not be adequate to reduce the country's dependency on Western digital platforms. However, a country's dependency on Chinese-developed ICT infrastructures and apps alongside U.S.-based digital

platforms may contribute to new regional geopolitical tensions as well as new digital capitalist possibilities. For instance, echoing the U.S., U.K. and Australia, India is set to ban Chinese-originated Huawei and ZTE, while allowing U.S.-based Google and Facebook to invest heavily in the country (Chaudhary et al., 2020). Meanwhile, Pakistan allows both US and Chinese companies to operate in within its borders due to its DSR agreements with China.

In general, compared with the rich connotation of this topic and the changes it may bring to the world in the next two decades, there are still few studies on the DSR. This is largely due to the fact that the construction of the DSR has just begun, and since most of the projects are still in the construction or planning stage, its impact is not clear yet. In this context, this study selects ICT infrastructure construction, which has a fundamental position in the DSR, as the research object, and explores how China challenges and reshapes the US-centric ICT infrastructure in the specific case of Pakistan. This research, on the one hand, expands the scope of case studies in the DSR study, and examines various ICT infrastructure constructions in a BRI partner country, not just limited to one certain Chinese company (Naughton, 2020; Vila Seoane, 2020), on the other hand, the expansion of ICT research in China has helped shift the perspective of such research from domestic policies to an international context (Hong, 2017). This research also touched on one of the core topics of critical communication, building a new global communication order. The ICT infrastructure order is in a fundamental position in the global communication order of the 21st century. It is precisely by constructing the U.S.-centered communication infrastructure network that the U.S. has controlled global communication for almost a century.

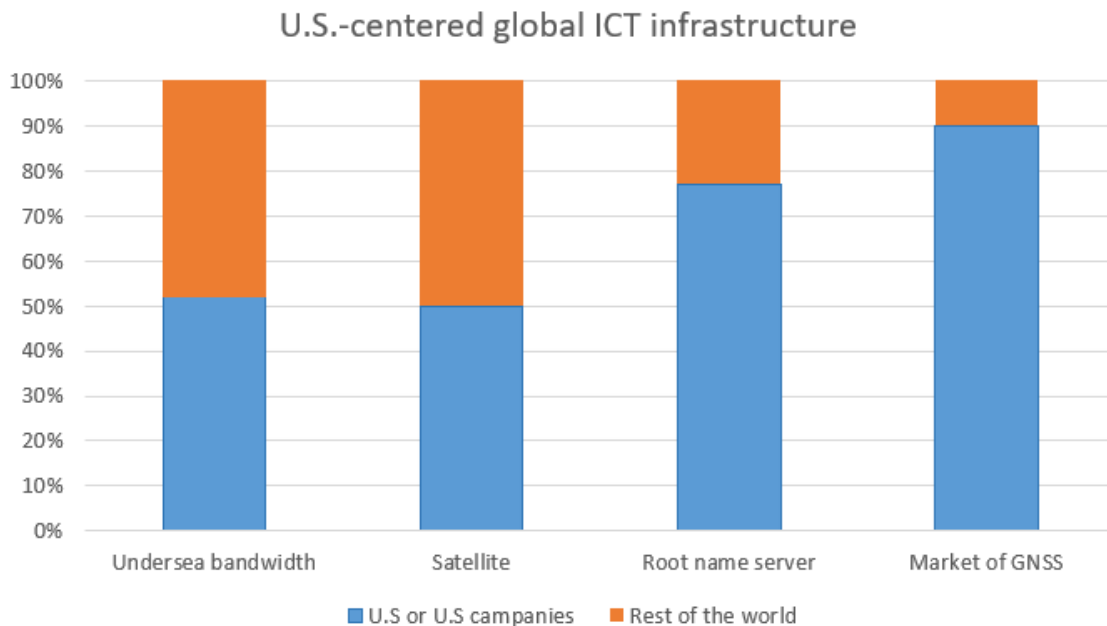


Figure 1 U.S.-centered global ICT infrastructure.

Note: Data based on the data from Satariano (2010)

From wired cables and wireless broadcasting to submarine optical cables and satellite communications, the ownership domination of companies at an international level is still intact. For almost a century, the United States has dominated the world's most important communication infrastructures at every stage of communication technology development. As shown in Figure 1 above, Google, Facebook, Microsoft, and Amazon currently own or lease more than half of the world's undersea bandwidth (Satariano, 2019), and the United States owns 50% of the world's operating satellites (USC, 2020). In the global navigation satellite system market share, U.S. military developed and operated GPS's account for more than 90%. Of the 13 IPv4 root name servers, the United States has 10 (INNA, n.d.). The dominance of these infrastructures gave the U.S. government and U.S. capital the ability to control the flow of global information, thus forming a global communication order in which it dominates. This kind of monopolistic control has brought a great imbalance in global information dissemination. Taking the IPv4 address as an example, the number of IP addresses allocated to China with a population of 1.4 billion is equivalent to the number of IP addresses allocated to the campus of the University of California (Zhao, 2010). In 2017, India, the world's second-most populous country, only used 4,977 Mbps of international

bandwidth, while the United States used 4,960,388 Mbps, which is 1,000 times that of India (Zimmer, 2018).

1.2. Why Pakistan?

Although there are other important partners of the BRI in South Asia, such as Bangladesh and Nepal, this research chooses Pakistan as the focal interest, mainly based on the following reasons. First, Pakistan and the People's Republic of China have long-standing and stable diplomatic relations. Pakistan is one of the first countries in the international community to recognize the legal status of the People's Republic of China (Sun, 2017). In 2015, the two heads of state formally signed an agreement to upgrade the relationship between the two countries to an "all-weather strategic partnership." Pakistan is currently the only country that maintains this level of diplomatic relations with China. In 2013, almost simultaneously with President Xi's proposal of the BRI, the two countries proposed to build the China-Pakistan Economic Corridor (CPEC). CPEC is the starting point of the BRI and is its flagship project. China needs to use Pakistan to gain more direct and stable connections with Africa and Europe, including transportation and information. In 2015, the two heads of state also signed 51 memorandums of understanding, which involved cooperation projects in various fields such as transportation, ports, energy, ICT, and finance. At that time, the entire project was expected to invest \$46 billion USD, mainly for infrastructure construction (Haider & Haider, 2017). According to the CPEC 2025 vision plan, China hopes to help Pakistan reach the goal of \$4,200 USD in per capita GDP by 2025 through this project. In 2015, Pakistan's per capita GDP was only \$1,356 USD (Iqbal, n.d.). At the end of 2019, CPEC entered a new phase. The two countries announced that the focus of the project will shift from the first phase of infrastructure construction to the second phase of stimulating economic development and creating job opportunities. In the past five years (or seven years), China's ICT infrastructure construction in Pakistan includes terrestrial and submarine fibre optic cable, BeiDou system, data center, IoT, smart city, and so on. At this moment, choosing Pakistan as a research case has the advantage of being able to study the work done by China in a relatively complete time period. This can bring a relatively complete and comprehensive perspective to this research.

Secondly, Pakistan has an important geopolitical position. As the two nuclear-weapon states in South Asia, the strategic balance between Pakistan and India is very

important for regional and global politics and economy. In some studies of international relations, the BRI is regarded as China's direct response to the U.S. "pivot to Asia" strategy (Ferdinand, 2016). India is precisely one of the important countries that carry this strategy of the United States. The conflict of interest between China and the United States in the India-Pakistan region is obvious, both in the ICT field and in the broader field. At the same time, Pakistan itself was once one of the core allies of the United States. Although the relationship between the two countries has deteriorated sharply with the fall of the United States to India, the United States still has many interests in Pakistan, including the ICT industry.

Last but not least, I want to explain the reason for my research on this topic from the perspective of my personal experience. As Mills (1959) said, we should combine personal experience with the grand social environment to produce valuable and meaningful research. As a Bachelor of Engineering in Broadcasting and Television Engineering, in the ICT era, most of my friends no longer work as traditional television engineers but have become programmers or product managers working in Internet companies. In short, they are all working as "digital labour". Many of these friends work in China's ICT giants such as Tencent, Alibaba, ByteDance and Huawei. Most of them are under great work pressure and need to work at the company for more than 12 hours a day, six days a week. Even so, their work is still admired in China today, because they can earn higher incomes than other occupations. However, these incomes still do not match their contributions. The exploitation and squeeze they receive are just as much as that of traditional industries. At the same time, China's ICT giants have relied on the contributions of these digital labourers to build China's most successful companies, and their shareholders have become China's richest group of people. Witnessing such tumultuous digital transformations and the consequence on its workers within my social network, I felt motivated to review China's ICT industry and the national policies that support their development from a critical perspective. As an international student of a global communication program I was particularly interested in studying China's ICT from outside perspectives, hence I chose to focus on the study of the DSR in Pakistan.

In this capstone, drawing from secondary sources such as news articles, statistical sources, academic literature, and semi-academic research reports, I will advance a critical analysis of the recent expansion (2014-2019) of the Chinese ICT in Pakistan in the context of DSR. In doing so, I will argue that China has mainly adopted

three methods to reshape and challenge the US-centric transnational ICT infrastructure network in Pakistan: building all-weather communication channels, extracting and controlling data, and militarizing a safe and stable social environment for the regional ruling elites.

This article mainly consists of seven parts. In Chapter 1, I described the realistic and theoretical context of this study and explained the main reasons for choosing Pakistan as the case. In Chapter 2, I elaborate on the two main theoretical frameworks of this article: digital capitalism and platform capitalism, then introduce the method I used in this research. Next, I make a three-part narrative based on the three main arguments of this research. In Chapter 3, I analyze the communication channels built by China in Pakistan in two aspects: fibre optics and satellite systems. In Chapter 4, I analyze China's Internet of Things and data center construction in Pakistan to point out that China has expanded on both data extraction and data controlling infrastructures. In Chapter 5, I study the ICT infrastructure that China has built for its own interests and the interests of local ruling elites of both China and Pakistan to create social security and stability, including smart cities and ICT support to the Pakistani army. Chapter 6 and Chapter 7 are the discussion and summary parts. I discuss the impact of China's ICT infrastructure construction on Pakistan under the background of DSR and some other problems encountered in the research.

Chapter 2.

Theoretical framework and method

This study follows the tradition of the critical study of communication to examine the Chinese DSR in Pakistan. In Hong Shen's (2018, p. 2625) research, she cited Pickard's discourse on media studies to illustrate the traditional logic of such research, citing that they "ruthlessly scrutinize these policies, expose their contingencies and contradictions" and "emphasize the power structures". I think this argument can also summarize my research. Shen is a systems scientist who teaches at Carnegie Mellon University. Her research focus is social and policy implications of emerging technologies and the global internet industry and policy.

In the research of critical study of communication, discussing the global communication order from the perspective of communication infrastructure is a common trend. In Dan Schiller's (1999, 2018) well-known works, he has emphasized the fundamental role of cable, radio, and satellite communication infrastructure in building a U.S.-led world communication system. He believes that the United States uses these infrastructures to cooperate with the struggle for global communications governing to achieve the goal of building an "American system of international communication." He indicates that the existing modern financial system, national defence system, and manufacturing industry in the United States are extremely dependent on network infrastructure, and the network infrastructure occupies a platform role in the entire industry. Yuezhi Zhao's (2015) research on the changes that BRICS brings to global communication also focused on infrastructure construction. She chose BRICS cable, which was planning at the time, as one of the case studies. In fact, her research also followed Schiller's paradigm, dividing the global communication order into two aspects: infrastructure and governing rights. By analyzing global media reports related to BRICS cable, she critically questioned whether this project can be finally completed and whether it can bring meaningful changes to the global communication order. In her research, she expressed cautious optimism about BRICS reshaping the global communication order, which is consistent with the result that BRICS cable eventually became the cable of Brazil and BRICS did not produce an anti-neoliberal and anti-hegemonic alliance. On this topic, some scholars have chosen different research

paradigms to conduct research. Wang, Bar and Hong (2020) used network modelling to analyze China's ICT aid to Africa from 2000 to 2014, revealing the aid structure. This research provides inspiration for exploring how Chinese telecom companies are shaping Africa's digital future, such as in Nigeria, Ethiopia, and Zimbabwe. These aids by China are almost all provided for the building of ICT infrastructure in Africa. Aouragh and Chakravartty's (2016) research on ICT infrastructure originated from the impact of ICT infrastructure on the Arab Uprisings. They criticized the imperialist hegemony behind the ICT infrastructure and indicated that any attempt to break this infrastructure network will be punished by the United States. At the same time, they also criticized the construction of ICT infrastructure accompanied by the BRI, believing that this project is ultimately for China's own interests, not for making more people gain access to the network.

In addition to an ICT infrastructure study approach, I find the digital capitalism theory by Dan Schiller and the platform capitalism theory by Nick Srnicek useful for my work. Dan Schiller's works include *Digital Capitalism* (1999), *Digital Depression* (2014) and *Networks and the Age of Nixon* (2018). In his 1999 work, Dan Schiller advanced the concept of digital capitalism. Schiller masterfully historicizes that the information network has penetrated into all aspects of capitalist economy and culture in an unprecedented manner and scale and has become an indispensable tool and driving force for the development of capitalism. Schiller showed that digital capitalism has realized the staged transformation of capitalism and is the latest development stage of capitalism. In this stage, the network industry has become the new growth pole of the capitalist economy. After World War II, with the advancement of globalization, the number of manufacturers oriented to the world market increased significantly. By the 1970s, the major western capitalist countries had problems with overcapacity. In order to cope with the decline in profitability caused by this problem, capital began to combine with computer networks, thereby effectively broadening the market in a certain stage.

Dan Schiller further narrates that the development of digital capitalism, on the one hand, was established by the development of computer network technology in the 1960s and 1970s. On the other hand, it is promoted by liberalized market policies. Since the 1970s, related industries have been favoured by policies. The Nixon administration paved the way for the development of digital capitalism through a series of key official appointments and management structure adjustments. Driven by technological development and policies, capital accumulation in the telecommunications industry has

been given priority in all capitalist industries. The telecommunications industry began to get rid of government subsidies and entered a thorough commercialization process. At the same time, financial networking has brought greater help to the development of digital capitalism. Network and software-driven products or operational services are the infrastructures of financial globalization. With the help of efficient computing and transmission capabilities, the world financial market has become closer than ever. This closeness also makes the spread of the financial crisis easier. The outbreak of the financial crisis in 2008 interrupted the development of digital capitalism but did not end it. The quantitative easing of monetary policies adopted by various countries in response to the crisis has caused a large amount of investment to flow into emerging technology companies, which promoted their development. At the same time, the unemployment brought by the crisis has provided a large amount of labour for these emerging technology companies. Under the dual effects of the economic environment and policy conditions, the emerging network technology industry has become an important source of capitalism's profits. The expansion of these companies has also reorganized the labour process in the digital capitalist society. The digital technology represented by the Internet has the function of connecting different labour processes, which makes fields not previously affected by the division of labour also involved in the collaborative labour-process of digital capitalism. However, the purpose of this division of labour is still to improve production efficiency, reduce salary costs, and increase profit margins. Behind it is still the stratified exploitation of labour by capital.

After 2008, Dan Schiller put forward the discussion of 'digital depression'. Although the positive contribution of the information and network industries to economic growth has been greatly exaggerated, Schiller believes that although the economic activities of the digital capitalist society have not been reduced on a large scale, the reconstruction of capitalism informatization has long been the seeds of the next crisis. He called this inevitably long-lasting economic depression the "digital depression." This depression, on the one hand, is manifested in the decline in consumption power brought by soaring public debt, leading to indigestible overcapacity in almost every industrial sector. On the other hand, it is manifested in the excessive investment of enterprises in digital services including digital infrastructure. The interaction of these two aspects has made the living standards of workers lower and lower and the unemployment rate has soared, which eventually brought serious social chaos.

At the same time, Schiller also defined that in global digital depression, every country will try to capture any possible profit growth points in the information network. In this contention, the United States still has a dominant position. Offensive international economic policies, huge R&D expenditures, the breadth and depth of the domestic market, the first-mover advantages and network effects of local Internet companies, and the right to speak in international organizations have contributed to the United States' ambitions for network colonial expansion. The U.S. has seized the commanding heights of the digital economy in the initial stage of the development of digital capitalism and will certainly seek to maintain its dominance at all costs. This kind of capitalism under authoritarianism is always constructing unequal and unbalanced geopolitical relations. The digital age is nothing more than the modernizing of the contradictions of capitalism.

The application of modern digital capitalism can be explained through the operation of digital platforms. Several authors (see, Boyd-Barrett & Mirrlees, 2019; Fuchs & Mosco, 2015; Jin, 2015) extensively discussed the imperialist continuation of U.S.-based media and digital platforms and its social and political implications around the world. Consistent with this line of works, I find Nick Srnicek's brief and systematic categories of platforms useful for this study. In *Platform Capitalism* (2017), Srnicek defines that a platform is a digital infrastructure that allows two groups to interact. Therefore, platforms regard themselves as intermediaries, bringing together different entities: customers, advertisers, service providers, manufacturers, resource suppliers and even the resource itself can be on the platform. Users can use the tools on the platform to build their own products, services and markets.

Whether in digital capitalism or platform capitalism, data is a vital raw resource. Training based on large amounts of data can give computing programs a competitive advantage. Data can help optimize the production process. Data can also transform low-profit goods into high-profit services. More importantly, the work of data analysis itself will generate new data, thus forming a virtuous circle. In the competition of digital capitalism, companies with complete or scarce data will gain significant advantages. The platform is a way to maximize the use of data as a resource. Although these platforms are only intermediaries, they not only obtain massive amounts of data but also control and monitor the flow of data and formulate rules for interaction between entities.

According to Srnicek's definition, platforms can be divided into five types: advertising platform, cloud platform, industrial platform, product platform and lean platform. I summarize these types here. This discussion will later help us to understand the contestation and overlap between U.S. based platforms and the Chinese DSR infrastructures and how they play out in the context of Pakistan and its surroundings.

Advertising platforms (p. 51-p. 60) are the earliest platform form. Srnicek's arguments are different from previous research on advertising platforms. He innovatively indicated that the use of attention to profit is only because the advertising platform has not yet matured. Mature advertising platforms pay more attention to the efficiency of advertising, that is, to provide advertising to customers who need it more. Facebook and Google have adopted this strategy. For advertisers, precise placement will maximize the advertising effect. This precision comes from the platform's collection and analysis of user data. Data extraction has gradually become the most important method for monopolistic advertising platforms, allowing platforms to directly profit from advertisers.

Cloud platforms (p. 61-p. 64) come from the recognition of the value of data. The so-called cloud provides data processing services for various businesses. Take Amazon's AWS (Amazon Web Services) as an example. This system was originally designed to serve Amazon's own warehousing and logistics system. Because of its powerful computing power, it became a cloud platform that can be leased. Amazon uses it to provide online services for various servers, storage, computing, software development, operating systems, and apps. Cloud platforms do not extract data in fragments but as a whole. All customers who rent a certain platform are equivalent to those sharing all their data with the platform. A similar platform to Amazon AWS is Alibaba's eWTP (Electronic World Trade Platform).

Industrial platforms (p. 65-p. 70) are derived from the combination of virtual data and actual industrial production. Traditional industries evolve and participate in the extraction and use of data by using industrial platforms. In the Industrial Internet of Things, all production processes are connected through sensors and chips. The original productions divided in time and space have become a whole in this platform.

Product platforms and lean platforms (p. 71- p. 87) are two related but separate concepts. They are all created to solve the problem of capitalist overcapacity mentioned

above. The difference is that the former still owns the product, while the latter only provides the platform service. Platforms like Rolls Royce and Zipcar belong to the product platform, while platforms such as Uber and Airbnb belong to the lean platform. The theoretical prototype of the lean platform is 'lean production'. It was first proposed by Toyota. The core idea is 'Just in time', which refers to the real-time adjustment of production according to demand. The emergence of digital platforms makes this kind of production possible. The role of the lean platform is to lean the requirements for the first time and quickly break down a job. According to the data provided by the Internet of Things, the production work of each link is allocated to each specific small manufacturer to realize the effective allocation of resources. The mature lean platform does not require any workers and production materials, and all its work is outsourced. It only needs to collect data, analyze data, and use data in real-time.

The platform itself is a digital infrastructure, and the realization of the platform also needs the support of other digital infrastructure. What connects platform capitalism and digital capitalism is ICT infrastructure. The U.S. relies on its infrastructure network established in the era of digital capitalism, and has a development advantage in platform capitalism. For example, in Table 1, as shown below, of the top 10 sites in Pakistan, 8 of them are digital platforms of the United States (Alexa, 2020). In Table 2, of the Top 10 downloads in Pakistan's App Store, only TikTok and foodpanda are non-U.S. company products, the rest are all from the five major U.S. Internet platforms FAANG (Facebook, Apple, Amazon, Netflix, Google) (SimilarWeb, 2020). Most of the sites and Apps are platforms owned by U.S. companies. In such a country, the DSR's challenge to U.S.-centered ICT infrastructure will be particularly obvious.

Table 1 Top 10 sites in Pakistan

Rank	Site	Country
1	Google.com	U.S.
2	Youtube.com	U.S.
3	Facebook.com	U.S.
4	Google.com.pk	U.S.
5	Hamariweb.com	Pakistan
6	Amazon.com	U.S.
7	Yahoo.com	U.S.
8	Wikipedia.org	U.S.
9	Urdupoint.com	Pakistan
10	Blogspot.com	U.S.

Note: Table created by the author based on the data from Alexa (2020).

Table 2 Top 10 downloads in Pakistan's App Store, SimilarWeb, 2020

Rank	App	Country
1	WhatsApp Messenger	U.S.
2	Facebook	U.S.
3	YouTube	U.S.
4	TikTok	China
5	Messenger	U.S.
6	Instagram	U.S.
7	Snapchat	U.S.
8	foodpanda-Food Delivery	German
9	Gmail	U.S.
10	Google Chrome	U.S.

Note: Table created by the author based on the data from SimilarWeb (2020).

The base question that this research is concerned with is a very broad one: How is the Chinese BRI reshaping and challenging the US-led global-communication order? To materialize such a broad question into the limited scope of a capstone thesis, it needs a more specific case. Therefore, I chose Pakistan and infrastructure building as a research case. With this, my project aims to find answers to this research question: How is China reshaping and challenging the US-centered ICT infrastructure in Pakistan through the BRI?

I use a literature analysis approach to analyze data from policy documents, media articles, think-tank reports, industrial reports, and academic literature. The following content is based on my analysis of this literature. Through these analyses, I reveal China's strategy in ICT infrastructure construction while addressing the purpose and measures behind these projects, discussing the possibility of China's reshaping of

the global communication system and the potential imperialist tendencies built-in to the DSR.

Chapter 3.

Building all-weather communication channels

In the development communication approach, building fast, safe, and effective communication channels are a necessary way for long-distance communication, while a critical approach focuses on ownership and geopolitics. Both are relevant to communication channels. Just like the ancient Silk Road, there are not only goods circulating on this road, but also Eastern and Western cultures and technologies. Since the nineteenth century, these communication channels are no longer limited to physical roads but have evolved into various cables and radio waves. In 1851, the English Channel Submarine Telegraph Company laid the first submarine telegraph cable across the English Channel. British and other European empires were connected to various colonies by telegraph and submarine cables. These communication systems span the ocean and promote the colonial expansion of European imperialism (Headrick, 1981). During World War I, Britain shuttled down German submarine cables to destroy its communication capabilities, proving the importance of having this communication infrastructure (Mochinaga, 2020). Just like the shift in the core of the Western world, after World War II, these communication channels were shifted from being dominated by the United Kingdom to gradually being dominated by the United States. These cables gradually became optical cables for Internet communications, and radio waves began to include satellite connections. Today, the United States has formed a submarine optical cable communication network centred by itself. At the same time, more than 95% of the world's network traffic is transmitted through submarine optical cables. In satellite communications, the United States has 1,327 satellites, while China, which ranks second, has only 363 satellites (USC, 2020).

These all-weather communication channels constitute the lifeline of the current digital economy. All-weather means being able to connect at any time, place, and in all natural conditions. Since this lifeline is almost controlled by the United States and its allies, some problems have arisen: On the one hand, the U.S. has long been monitoring and stealing information flowing through these communication channels, which has brought huge security concerns to countries around the world. According to Edward Snowden's revelations, the United States even monitors the information of its allies to

provide information for its policies and economic decisions. On the other hand, this monopoly has also brought huge inequality of power in global communication in terms of access to and control over internet resources. Take China as an example, the number of submarine cables in the United States is 8 times and the per capita bandwidth is 20 times that of China; In Singapore, the number of submarine cables is double and the per capita bandwidth is 262 times that of China (CAICT, 2018).

A common critique against the BRI in Western media is that it is a plan to take over the U.S. as a superpower. Such as, that China is threatening the foundation of Washington's hegemony. Including economic, military and political foundations. China not only seeks to replace the United States in the Asia Pacific region but also tries to influence the entire Eurasian continent (see Cavanna, 2018). Other critiques are that the BRI provides the world with attractive development prospects and will change the global balance of power (see Sharma, 2019), and that the United States needs to actively intervene in the BRI, rather than resisting it and harming its own interests (see Khanna, 2019). Some of the observations of the BRI in these lines might be an exaggeration of what the BRI intends to be about. Philippine-based Marxist scholar Walden Bello (2019) makes it clear that:

The image that China is somehow bent on global hegemony with its Belt and Road Initiative is, I think, really off. The Belt and Road Initiative is not really a blueprint for Chinese hegemony, it is an effort to solve the overcapacity problem.

China, as a communist party ruled country with a capitalist market economy (although the Chinese government does not recognize itself as capitalist), has no better way to deal with industrial overcapacity and financial bubbles (Hung, 2015). Expanding overseas markets is the main response of the Chinese government. China's economic development has stagnated in recent years. The emerging ICT innovations and industrial developments are largely aimed at bringing new growth points to the stagnant economy. A similar observation may apply to the digital components of the BRI. The DSR is a crucial network to expand China's digital economy abroad to generate more surplus, not necessarily to challenge the US's global hegemony, but the competition is between who can reach there first and who can compete for more profit.

For China, if it wants to compete against or to join with the U.S.-centric global communications infrastructure network in the context of the BRI, the first step is to

establish independent communication channels. These autonomous channels not only mean the security of data, but also the increase of the amount of data transmission and the stability of communication as well as the reduction of communication delay. These factors are indispensable in the development of the digital industry. In the case of Pakistan, China is building communication channels in two aspects: optical cables and satellites. By building an all-weather communication channel, they are taking the first step to reshape and challenge the communication infrastructure network.

3.1. Optical fibre cable construction: terrestrial and submarine

Many trade routes in the BRI are designed to bypass US military blockades and interference. For example, the CPEC can help China effectively circumvent the Malacca, Sunda, and Lombok Straits. Historically, Malacca has always been China's only maritime route to Africa and Europe, but this strait is full of uncertainty. The United States has always emphasized the strategic position of the First Island Chain. As shown in Figure 2, this refers to the chain-shaped island belt from the Japanese islands and Okinawa islands in the north to the Philippines and the Greater Sunda Islands in the south. General MacArthur has called it an "unsinkable aircraft carrier". In fact, the United States' firm grasp of the "First Island Chain" in the past few decades has always been one of the most vigilant situations in China (Holmes, 2014). Since this island chain covers almost the entire coastline of China, all of China's current submarine cables need to pass through this sphere of influence of the United States. As shown in Figure 3, the network connection between China and almost all of the BRI partner countries, except for those that border China, needs to pass through the First Island Chain and through risky areas such as Malacca. (TeleGeography, 2020). This situation not only facilitates the monitoring and theft of data by the United States. In the event of a war, the United States can easily cut off most of China's transnational submarine cables. China would never want such a situation to occur.



Figure 2 First Island Chain

Note: The base map is from the Mapswire website. The blue line is drawn based on the information from Holmes (2014).

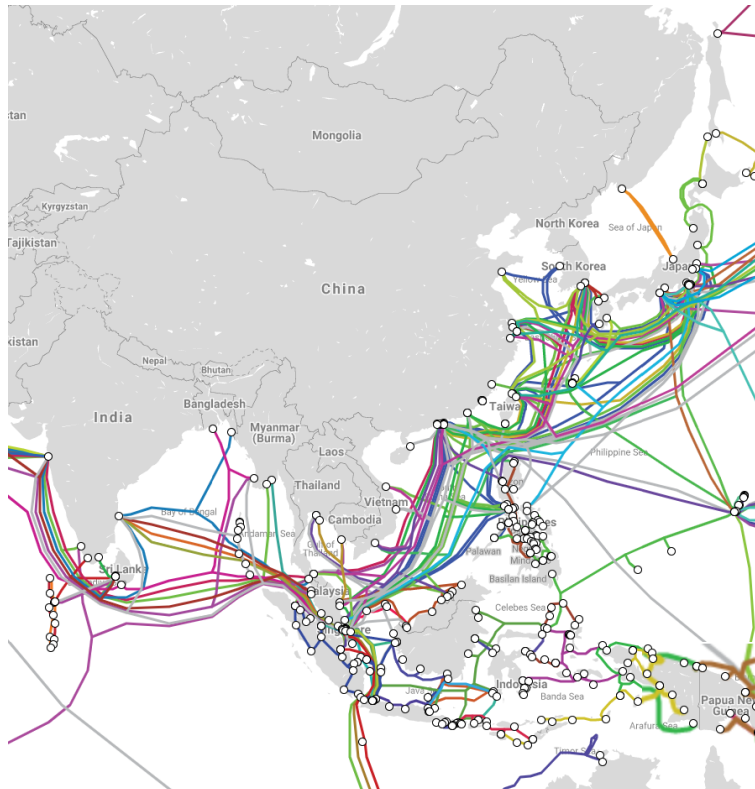


Figure 3 China's submarine cable, TeleGeography, 2020

For Pakistan, the connection to the international Internet is also very scarce. In 2017, due to some malfunctions, three of the six cables connected to the international Internet in Pakistan broke down, causing the country to experience a considerable period of network speed drop and disconnection (Siddiqui, 2017). These lines have only one landing station in Karachi, Pakistan. At the same time, because a consortium with Indian background had participated in the construction and operation of some submarine cables in Pakistan, some of its data needs to be transferred in India when entering and leaving Pakistan, causing the government of this country to also have concerns about data security (Shahid, 2017).

In consideration of the common interests of the two countries, under the BRI context, the Chinese government and enterprises, including state-owned enterprises (SOEs) and private enterprises, have carried out the construction of two fibre cable projects in Pakistan, namely the China-Pakistan Fiber Optic Project (CPFOP) on land, and the Pakistan & East Africa Connecting Europe (PEACE) project located in ocean.

The first phase of CPFOP has a total length of 822km, connecting Rawalpindi and the Khunherab Pass on the China-Pakistan border, with a 172km aerial cable as backup. As shown in Figure 4, this optical cable will pass through the city of Kashgar in western China to connect with the Internet in mainland China, thus providing Pakistan with the first land-based international network cable (Monitoring report, 2018a). CPFOP started construction on May 19, 2016, witnessed by Nawaz Sharif and Li Keqiang, the then prime ministers of the two countries. On July 13, 2018, the project was completed with a total cost of 44 million U.S. dollars, of which 85% of the funds came from a loan with an annual interest rate of 2% provided by the Export-Import Bank of China. The construction enterprise of the project is China's private enterprise, Huawei. The operators are China Telecom and the Special Communications Organization of Pakistan. China Telecom is one of China's three major telecom operators and an important state-owned enterprise (Rauf, 2019)

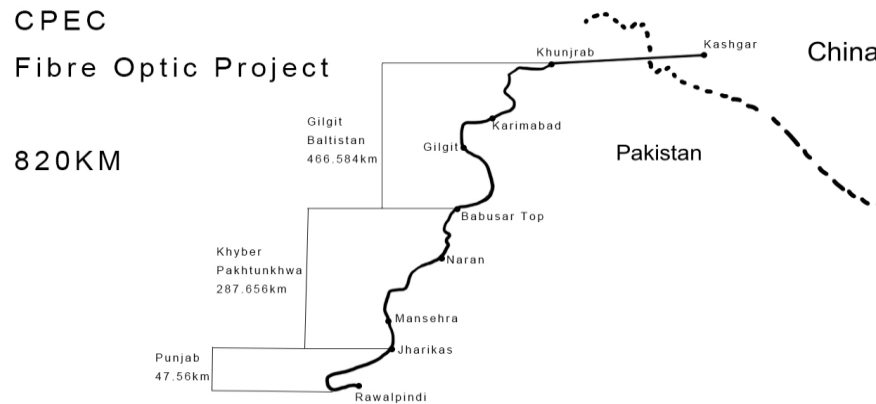


Figure 4 CPOFP map.

Note: The illustration is created by the author based on the data from Monitoring report (2018a).

On the surface, CPFOP is beneficial to both China and Pakistan. Through this cable, Pakistan can conduct stable, fast, and safe information exchange with China, and can also be connected to the Tans-Asia Europe cable located in China. For China, this cable is the beginning of the cable connecting the BRI partner countries. According to public reports in China, the total length of this line is 2950km. The second phase will connect Rawalpindi to Gwadar Port and Karachi, where it will be connected to another project under construction in China, PEACE, thus greatly shortening its network connection distance with Africa and Europe, especially the network connection distance of some BRI-partner countries (Taneja, 2019). At the same time, the important position of the Gwadar Port in the entire BRI strategy and its goal of building an intelligent port will also help China better control the operation of this port.

The Gwadar Port would reduce the distance between western China and usable ports by thousands of kilometres while eliminating the dangerous and time-consuming route through the Strait of Malacca for much of the Middle East's oil. The Gwadar Port also has potential military uses, and has possibilities for becoming a naval base in the future (Ritzinger, 2015). While the Chinese government and media have been silent on the implications, China's ambitions can be seen in some expressions. In a press release from China Telecom (2018), it can be seen that “CPFOP is a new strategic corridor for China to the Middle East and Africa and the key to the construction of the CPEC.”

However, for Pakistan, this project may be a double-edged sword. On the one hand, through this fibre optic cable, China can exert greater influence and even control

over Pakistan's domestic politics, economy, and culture, which has the potential to evolve into a new type of colonialism. The construction of this fibre optic cable has been laid alongside China's energy and transportation projects in Pakistan. This decision shows that China wants to increase the control of these projects through this cable, and also wants to promote the export of Chinese goods and technology through this communication network (Shen, 2018). For the Gwadar port, one of the cable's destinations, China can use this network to monitor port operations in almost real-time, even if this port has not been leased by China for 99 years like the Hambantota port in Sri Lanka. In terms of control strength, however, there is no difference. Digital colonization may already be taking place before actual colonization. In fact, the accusations of colonization of the BRI and CPEC have never stopped. On the other hand, is it possible for the Pakistani government to use this more stable and effective communication channel to strengthen its control and violation of domestic democracy? Pakistan's government has always taken a repressive attitude towards freedom of the press and speech, and they have been particularly strict with public opinion on the CPEC. This project may not promote the free flow of information as the NWICO movement envisions, but brings forth a counterproductive effect. It might primarily benefit the online consumption of the 'mythical middle class' and the ruling elites of certain ethnicities while marginalizing and dispossessing others (Akhtar, 2018).

From the perspective of challenging and reshaping the global communication infrastructure network, the network provides both China and Pakistan with a new, de-Americanized international communication channel. High-bandwidth and low-latency cables like those in the CPFOP will make it easier for Chinese digital companies to expand their businesses in the BRI partner countries. They can connect with their headquarters in China through these cables but do not need to worry about unstable connection and insufficient bandwidth. In the past ten years, Google has spent tens of billions of dollars in building its own exclusive multinational cable to connect its data centers around the world (Table 3). Most Internet giants in China do not have such a wealth of funds for such infrastructure building. Cables like the CPFOP will be their first choice when expanding globally. Of course, this effect will be fully realized only when the CPFOP successfully connects to the Gwadar port and Karachi and connection to PEACE is completed.

Table 3 Submarine cables owned by Google

Cable Name	RFS Time	Connecting Region
Curie	2019	U.S. & Chile
Havfue	2019	U.S. & Ireland & Denmark
HK-G	2019	Hongkong & Guam
Indigo	2019	Singapore & Indonesia & Australia
PLCN	2019	Hongkong & Laos
Tannat	2018	Brazil & Uruguay
Junior	2018	Rio de Janeiro & Santos
Monet	2017	U.S. & Brazil
Faster	2016	U.S. & Japan & Taiwan
SJC	2013	Japan & Hongkong & Singapore
UNITY	2010	U.S. & Japan

Note: Table created by the author based on the Sawers (2019).

PEACE is a submarine optical cable connecting Pakistan, Africa, and some European countries. According to the plan, the first phase of the project will connect Pakistan (Gwadar and Karachi) with Djibouti, Somalia, and Kenya, with a total length of 6,200km (PEACE, n.d.). The second phase of the project will be extended to South Africa, Egypt, and France, and the final length will reach 12,000km (Dawn-Hiscox, 2018). It can be seen from Table 4 that the bandwidth of this cable will reach 60Tbps, which exceeds all current international submarine cables in Pakistan and almost doubles Pakistan's international bandwidth. This project was originally planned to be completed in the first quarter of 2020, but according to PEACE's official website, the project is currently progressing to "wet plant manufacture & integration of PEACE cable system delivering in advanced stages", and while 90% of the marine survey has been completed, It will be fully finished in the first quarter of 2021 (PEACE, 2020)

Table 4 Pakistan's existing and building submarine cable

Cable Name	Design Capacity
TW1	1.28Tbps
Sea-Me-We-3	480Gbps
Sea-Me-We-4	1.28Tbps
Sea-Me-We-5	24Tbps
I-ME-WE	3.86Tbps
AAE-1	40Tbps
PEACE	60Tbps

Note: Table created by the author based on multiple sources.

The total population of countries in Asia and Africa that are connected by PEACE exceeds 2 billion. This submarine cable, which has high expectations in the BRI, will cooperate with the CPFOP mentioned in the previous section and the existing optical fibre networks in China and Pakistan to achieve the goal of directly connecting China's western region with Europe and Africa. As mentioned previously, all submarine cables from China to Europe are routed through Hong Kong-Singapore, and a single route brings great uncertainty. If a natural disaster or an artificial cut-off occurs for some reason, the Internet connection between China and Europe and Africa will almost collapse. PEACE not only has high bandwidth but also provides lower latency because of its direct connection from China and fewer transit points (Jiang, 2018). This feature is closely related to the 5G and IoT technologies that China is striving to develop. These technologies have fundamental requirements for low-latency and high-bandwidth networks.

In addition to high speed and low latency, this system has another feature that is different from existing international cables in Pakistan and Africa: Open access. Compared with the cables invested and operated by telecom companies, this system is owned and operated by PEACE Cable International Network Co., Ltd. According to the company's CEO Xiaohua Sun:

PEACE...has created a new business model in the submarine cable industry...PEACE is positioned as an open system, so it could be adapted with any supplier and with the new technologies introduced to the market. The updated would be defined by the market demand and need with a more flexible process compared to the consortium cable system" (PEACE, 2018).

This open-access feature allows PEACE to provide more flexible and cost-effective services. It meets the needs of the main audience of the emerging markets in Asia and Africa and is also one of its main advantages. For this type of market, rapid demand upgrades and small budgets are the main characteristics.

As mentioned above, this project has undergone a quiet postponement, and the currently planned ready-for-service time is the first quarter of 2021, but this may still be an optimistic estimate. According to Seychelles media reports, PEACE will land in Seychelles in July 2021 (Telecompaper, 2020). On the one hand, this delay is due to the obstacles caused by Covid-19. On the other, it may be related to the competition

between the United States and China in the construction of submarine cables in the past few years.

Since 2012, the United States has been competing with China for the opportunities to build submarine cables, especially against Huawei Marine, a subsidiary of Huawei. Huawei Marine was established in 2008 and was jointly funded by Huawei and Global Marine Group. Before 2019, Huawei held 51% of the shares and Global Marine held 49%. Global Marine is a private British company and holds an important position among the world's submarine cable companies (Qiu, 2020). The United States and some of its allies regard these cables built by Huawei as part of China's strategy to increase its global influence by building telecommunications infrastructure and exporting digital technology. General William Mayville claimed that "This is another victory by which Huawei gets into the infrastructure of another country." (Page et al., 2019). The U.S. government always claimed that in projects such as PEACE, Huawei and the Chinese government will be able to easily use the landing stations of those underdeveloped countries to monitor data flow. This is actually the same as Snowden's claim that the United States has been monitoring submarine cables. Although Huawei has always insisted that it is a private company and is willing to submit all its equipment and technology to a third party for review, just like its 5G technology, the United States and its allies insist that it is controlled by the Chinese government (Page et al., 2019).

Although the United States has not produced actual evidence to prove its accusations against Huawei so far, these blocks have indeed affected Huawei's business. In 2019, Huawei sold all its shares in Huawei Marine to Hengtong Optic-Electric Co., Ltd, another private optical cable company in China (Bloomberg News, 2019). The remaining 49% of the shares held by Global Marine will also be acquired by the Hengtong group in phases in 2020 (Qiu, 2020). Huawei actually withdrew from the submarine optical cable construction business, which is regarded as one of the businesses that Huawei was forced to abandon due to obstruction from the United States. In the construction of PEACE, Huawei Marine was originally one of the main builders and investors, but in 2018, PEACE Cable International Network Co., Ltd was jointly funded by the Hengtong group and PCCW Group located in Hong Kong, China. This company is fully responsible for the construction and future operations of PEACE (PEACE, 2018).

PEACE still has a year to complete, and the second phase of the CPFOP is still being negotiated (Bhutta, 2020). At the level of fibre optic cable construction, although China has challenged the U.S.-centric infrastructure network and has received responses from its opponents, its specific results have yet to be tested. In contrast, China has made more progress in satellites as another important communication channel.

3.2. Satellite communication: BeiDou Navigation System

Over the past two decades, China has invested \$10 billion USD in the BeiDou Navigation System (BDS), and finally launched the last satellite of the project in June 2020, completing the constellation construction (Woo & Gao, 2020). The BDS is an alternative to the United States-owned GPS navigation system. It is regarded by President Xi as "One of the great achievements in China's 40 years of Reform and Opening-up" and is an important achievement of its Indigenous Innovation policy (Sloane, 2020). According to an official from the Chinese Academy of Sciences - China's national scientific institution - "No component of the BeiDou satellite is imported from abroad" (Feng & Li, 2019).

Pakistan is the fifth country in the world to use the BDS, and it is also the only country in the world that has full access to the BDS, both for citizen and military use (App, 2020). As early as 2013, Pakistan adopted this system owned by China and built a ground station that can improve the system's location accuracy in South Asia and the Indian Ocean (AFP, 2013). Pakistan used the BDS to carry out geographic surveying and mapping, land management, fishery management, and aviation and port management in its own country with lower cost and higher efficiency. The time service application of the Islamabad International Airport information system based on the BDS built by UniStong, a private Chinese company in Pakistan, is one of the most excellent application cases of the BDS (CSNO, 2018). In the consumer market, more than 70% of Chinese mobile phones currently support the BDS, while in Pakistan, the market share of Chinese mobile phones is more than 30%. Users of Chinese-brand mobile phones have naturally become users of the BDS, however, the changes brought to Pakistan by the military application of the BDS will be discussed later in the article.

Although the BDS is an alternative to GPS, in the civilian field, the competitive relationship between the two is not significant because in civil facilities, most manufacturers tend to produce "multi-constellation" receivers. This kind of equipment can receive all GNSS signals and switch the system used automatically according to the signal strength (Wilson, 2017). At the same time, although the BDS can provide services with higher accuracy than GPS and other navigation systems in the Asia-Pacific region, and can provide services with the same quality as GPS globally, the industries that China can develop in the BDS industry chain are currently all downstream industries. As shown in Table 5, in the upstream industry of navigation systems, the top 10 companies in the world are currently non-Chinese mainland companies (Chen, 2019). For the navigation system industry chain, the upstream industry refers to receiver chip manufacturing and the downstream industry uses chips for product integration and application. Because of China's current backwardness in semiconductor technology and the technological blockade of China in this regard by the Western world, it is difficult for China to occupy the market in the upstream industry for the time being (Lewis, 2020).

Table 5 Top 10 global manufacturers of satellite navigation devices in 2018

Company	Country (Region)	Revenue of 2018 (Billion USD)
MTK	Taiwan, China	355.9
Qualcomm	U.S.	227
Broadcom	U.S.	209
Texas Instruments	U.S.	157.8
STMicroelectronics	Switzerland	96.6
Rockwell Collins	U.S.	86.7
Hexagon	Sweden	33.8
Garmin	U.S.	33.5
Trimble Navigation	U.S.	7.9
U-blox	Switzerland	4.6

Note: Table created by the author based on the data from Chen (2019).

Nevertheless, China has also given the BDS more abundant application scenarios. The joint application of new technologies such as BDS & 5G, BDS & Data, and BDS & Internet of Vehicles are all reflected in China's industrial planning (CAICT, 2019). The BDS's extraction and control of data, makes a platform. The platform generates and depends on "Network Effects": The more people that use a platform, the more valuable the platform is to everyone else (Srnicsek, 2017). China has used the BDS in projects such as smart ports, smart grids, and smart cities, which will be analyzed later in the context of Pakistan (Xinhua, 2018). These applications show that China is

using the network effects of the BDS platform. Not only will these projects themselves use a large number of Chinese BDS products, but they will also drive other similar projects in Pakistan to use these products for technological upgrades. Although China can only produce downstream products in the industry chain, with the government's BRI-based financial support and tax relief for these companies, China's satellite navigation industry will still share more benefits than the U.S.-led market (Wilson, 2017). It is predicted that in 2020, China's satellite navigation industry will grow to a scale of approximately \$28.5 billion USD (G. Li & Yang, 2019). The global scale of this industry is \$176.8 billion in 2019 (GSA, 2019). It should also be noted that although China is now unable to produce competitive upstream products due to the backwardness of semiconductor technology, in the past two decades, China has been investing a lot of resources in the research and development of core technologies. Its indigenous innovation policy has allowed it to reach the upstream of the industrial chain in multiple technological fields. What is certain is that China will not be willing to wander at the bottom of the satellite navigation industrial chain (Zhao, 2010).

By building fibre optic cable and a satellite network, China has established an all-weather communication channel in Pakistan. Whether it is cable or satellite, it is not just a communication channel between China and Pakistan, but a communication channel between China and all BRI partner countries. Pakistan plays more like a hub and an intermediary. Like the Gwadar Port, Pakistan has become a port of information and data in the current stage of China's ICT infrastructure construction. The second way for China to reshape the U.S.-led ICT infrastructure in Pakistan is to use these channels to extract and control data in Pakistan.

Chapter 4.

Extracting and controlling data

As Srnicek (2017) noted, after experiencing a decline in manufacturing profits, capitalism uses data as one of the important ways to stimulate economic growth and improve the efficiency of the production sector. Data is to the digital economy as the value of oil is to traditional manufacturing. The Chinese government and ICT companies have also realized the importance of data to the digital industry. In 2016, the State Council issued the "13th Five-Year Plan for National Informatization", proposing to implement the national big data strategy, use big data as a basic strategic resource, fully implement the promotion of big data development actions, and help the industrial transformation and upgrading and social governance innovation (State Council, 2016). In 2017, at the Belt and Road Forum, President Xi formally proposed to build the Digital Silk Road, expressing the need to promote the development of industries such as big data, cloud computing, and smart cities in the BRI-partnering countries (Xi, 2017).

Oil needs refining to become a resource that can be used, and data also needs to be "refined" in some ways. The collection of data is dependent on vast infrastructure to sense, record, and analyze it (Srnicek, 2017). The infrastructure for extracting this resource is the sensor, and the infrastructure for controlling this resource is the data center. In these infrastructures, the United States still in a dominant position. As shown in Table 6, there are currently seven US companies among the top ten data center companies, accounting for 31.6% of the global market. As for those Internet giants, they are building their own data centers (Harvey, 2017). Google has 36 data centers around the world which are connected to each other through submarine optical cables owned by Google. According to a document released by Wikileaks in 2018, as early as 2015, Amazon had 89 data centers distributed around the world (Hardesty, 2018).

Table 6 Top 10 data center companies

Company	Country (Region)	Market Share (2017)
Equinix	U.S.	9.5%
Digital Realty Trust	U.S.	5.7%
China Telecom	China	3.3%
CenturyLink/Cyxtera Technologies	U.S.	2.1%
China Unicom	China	2.1%
Verizon	U.S.	1.9%
DuPont Fabros Technology (DFT)	U.S.	1.9%
Level 3 Communications	U.S.	1.8%
CyrusOne	U.S.	1.7%
Interxion	Netherlands	1.6%

Note: Table created by the author based on the data from Harvey (2017).

To match with this infrastructure network, China has expanded in both extracting data and controlling data. As several studies have identified, in the international business of the Chinese Internet giant Alibaba, extracting data is its core strategy. A large amount of data supports the development of its emerging technologies such U.S. artificial intelligence and cloud computing. By using this data extraction and connection technology, Alibaba links the Malaysian small and medium-sized enterprises with consumers and their Chinese counterparts (Vila Seoane, 2020). The Chinese government has adopted a "local storage, outbound assessment" policy for cross-border data flows. This policy is based on technological nationalism and the Holistic National Security Concept, in order to protect industrial interests, maintain national security, and promote the development of local technology (Liu, 2020). In Pakistan, China is developing its own IoT industry and building "smart" projects on the one hand, and on the other hand, is cooperating with local entities to build data centers.

The Internet of Things (IoT) is the concept of connecting any device (so long as it has an on/off switch) to the Internet and to other connected devices. The sensors built into these IoT devices will constantly generate new data, and the IoT platform integrates and analyzes the data to make judgments and feedback on the device (Clark, 2016). China is currently a global leader in this industry. This is largely due to the fact that China itself has the world's largest IoT market. The number of IoT devices connected through cellular networks has reached 960 million units in 2019 (GSMA, 2019). Now, China hopes to further occupy the international IoT market. In "Made in China 2025", the goal of developing IoT technology was clearly put forward, showing China's ambition to

integrate traditional industries through ICT technology (Arcesati et al., 2020). In 2018, many Chinese technology companies expressed their willingness to develop the IoT industry in Pakistan and provide technological upgrades for Pakistan's finance and transportation. The main players are Jumore Holdings Group and Megvii Technology. The former is an e-commerce and e-finance company, and the latter is a company good at image recognition and artificial intelligence technology (Monitoring Report, 2018b). In 2019, Pakistan released the Gwadar Smart Port City Master Plan, which was developed by the Chinese Fourth Harbour Design Institute (CPEC Secretariat, 2019). Under the CPEC framework, China has built a number of smart projects in Pakistan, including smart ports, smart cities, and smart grids. These smart projects rely on ubiquitous sensors to collect data and then conduct smart operations.

China also participates in Pakistan's data center industry. On the one hand, companies such as Huawei and ZTE provide equipment and technical support for data centers in Pakistan, and on the other hand, they also cooperate with local companies or governments to establish joint venture data centers. In 2016, Pakistan's state-owned National Telecommunications Corporation (NTC) announced its cooperation with Huawei to build the country's first National Data Center. This data center will host government data and applications to serve the country's e-government services. Currently, the data center is already providing services (Mah, 2016). In 2019, Huawei and Airlink Communication, a local company in Pakistan, signed a memorandum of understanding (MoU) for the building of a cloud data center in Pakistan. The main service target of this center is Pakistan's media and financial industry (Moss, 2019). The construction of such data centers can serve Pakistan's local enterprises on the one hand, and on the other hand, can also provide custody for the data of Chinese Internet companies that are expanding in Pakistan. For these Chinese companies, storing their data in local data centers operated by Chinese capital is a safer and more efficient choice.

The construction of infrastructure for extracting and controlling data is currently one of the most important ICT infrastructure constructions in China. Both IoT and data centers belong to what the Chinese government calls "new infrastructure". In May of 2020, Premier Li delivered a Report on the Work of the Government 2020 at the National People's Congress, stating that China will "step up" the construction of new infrastructure (Li, 2020). This move is seen as the Chinese government's response to

the post-Covid recession. It is easily reminiscent of the "Four Trillion Plan" during the 2008 global financial crisis where the Chinese government invested four trillion yuan to stabilize the economy, and a large part of this money was used for infrastructure construction. However, this plan has brought serious industrial overcapacity problems. In fact, one of the important purposes of building the DSR is to eliminate China's overcapacity. Nowadays, large-scale investment flows into infrastructure construction again. Although it is ICT infrastructures this time, the results are still unclear. The history of digital capitalism since the 1970s has proved that although ICT has become a key player in economic development and can temporarily improve production efficiency and stimulate consumption, it cannot really solve the core forces of capitalism exploitation, commoditization, and inequality. This is an inevitable contradiction in the logic of capitalist development that China embraced since the market-liberalization. As China still has a serious problem with industrial overcapacity, can today's large-scale investment stabilize the economy while avoiding greater overcapacity? Private digital companies will be the main participants in the new infrastructure, but how can they hope that capitalism can solve exploitation and inequality? Will the BRI partner countries face a similar crisis due to the expansion of the DSR? Answering these questions will require further studies in future as it might take decades to reveal what social relations have been reshaped due to other external factors as well.

For China, maintaining the trend of globalization and continuing to opening-up in a relatively peaceful and stable international environment are important conditions for continued economic development (Huang, 2020). The BRI's priority target is "emerging markets." In the face of Western hostility and blockade, China can only continue to seek opportunities in these emerging markets. For these markets and countries, due to economic backwardness and political instability, social security problems and regional stability problems are two of the main challenges China faces. China faces the same situation in Pakistan. Therefore, in order to obtain opportunities for sustainable development, maintaining the safety and stability of the social environment in the BRI regions is China's third step.

Chapter 5.

Militarizing a secure and stable social environment for ruling elites

In 2015, China and Pakistan signed the Long-Term Plan for the China-Pakistan Economic Corridor, which is regarded as a CPEC guidance document and covers development goals until 2030. In response to public doubts about the transparency of the CPEC, CPEC released a shortened version of this document in 2017. Although many details have been omitted, this version still highlights the risks and challenges that CPEC may face. The most important risks are politics and security (Husain, 2017).

There are various factors affecting Pakistani politics, such as competing parties, religion, tribes, terrorists, and Western intervention... The security situation is the worst in recent years” (CPEC Secretariat, 2017).

Ritzinger (2015) believes that the CPEC faces obstacles. On the one hand, it comes from the insecurity and political instability within Pakistan. On the other hand, it comes from U.S. intervention in the changing regional situation based on its own interests. Therefore, for China, helping the Pakistani authorities maintain a safe and stable social environment is a necessary condition for Chinese capital and Chinese companies to achieve sustainable development in the local area. The development of China's ICT infrastructure is both a method and a result of achieving this goal. Analyzing this approach in China requires both micro and macro aspects.

At the micro-level, China has helped Pakistani authorities better monitor terrorism and criminal acts in its territory by promoting the construction of Smart City in many cities in Pakistan. One of the cores of Smart City construction is "Safe City". The Skynet system established by China in the domestic area is part of Safe City. By 2019, the Skynet system will have 200 million surveillance cameras in mainland China. China also wants to help Pakistan establish systems like Skynet. In the Long Term Plan, China stated that it hopes to help prevent terrorism and criminal acts through sophisticated monitoring, smart alert systems, and visual command and dispatch (CPEC Secretariat, 2017). After 9/11, Pakistan was deeply poisoned by modern terrorism. The Musharraf government chose to help the United States in the war on terrorism, which made Pakistani soldiers and civilians the targets of terrorist organizations. Although the

situation improved slightly after 2014, suicide terrorist attacks still exist. There have been several incidents in which employees of Chinese companies or Chinese citizens were kidnapped or even killed by terrorist organizations in Pakistan. For example, in 2017, a Chinese couple was kidnapped and killed by ISIS in the Balochistan province. (Hussain, 2019). Protecting the interests of Chinese citizens and Chinese companies has become one of the excuses and motivations for China to promote the construction of these ICT infrastructures in Pakistan. The Safe City project that China helped Islamabad complete has already started operation in June 2018. The project includes 1,800 surveillance cameras, and the Minister of Interior Nisar comments on the effectiveness of this system, that “This is true policing, where every corner of Islamabad can be seen on camera”. As shown in Table 5, similar projects are still being completed in cities such as Lahore and Karachi (Haque & Siddiqui, 2019).

Table 7 Project list of Safe City in Pakistan

Project Location	Cost (million USD)	Number of Surveillance Cameras
Islamabad	124	1800
Punjab	72	8000
Karachi	60	10000
Quetta & Gwadar	60	1865

Note: Table created by the author based on the data from Haque and Siddiqui (2019).

The Chinese government has more than one reason to build these projects in Pakistan, but even protecting the safety of Chinese citizens and capital in Pakistan is not the most important reason. More importantly, China hopes to bring stability to its western border provinces, especially Xinjiang, by helping or forcing Pakistan to combat terrorist acts. Elements of China's own Muslim Uyghur insurgency in its westernmost Xinjiang Uyghur Autonomous Region are reportedly tied to extremist networks in Pakistan and use the country's lawless western regions as a base of operations (Ritzinger, 2015). Recently, Western societies have strongly attacked China's human rights issues in Xinjiang and elsewhere. Chinese central authorities insist that the surveillance system and "Vocational Education and Training Centers" established in Xinjiang are for counterterrorism and de-radicalization (Xinhua, 2018). Whether the Chinese government is violating the human rights of the Uyghurs or whether Western society is condoning terrorism in Xinjiang is beyond the scope of this study, but it is sufficient to point to the fact that the stability of this region is crucial in protecting China's strategic cross-border investments. A prominent Pakistani Sinologist Zamir Ahmed Awan (2020) stresses that

Xinjiang is the gate of the BRI in China, and it is also the key region that China wants to develop through the BRI. Only by maintaining a stable rule in this region can the BRI strategy succeed. In the government's account, in the past two decades, most of the terrorist attacks that have caused large casualties in China have been supported by terrorism from Xinjiang (CGTN, 2020). This has given China an incentive and an excuse to push or force Pakistan to fight terrorism. For these reasons, Safe City project investors, whether in Pakistan or China, are largely either the government or the military. This is also in line with the law that the development of the ICT industry depends on government and military sector investment (Schiller, 2011).

One must acknowledge that any smart city project is a gateway for potential authoritarian misuse of surveillance if it is not protected by the citizen's democratic and individual privacy rights (van Zoonen, 2016). The DSR-built smart cities enable further military surveillance to contain legitimate dissents. So far, the world is facing the risk of the pandemic. To control the spread of the virus, smart cities or similar technologies are being adopted by authorities of various states, including by authoritarian governments, such as China, as well as several governments that are known to be democratic, such as South Korea and Singapore. These technologies are currently proven to be effective for Covid-19 contact tracing. After an epidemic emerged in a public market in Beijing, China used big data technology to isolate thousands of people in two days (Cai, 2020). This kind of digital surveillance may continue to be implemented for several years for the pandemic, and even when pandemic ends, authoritarians of various countries may become accustomed to this kind of surveillance and find ways to extend it. We need to remain concerned about the control instincts of these authorities (Foncillas, 2020). At the same time, even if the government can guarantee respect for citizens' privacy, private companies that implement this technology may not. If these surveillance data are seen as corporate resources rather than public resources, it will exacerbate the emergence of digital and data colonialism. A wider range of personal data will be the resource for business and political purposes (Mejias & Couldry, 2020).

When researching Pakistan's military sector's investment in China's ICT, we entered macro-level research. For Pakistan, the biggest imaginary enemy is the military in India. In South Asia, after the Partition of India in 1947, regional stability has always depended on the fragile strategic balance maintained between India and Pakistan. The armed forces of the two countries have always been on guard against each other and

maintained their balance by continuously purchasing advanced weapons. Although Pakistan has maintained a weapons purchase relationship with China in the past decades, and China has even supported Pakistan’s nuclear weapons program, Pakistan has never given up on purchasing advanced weapons from the United States. Since 1948, Pakistan has successively served as the frontline of the U.S.-supported anti-Soviet war and the frontline of the war on terrorism, and has obtained a large number of advanced weapons from the U.S. However, when the United States decided to end the war on terrorism and turned to support India, Pakistan began to lose the opportunity to obtain weapons from the United States (Akhtar, 2018). In response to this situation, Pakistan began to import more and more advanced military technology from China, and China is also willing to arm the Pakistani army with its own equipment. As shown in Figure 5, Pakistan is currently the largest purchaser of Chinese weapons including JF-17 fighters, A-100 multiple rocket launchers, VT-1A tanks, etc. (Gao, 2020) and China is also the largest supplier of Pakistani weapons (Pubby, 2019).

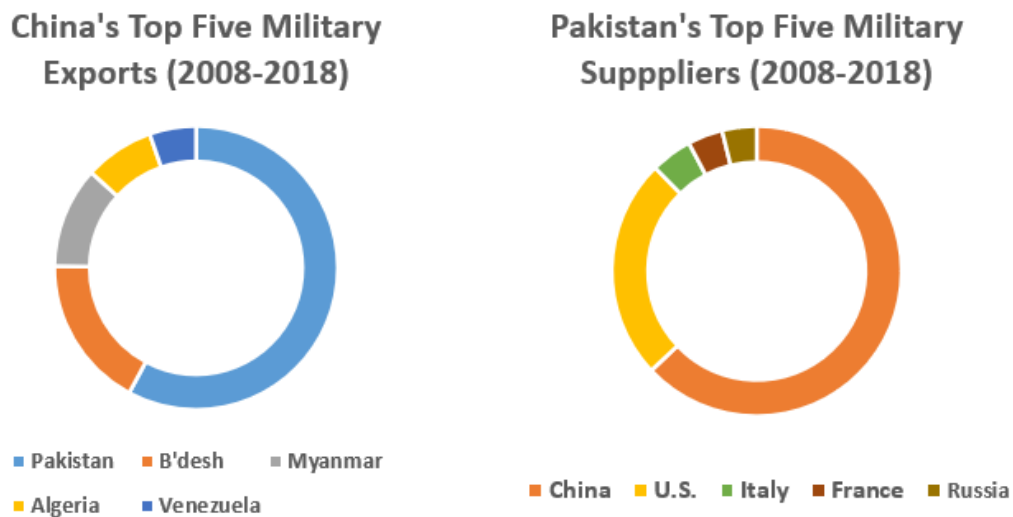


Figure 5 China and Pakistan’s arms trade data.

Note: Illustration created by the author based on the data from Pubby (2019).

This military relationship is not only limited to the trading of certain types of weapons but also includes the use of China's ICT technology to upgrade Pakistan's military communication. One of these upgrades is the replacement of U.S.-based GPS by the BDS. Techno-military competitions like this create geopolitical tensions between the US and China that extends to other areas such as cultural and diplomatic ties.

In 2014, the BDS covered the entire territory of Pakistan. As the only country in the world that has obtained full access to the BDS, Pakistan is the first country to import BDS equipment for military purposes (AFP, 2013). In a technical thesis in 2013, Pakistani scientists demonstrated the performance comparison of the BDS and GPS on Pakistani navy vessels (Mubarak & Dempster, 2013). Currently, Pakistan's fighter jets and cruise missiles use the BDS for positioning and navigation. Compared with civilian positioning systems, it has greater exclusivity in the selection of military positioning systems, which is a result of its higher safety requirements. Regarding the reason for the switch to BDS, a Pakistani official stated that Pakistan cannot trust the United States, "Pakistan's armed forces cannot rely on US GPS because of its questionable availability during a conflict that has overtones of nuclear escalation" (Web Desk, 2020).

The initial motivation for China's research and development of the BDS also came from the same concerns. In the First International Symposium on Precise Positioning with the Global Positioning System held in Washington, the U.S. in 1985, the U.S. government stated that in the face of national emergencies, it would use methods such as reducing accuracy, changing codes and restricting regional use to serve national security (Bossler & Challstrom, 1985). Qingjun Bu, a Chinese military technician who participated in this meeting, believes that if China's military navigation and positioning relies on GPS, it may harm China's interests in the war. Under his impetus, the Chinese military officially proposed the BDS plan in 1994 and started the 26-year construction process of the BDS. Bu also became one of the generals of the Chinese People's Liberation Army in 1994 (Yang, 2010).

The construction of the BDS promoted by military demand is reminiscent of the military-industrial system in the development of the U.S. ICT industry. The establishment of the American telegraph system was largely based on military needs during the Civil War from 1861 to 1865. After World War II, digital computers were planned to continue to develop with the support of the U.S. military. The surge in the transistor, integrated circuit, and microprocessor markets also originated from current and future military applications (Schiller, 2018). Today, the U.S. Department of Defense has invested more in IT technology than any US Internet giant (Schiller, 2011). This is what Melman calls, "the permanent war economy" (Melman, 1974).

China uses the war economy to help Pakistan upgrade their military, but China does not really want to provoke a war in South Asia, at least for now. As I said before, what China seeks is to maintain stability in South Asia. Its military support to Pakistan is to maintain the balance of India-Pakistan military power, not to help Pakistan prepare for a war against India. In 1971 when the West and East parts of Pakistan broke into a deadly war, neither Beijing nor Washington were willing to directly support the actions of the Pakistani army. Eventually, the war led to the birth of Bangladesh (Akhtar, 2018). In 2017, Chinese Ambassador to India, Chaohui Luo, bluntly expressed the view of "China First", stating that China seeks to maintain friendly relations between Pakistan and India at the same time, and strives to help the two countries ease their conflicts (Editorial, 2017). From the perspective of trade data alone, the total value of trade between China and India in 2019 was approximately \$92.8 billion USD, and the total value of China's trade with Pakistan was only \$17.9 billion USD (Ministry of Commerce, 2020a, 2020b). Although China maintains an "all-weather strategic partnership" relationship with Pakistan, it never wants to lose India as an important trading partner. Even if a conflict broke out between China and India on the border, China will try to maintain low-key restraint, and will not support the outbreak of war between Pakistan and India.

Chapter 6.

Discussion

China has used the above three methods to challenge and reshape the U.S.-centered ICT infrastructure. While the results of these attempts still need to be further researched, I want to continue to discuss this question: How far along can China go in constructing a new global communication order with the DSR?

The answer to this question is jointly decided by China and the United States. On the one hand, so far, the United States still dominates the global communication order, and will not just let China challenge it. But on the other hand, is China willing to bring about a new global communication order? Or does it want to replace the United States more and become the ruler of the existing order?

Although China's ICT industry has begun to occupy a leading position in some core technology fields in recent years, and some Chinese platforms have begun to gain attention worldwide, On a broader scale, the United States still dominates the world ICT order. This dominance is in two aspects. On the one hand, the United States still leads the world in most of the core ICT technology fields. The most notable point is semiconductor technology. Semiconductor technology is almost a necessary technology for the production of all high-tech, value-added ICT equipment. In this regard, China is in the downstream of the industrial chain. The United States accounted for 47% of global semiconductor revenue in 2019, and mainland China only accounted for 5%. The growth points of semiconductors in future applications include AI, quantum computing, 5G, IoT, and smart cities. These are all areas where China wants to occupy the market in ICT (Yinug, 2020). As long as China does not achieve breakthrough development in semiconductor technology, even if China occupies a major position in these ICT infrastructures, it will still need to pay very high semiconductor import costs to the United States. Technology leadership is the foundation for the United States to dominate the ICT industry, whereas the Chinese firms face a greater uncertainty, more so due to the Covid-19 pandemic as well as trade wars. For instance, Hon Hai Precision Industry (which is known as Foxconn) has planned to split its supply chain in China, and move more of its factories to South-east Asia and other regions. This company is always seen

as an example of China as the “world’s factory” (Wu, 2020). On the other hand, the US Internet platform still has an overwhelming monopoly in the world. The development of China's Internet platform is largely due to China's network great wall. In the past ten years, most of the mainstream international platforms have been unable to conduct business in China, which has given Chinese local companies a chance to develop. Nowadays, although Chinese local platforms want to open up to the international market, they are also facing an already mature market system, and it is difficult to expand. With the “network effect” that was previously mentioned, FAANG, which has already occupied the market, hardly has to worry about the loss of market share. Take Pakistan as an example. Despite the CPEC and China's ICT infrastructure, Chinese Internet platforms have also begun to expand their business in Pakistan. But so far, in the search engine field, Google’s market share in Pakistan is still 98.22%, and in the social media field, Facebook’s share in Pakistan is 91.67%. Except for TikTok, Chinese Internet platforms have almost no market share in Pakistan (Statcounter, 2020a, 2020b).

In regards to ZTE, Huawei, and TikTok, which are successful Chinese ICT companies in overseas markets, the United States has just ignored them until now. In the international market outside the United States, despite the great development of China's digital platforms in the past five years, the U.S. platforms are still dominant. Before June, China's Apps have taken the lead in India, the largest emerging market so far. Among them, TikTok ranks first (Sheehan, 2020). However, in June, India blocked 55 apps including TikTok, and in July, India blocked another 47 apps. This means that Chinese Internet companies have lost all of the Indian market almost overnight (Pham & Gupta, 2020). Although these bans are considered by some to be derived from the tensions between China and India at the border, we must also see that in the past six months, Facebook acquired India’s largest mobile operator Jio Platforms 9.99% for \$5.7 billion USD (Pham, 2020). Google announced that it will invest \$10 billion USD in India in the next five years (Swarajya, 2020). The forced withdrawal of China and the active entry of the United States will enable the U.S.-dominated platform to gain a stronger network effect in India and will change China's short-term advantage in this emerging market. The further expansion of these platforms in India will also make the entire South Asia region more dependent on these U.S. platforms. From the review of ZTE and calling on the world to block Huawei, to forcing TikTok to sell its U.S. business, the United States only uses the two interfaces of intellectual property and national security,

which has made China's ICT internationalization difficult. In fact, in the 18th and 19th centuries, the United States itself achieved technological advancement by stealing intellectual property rights. Today, the United States has in turn used it as an important tool to contain China. As Friedrich List (1909) said:

It is a vulgar rule of prudence for him who has reached the pinnacle of power to cast down the ladder by which he mounted, that others may not follow. In this lies the secret of Adam Smith's theory, and of its cosmopolite tendencies; of his illustrious contemporary, William Pitt, as well as of all his successors in the government of Great Britain.

The recent U.S. accusations of TikTok stealing user data and transferring U.S. user data to China has caused people to think of the "cyber sovereignty" policy that the United States has always opposed. China is the biggest advocate and practitioner of this policy.

China believes that territorial sovereignty should be extended to the network, and the transnational digital economy should respect this sovereignty. From the perspective of resources, China's adherence to this principle is in fact insisting on the ownership of the data generated in the country. China's defence and promotion of this concept is considered to maintain the multi-polarization of global capitalism, while also strengthening its ability to control the Internet and use it as a tool to govern the people more efficiently (Hong & Goodnight, 2020). This principle is contrary to the so-called "free flow of information" that the United States has always advocated. From an objective perspective, China's adherence to this policy has indeed played a role in protecting the data of its citizens. Based on this policy, in 2018, Apple chose to transfer its cloud services for Chinese users to the Chinese platform Guizhou-Cloud Big Data for data storage.

The United States will not easily give up dominating the world communication order. So, is China seeking to replace the United States or reshape a new world communication order? Hong's (2017) research points out that, in order to seek greater control in the transnational digital capital accumulation system and then in the world ICT order, China has adopted a combination of politics and business to encourage Chinese capital to participate in the production, distribution, and governance across the board strategically. In the process of promoting the DSR, China still relies on a complex and dynamic political-business alliance, and private enterprises are at the center of the process. Then, since private capital participates, its primary purpose must be profit.

Even though private capital may be able to withstand a certain degree of loss by relying on state subsidies at the beginning of the project, in the long run, private capital will certainly seek greater benefits in the process. As Auragh and Chakravartty (2016) said, although China's ICT infrastructure construction in the BRI embodies the rise of a de-Westernization of capitalism, it is basically for self-interest. Palestine was originally supposed to be a place where the BRI must pass, but it is now excluded because the local instability makes capital unprofitable. The inability of people in unstable areas to enjoy advanced infrastructure shows that the BRI is not for unity but for self-interest.

Similarly, in Pakistan's Balochistan, Sindh, and Gilgit-Baltistan regions, historical, natural, and ethnic factors have made these regions very poor. At the same time, serious ethnic oppression also exists. CPEC is seen locally as a state-funded project that uses "development" as a gimmick to grab Baloch resources. In fact, the coal and metal mines developed by the CPEC in the local area have caused considerable pollution while tapping into local resources (Akhtar, 2018), and the local residents did not get a better life. In addition to minerals, China's ICT infrastructure construction in these areas is currently in the planning stage. Regional instability and small market size are the reasons why these projects are still "planning."

Chapter 7.

Conclusion

As a case study, my capstone project has primarily focused on the specific practical level of the DSR. I tried to provide some academic supports to the issue of China reshaping the global communication order via the DSR with a case study on China's ICT infrastructure in Pakistan. I acknowledge that this study mostly emphasizes a Chinese perspective of the DSR. This study is limited in the way that it should have represented more literature and research works from Pakistan's point of views. Language and access barriers made this research limited to some extent. I am aware that many of the official documents, local media responses, information sources, and academic works about the CPEC might be in local languages in Pakistan and China, which may not be available in English or on the Internet. The ability for multi-lingual data-searching and data access would help future researchers to overcome such biases and limitations. Despite these limitations, my study has contributed to fill in the gap about the ICT aspect of the BRI, and I hope that it will serve as a starting resource for further academic research on the DSR in the future.

With U.S.-centered ICT infrastructure still dominating and the U.S. ICT industry still leading the world, I argue that China has mainly adopted three methods to reshape and challenge U.S.-centered ICT infrastructure in Pakistan: First, China has built an all-weather communication channel in Pakistan composed of optic fibre cable and satellite. This approach conforms to the objective law of the development of the ICT industry, as well as to China's long-standing development philosophy of "If you want to get rich, build roads first. (*Yaoxiangfu xianxiulu*)" In the traditional sense, this road refers to transportation infrastructures such as roads or railways. Only when the road is open, two separate places can communicate and cooperate. In the digital age, this road has become what China calls the "information highway". These connection channels are the basis for the Chinese government and enterprises to expand their ICT industries in Pakistan, and also the basis for China to connect all BRI partner countries. Secondly, China controls the raw material of this digital capitalism by building the infrastructure for extracting and controlling data in Pakistan. At this point, China coincides with its traditional infrastructure construction in Pakistan. Through the construction of coal mines

and thermal power plants in Pakistan, China not only helped Pakistan to get rid of the electricity dilemma but also provided electricity to its western provinces. The facilities for extracting and controlling data are like these coal mines and thermal power plants. The acquisition of these resources can certainly help China's digital platform to develop in Pakistan, but the capacity for these resources to be used for the development of the Pakistani people is questionable. The final method is for China to face the unstable political and security worries in Pakistan. China solves this problem by building monitoring equipment in Smart City projects, enhancing the authorities' ability to enforce stricter surveillance on its people, and helping Pakistan to enhance its military deterrence capabilities and maintain a strategic balance in South Asia. At this stage, China does not want terrorism and war, so what China needs most is to maintain regional calm and maintain balance instead of breaking it. In this regard, ICT infrastructure is not only a means that China uses, but also a goal that China wants to develop in a peaceful and stable environment.

China has undergone 40 years of Reform and Opening-up, and now the Communist Party of China is more accepting of neoliberal development ideas represented by Deng Xiaoping, which are to let go of class struggle and class inequality first, work hard to achieve development, and let some people get rich first. These reform thoughts include the promotion of marketization, the development of the private economy, the shift from 'distribution according to needs' to 'distribution according to work', the active introduction of foreign capital, the use of cheap labor to develop labor-intensive industries (such as Foxconn), etc. Although the CCP insists that these thoughts are in line with the development of communism and socialist ideology, these contents show a strong tendency of pragmatism. Deng himself believes that if the reform moves towards polarization, then the reform will fail (Chang, 1996). However, under his ideological guidance, inequality in China has experienced a sharp economic rise since the 1980s, and the Gini coefficient has always been higher than 45 (Jain-Chandra et al., 2018). These neoliberal thoughts have determined the directions of China's policies with negative outcomes, such as coastal urban-centric and middle-class oriented development policies, divestment from agricultural development, higher dependence on export-driven economy, increase of labor exploitation, environmental degradation, and so on (Zhao, 1998; Hung, 2015). The BRI as a part of China's foreign policy may also reflect and influence similar contradictory and uneven developmental paths if they are

not challenged and adjusted by the partnering countries. In addition, China has consciously or unconsciously strengthened authoritarianism and class differences in certain countries along the BRI. This intentional or unintentional mistake caused Beijing to encounter setbacks in some BRI partner countries. They often only negotiate with the central government or those in power, and lack communication with ordinary people. This makes the BRI lose the basis of public opinion in many countries, and accordingly lose its legitimacy. In Pakistan, the people of the Baluchistan Province did not fully enjoy the development opportunities brought by the CPEC, so they resisted locally and boycotted China's CPEC project (Suleman, 2020). Therefore, some projects that originally routed through Baluchistan could only change their way. The real completion and opening of the Gwadar Port, which has been regarded with high hopes, is nowhere in sight. If the BRI insists on negotiating with those in power and only cares about the interests of the elite, then it will only be rejected by the people in more and more countries, and will even strengthen the oppression and surveillance of ordinary people by those in power, instances which already exist in our current global order. Even if China eventually surpasses the United States in GDP and other economic measures, it might only lead the world to a society that is more unequal and lacks democracy.

However, we cannot deny that the developmental possibilities are contained in the the DSR. What we can see is that China has become more and more cautious in its recent investments and no longer makes financial commitments easily to any BRI partner country. At the same time, although private companies are at the center of the DSR, we also need to see that the technological solutions provided by these Chinese companies can meet the needs of developing countries and low-income people, so that they are welcomed by low-income countries. These technological solutions are beneficial to the poorer population (Gong & Li, 2019).

Western society's research on the DSR either considers it to be the expansion of China's imperialism and the output of authoritarianism, or that it is another victory of neoliberalism. China has no ability to challenge the existing global order. However, as Zhao (2020) said, at the critical moment of the transformation of the global order, understanding China's development path can no longer be seen from West-centric position but rather, research should be conducted in the context of China. Although some domestic intellectuals and elites once hoped to switch to a neoliberal development path, after President Xi came to power, the CCP adopted stricter ideological control, and this

idea gradually disappeared from the mainstream public opinion environment. At the same time, with the digital development of communication infrastructure construction in China over the years, more and more young people from rural and underdeveloped areas have joined in on public opinion. They have formed groups such as Little Pink (Xiao fenhong) and Industrial Party (Gongye dang) to support the Communist Party of China and China's independent development path, however, will these people push the Digital Silk Road in the direction we hope for?

References

- AFP. (2013, May 18). Pakistan adopts Chinese GPS satellite system. *Dawn*. Retrieved from <https://www.dawn.com/news/1012104/pakistan-adopts-chinese-gps-satellite-system>
- Akhtar, A. (2018). The China-Pakistan Economic Corridor: Beyond the rule of capital? *Monthly Review*, 70(2), 34–48. doi: <https://doi.org/10.14452/MR-070-02-2018-063>
- Alexa. (2020). *Top Sites in Pakistan*. Alexa. Retrieved from <https://www.alexa.com/topsites/countries/PK>
- Aouragh, M., & Chakravartty, P. (2016). Infrastructures of empire: Towards a critical geopolitics of media and information studies. *Media, Culture & Society*, 38(4), 559–575. doi: <https://doi.org/10.1177/0163443716643007>
- App. (2020, June 22). Pakistan 'key partner' of China's satellite programme. *The Express Tribune*. Retrieved from <https://tribune.com.pk/story/2247760/1-pakistan-key-partner-chinas-satellite-programme>
- Arcesati, R. (2020, April 28). *The digital Silk Road is a development issue*. Berlin, Germany: Mercator Institute for China Studies. Retrieved from <https://merics.org/en/analysis/digital-silk-road-development-issue>
- Arcesati, R., Holzmann, A., Yishu, M., Shi-Kupfer, K., Carnap, K. von, & Wessling, C. (2020, May 29). *China's digital platform economy: Assessing developments towards Industry 4.0*. Berlin, Germany: Mercator Institute for China Studies. Retrieved from <https://merics.org/en/report/chinas-digital-platform-economy-assessing-developments-towards-industry-40>
- Awan, Z. A. (2020, August 26). Xinjiang's role in China's rapid development. *Asia Pacific Daily*. Retrieved from <https://www2.apdnews.cn/en/item/20/0826/axgankkz9ab752c51f824b.html>
- Bhutta, Z. (2020, February 20). Pakistan plans second phase of Pak-China fibre optic cable. *The Express Tribune*. Retrieved from <https://tribune.com.pk/story/2160351/2-pakistan-plans-second-phase-pak-china-fibre-optic-cable>
- Bloomberg News. (2019, June 4). Embattled Huawei to exit undersea cable business after Trump ban. *Bloomberg*. Retrieved from <https://www.bloombergquint.com/china/embattled-huawei-to-exit-undersea-cable-business-amid-trump-ban>

- Bossler, J. D., & Challstrom, C. W. (1985). *GPS instrumentation and federal policy*. In *Positioning with GPS-1985: Proceedings: First international symposium on precise positioning with the global positioning system (pp. 1-9)*. Rockville, MD: U.S. Dept of Commerce, National Oceanic and Atmospheric Administration.
- Boyd-Barrett, O., & Mirrlees, T. (2019). *Media Imperialism: Continuity and Change*. Lanham, MD: Rowman & Littlefield.
- Brown, K., & Burjanadze, A. (2020). The digital Silk Road: Upgrading the “16+1” cooperation? In *China and the New Silk Road* (pp. 137–145). Springer International Publishing.
- Cai, J. (2020). Big data behind repaid response to Beijing market coronavirus cluster. *South China Morning Posta*. Retrieved from <https://www.scmp.com/news/china/society/article/3090692/big-data-behind-rapid-response-beijing-market-coronavirus>
- CAICT. (2018). *White Paper on China International Optical Cable Interconnection*. Beijing, China: China Academy of Information and Communications Technology. Retrieved from <http://www.caict.ac.cn/english/research/whitepapers/202003/P020200327550620516330.pdf>
- CAICT. (2019). *Beidou jishuyuchanyefazhan baipishu [White Paper on BeiDou technology and industrial development]*. Beijing, China: China Academy of Information and Communications Technology. Retrieved from <http://www.caict.ac.cn/kxyj/qwfb/bps/201912/P020191226514122177888.pdf>
- Carlsson, U. (2017). The rise and fall of NWICO: From a vision of international regulation to a reality of multilevel governance. *Nordicom Review*, 24(2), 31–67. doi: 10.1515/nor-2017-0306
- Cavanna, T. P. (2018, June 5). What does China’s Belt and Road Initiative mean for US grand strategy. *The Diplomat*. Retrieved from <https://thediplomat.com/2018/06/what-does-chinas-belt-and-road-initiative-mean-for-us-grand-strategy/>
- CGTN. (2020, June 19). CGTN exclusive: Memories of fighting terrorism in Xinjiang. *CGTN*. Retrieved from <https://news.cgtn.com/news/2020-06-19/CGTN-Exclusive-Memories-of-fighting-terrorism-in-Xinjiang-RqHhw388WA/index.html>
- CGTN. (2020, June 28). Chinese President Xi Jinping sends letter to high-level conference on Belt and Road int’l cooperation. *CGTN*. Retrieved from <https://news.cgtn.com/news/2020-06-18/Xi-sends-letter-to-high-level-BRI-int-l-cooperation-conference-RqCJc0v45O/index.html>
- Chang, M. H. (1996). The thought of Deng Xiaoping. *Communist and Post-Communist Studies*, 29(4), 377–394.

- Chaudhary, A., Saxena, R., Sanjai, P. R., & Rai, S. (2020, August 13). China's Huawei, ZTE set to be shut out of India's 5G trials. *Bloomberg*. Retrieved from <https://www.bloomberg.com/news/articles/2020-08-13/china-s-huawei-zte-set-to-be-shut-out-of-india-s-5g-trials>
- Chen, Z. (2019, December 30). *2019Nian quanqiweixingdaohang yuweizhifuwuhangye fazhanxianzhuang he shichanggejufenxi [Analysis on the development status and market Pattern of global satellite navigation and location services industry in 2019]*. Shenzhen, China: Forward the Economist. Retrieved from <https://www.qianzhan.com/analyst/detail/220/191227-1970387f.html>
- Cheney, C. (2019, September 26). *China's Digital Silk Road: Strategic technological competition and exploring political illiberalism*. New York, NY: The Council on Foreign Relations. Retrieved from <https://www.cfr.org/blog/chinas-digital-silk-road-strategic-technological-competition-and-exporting-political>
- China telecom. (2018, July 16). Zhongguoianxin jiancheng shoutiao zhongbaludizhidaguanglan: Yidaiyilu guanjianxingxiangmy qude zhongdatup[China Telecom has built the first China-Pakistan terrestrial Fiber cable: The Key project of BRI has made great progress]. *People.Cn*. Retrieved from <http://tc.people.com.cn/n1/2018/0716/c183008-30148606.html>
- Clark, J. (2016, November 7). *What is the Internet of Things*. Armonk, NY: IBM. Retrieved from <https://www.ibm.com/blogs/internet-of-things/what-is-the-iot/>
- CPEC Secretariat. (2017). *Long term plan for China-Pakistan Economic Corridor (2017-2030)*. Islamabad, Pakistan: CPEC Authority. Retrieved from <https://cpec-centre.pk/wp-content/uploads/2017/12/LTP-Web-Document-1.pdf>
- CPEC Secretariat. (2019). *Gwadar smart port city master plan*. Islamabad, Pakistan: CPEC Authority. Retrieved from <http://cpec.gov.pk/project-details/63>
- CSNO. (2018). BeiDou weixingdaohangxitong yingyonganli [Application case of BeiDou Navigation System]. Beijing, China: China Satellite Navigation Office. Retrieved from <http://www.beidou.gov.cn/xt/gfxz/201812/P020181227583462913294.pdf>
- Dawn-Hiscox, T. (2018, January 2). *Huawei Marine Networks to initiate PEACE submarine cable survey*. London, UK: Data Centre Dynamics. Retrieved from <https://www.datacenterdynamics.com/en/news/huawei-marine-networks-to-initiate-peace-submarine-cable-survey/>
- Editorial. (2017, June 21). How China connects. *Dawn*. Retrieved from <https://www.dawn.com/news/1332290/how-china-connects>
- Fallon, T. (2015). The New Silk Road: Xi Jinping's grand strategy for Eurasia. *American Foreign Policy Interests*, 37(3), 140–147. Retrieved from doi: <https://doi.org/10.1080/10803920.2015.1056682>

- Feng, X., & Li, Q. (2019, June 14). Congzhinanzhen daobeidou: Zhongguo daohangxitong cujin shijie hulianhutong [From compass to Beidou: China's navigation system promotes global connectivity]. *People's Daily*, 17.
- Ferdinand, P. (n.d.). Westward ho-The China dream and "One Belt, One Road": Chinese foreign policy under Xi Jinping. *International Affairs*, 92(4).
- Foncillas, A. (2020, June 18). The risks of teaming up with Big Brother to protect health. *Equal Times*. Retrieved from <https://www.equaltimes.org/the-risks-of-teaming-up-with-big?lang=en#.Xz8gyehKhhF>
- Friedrich List, G. (1909). *National system of political economy*. Longmans, Green, and Co.
- Fuchs, C., & Mosco, V. (2015). *Marx in the Age of Digital Capitalism*. Leiden, Netherlands: Brill.
- Gao, C. (2020, March 20). Here's how China made Pakistan into a military powerhouse. *The National Interest*. Retrieved from <https://nationalinterest.org/blog/buzz/heres-how-china-made-pakistan-military-powerhouse-135137>
- Gong, S., & Li, B. (2019). The Digital Silk Road and the sustainable development goals. *IDS Bulletin*, 20(4), 23–45. doi: <https://doi.org/10.19088/1968-2019.137>
- GSA. (2019). *GSA GNSS Market Report*. Prague, Czech: European Global Navigation Satellite Systems Agency. Retrieved from <https://www.gsc-europa.eu/news/european-gnss-agency-gsa-releases-6th-gnss-market-report>
- GSMA. (2019, June 27). *Mass deployments of IoT solution transforming China says GSMA*. London, UK: GSMA. Retrieved from <https://www.gsma.com/newsroom/press-release/mass-deployments-of-iot-solutions-transforming-china-says-gsma/>
- Haider, I., & Haider, M. (2017, June 21). Economic corridor in focus as Pakistan, China sign 51 MoUs. *Dawn*.
- Haque, J., & Siddiqui, Q. ul ain. (2019, March 22). Exclusive: The CPEC plan for Pakistan's digital future. *Dawn*. Retrieved from <https://www.dawn.com/news/1361176/exclusive-the-cpec-plan-for-pakistans-digital-future>
- Hardesty, L. (2018, October 12). WikiLeaks publishes the location of Amazon's data centers. *Sdxcentral*. Retrieved from <https://www.sdxcentral.com/articles/news/wikileaks-publishes-the-location-of-amazons-data-centers/2018/10/>
- Harvey, C. (2017, July 19). Data Center Companies. *Datamation*. Retrieved from <https://www.datamation.com/data-center/data-center-companies.html>

- Headrick, D. R. (1981). *The tools of Empire: Technology and European imperialism in the nineteenth century*.
- Hemmings, J. (2020). Reconstructing order: The Geopolitical risks in China's digital Silk Road. *Asia Policy*, 15(1), 5–21. doi: <https://doi.org/10.1353/asp.2020.0002>
- Holmes, J. R. (2014, April). *Defend the First Island Chain*. Washington, DC: U.S. Naval Institute. Retrieved from <https://www.usni.org/magazines/proceedings/2014/april/defend-first-island-chain>
- Hong, Y. (2017). *Networking China: The Digital transformation of the Chinese economy*. Champaign, IL: University of Illinois Press.
- Hong, Y., & Goodnight, G. T. (2020). How to think about cyber sovereignty: The case of China. *Chinese Journal of Communication*, 13(1), 8–26. doi: <https://doi.org/10.1080/17544750.2019.1687536>
- Hong, Y., & Harwit, E. (2020). China's globalizing internet: History, power, and governance. *Chinese Journal of Communication*, 13(1), 1–7. doi: <https://doi.org/10.1080/17544750.2020.1722903>
- HSBC. (2018, March 6). Where is the funding for a \$26 trillion initiative coming from. *CNBC*. Retrieved from <https://www.cnbc.com/advertorial/2018/03/06/where-is-the-funding-for-a-26-trillion-initiative-coming-from.html>
- Hung, H. (2015). *The China boom: Why China will not rule the world*. Columbia, NY: Columbia University Press.
- Huang, Q. (2020, July 20). *Ruhegoujian wanzhengde neixutixi xingcheng guoneiguoji shuangxunhua xinggeju [How to construct a complete domestic demand system and how to form a new pattern of domestic and international circulation]*. Beijing, China: Liaowang Institution. Retrieved from https://mp.weixin.qq.com/s/LFDRoqA6ovTB9KLWjcOm_A
- Husain, K. (2017, June 21). Exclusive: CPEC master plan revealed. *Dawn*. Retrieved from <https://www.dawn.com/news/1333101>
- Hussain, E. (2019). CPEC: governance and security challenges-Implications for the Belt and Road initiative. *Chinese Political Science Review*, 2019(4), 135–147. doi: <https://doi.org/10.1007/s41111-018-0109-z>
- INNA. (n.d.). *Root servers*. Los Angeles, CA: Internet Assigned Numbers Authority. Retrieved from <https://www.iana.org/domains/root/servers>
- Iqbal, A. (n.d.). *Official message from Prof Ahsan Iqbal*. China-Pakistan Economic Corridor. Retrieved from <http://cpec.gov.pk/messages/7>

- International Commission for the Study of Communication Problems, MacBride, S., & Unesco. (1980). *Many voices, one world: Towards a new more just and more efficient world information and communication order* / [report by the International Commission for the Study of Communication Problems]. London, UK: Kogan Page; New York, NY: Unipub; Paris, France: Unesco. Retrieved from <https://digitallibrary.un.org/record/80>
- Jain-Chandra, S., Khor, N., Mano, R., Schauer, J., Wingender, P. (2018, June). *Inequality in China-trends, drivers and policy remedies* (IMF WP/18/127). Retrieved from <https://www.imf.org/~/media/Files/Publications/WP/2018/wp18127.ashx>
- Jiang, J. (2018, August 30). Dianfu chuantong daxiangmu lianmengyunzuomoshi Sunxiaohua xiangjie PEACEhailan xitongyoushiyuqishi [Subvert the traditional operation mode of large project alliance: Xiaohua Sun explains the advantages and enlightenment of PEACE cable system]. *Submarine Cable Network*. Retrieved from <https://www.submarinenetworks.com/zh/cables/2018083001>
- Jin, D. Y. (2017). *Digital Platforms, Imperialism and Political Culture*. Abingdon, OX: Routledge.
- Khanna, P. (2019, April 30). Washington is dismissing China's Belt and Road. That's a huge strategic mistake. *Politico Magazine*. Retrieved from <https://www.politico.com/magazine/story/2019/04/30/washington-is-dismissing-chinas-belt-and-road-thats-a-huge-strategic-mistake-226759>
- Koleski, K. (2017, February 14). *The 13th Five-Year Plan*. Washington, DC: U.S.-China Economic and Security Review Commission. Retrieved from [https://www.uscc.gov/sites/default/files/Research/The%2013th%20Five-Year%20Plan_Final_2.14.17_Updated%20\(002\).pdf](https://www.uscc.gov/sites/default/files/Research/The%2013th%20Five-Year%20Plan_Final_2.14.17_Updated%20(002).pdf)
- Lewis, J. A. (2020, May 5). *Managing semiconductor exports to China*. Washington, DC: Center for Strategic & International Studies. Retrieved from <https://www.csis.org/analysis/managing-semiconductor-exports-china>
- Li, G., & Yang, X. (2019, May 23). Woguo weixingdaohang chanyeguimo 2020nian jiangchao400yiyuan [China's satellite navigation industry will exceed 400 billion yuan by 2020]. *Xinhua News*. Retrieved from http://www.xinhuanet.com/fortune/2019-05/23/c_1124534119.htm
- Li, K. (2020). *Report on the Work of the Government*. Beijing, China: The State Council of the People's Republic of China. Retrieved from http://english.www.gov.cn/premier/news/202005/30/content_WS5ed197f3c6d0b3f0e94990da.html
- Liu, J. (2020). China's data localization. *Chinese Journal of Communication*, 13(1), 84–103. doi: 10.1080/17544750.2019.1649289

- Liu, W. (2018, September 10). *The Belt and Road Initiative: A Bellwether of China's role in global governance*. Beijing, China: Carnegie-Tsinghua Center for Global Policy. Retrieved from <https://carnegietsinghua.org/2018/09/10/belt-and-road-initiative-bellwether-of-china-s-role-in-global-governance-pub-77204>
- Lou, X. (2019). Building China-Latin America Digital Silk Road: Challenges and roadmap. *China International Studies*, 2019(4).
- Mah, P. (2016, August 30). *Pakistan introduces first national data center*. London, UK: Data Centre Dynamics. Retrieved from <https://www.datacenterdynamics.com/en/news/pakistan-introduces-first-national-data-center/>
- Mejias, U. A., & Couldry, N. (2020, April 28). Resistance to the new data colonialism must start now. *Aljazeera*. Retrieved from <https://www.aljazeera.com/indepth/opinion/resistance-data-colonialism-start-200428162353538.html>
- Melman, S. (1974). *The Permanent War Economy*. New York, NY: Simon & Schuster.
- MERICs. (2018, June 7). *Mapping the Belt and Road initiative: This is where we stand*. Berlin, Germany: Mercator Institute for China Studies. Retrieved from <https://merics.org/en/analysis/mapping-belt-and-road-initiative-where-we-stand>
- Mills, C. W. (1959). *The sociological imagination*. New York, NY: Oxford University Press.
- Ministry of Commerce. (2020a, July 30). *2019nian zhongguo-bajisitan jingmaohezuo jiankuang [An overview of China-Pakistan economic and trade cooperation in 2019]*. Retrieved from <http://yzs.mofcom.gov.cn/article/t/202007/20200702987829.shtml>
- Ministry of Commerce. (2020b, July 30). *2019nian zhongguo-yindu jingmaohezuo jiankuang [An overview of China-India economic and trade cooperation in 2019]*. Retrieved from <http://yzs.mofcom.gov.cn/article/t/202007/20200702987826.shtml>
- Mochinaga, D. (2020). The expansion of China's digital Silk Road and Japan's response. *Asia Policy*, 15(1), 41–60. doi: <https://doi.org/10.1353/asp.2020.0005>
- Monitoring Report. (2018a, July 13). Pak-China fibre optic cable set for opening today, *Profit*. Retrieved from <https://profit.pakistantoday.com.pk/2018/07/13/pak-china-fibre-optic-cable-set-for-opening-today/>
- Monitoring Report. (2018b, December 12). Chinese entities interested in providing IoT, financial and transportation solutions in Pakistan. *Profit*. Retrieved from <https://profit.pakistantoday.com.pk/2018/10/12/chinese-entitites-interested-in-providing-iot-financial-and-transportation-solutions-in-pakistan/>

- Moss, S. (2019, April 29). *Huawei signs MoU with Pakistan for cloud data center*. London, UK: Data Centre Dynamics. Retrieved from <https://www.datacenterdynamics.com/en/news/huawei-signs-mou-pakistan-cloud-data-center/>
- Mubarak, O. M., & Dempster, A. G. (2013, June). *Beidou: A GPS alternative for Pakistan's naval vessels*. 2013 10th International Bhurban Conference on Applied Sciences & Technology (IBCAST), Islamabad: Pakistan. doi: <https://doi.org/10.1109/IBCAST.2013.6512169>
- National Development and Reform Commission. (2015, March 28). *Vision and actions on jointly building silk road economic belt and 21st-century maritime silk road*. Retrieved from https://en.ndrc.gov.cn/newsrelease_8232/201503/t20150330_1193900.html
- Naughton, B. (2020). Chinese industrial policy and the digital Silk Road: The Case of Alibaba in Malaysia. *Asia Policy*, 15(1), 22–39. doi: <https://doi.org/10.1353/asp.2020.0006>
- Noort, C. van. (2020). Strategic narratives, visibility and infrastructure in the digital age: The case of China's Maritime Silk Road Initiative. *Cambridge Review of International Affairs*. doi: <https://doi.org/10.1080/09557571.2020.1741513>
- Page, J., O'Keeffe, K., & Taylor, R. (2019, March 12). America's undersea battle with China for control of the global internet grid. *The Wall Street Journal*. Retrieved from <https://www.wsj.com/articles/u-s-takes-on-chinas-huawei-in-undersea-battle-over-the-global-internet-grid-11552407466>
- Padovani, C., & Nordenstreng, K. (2005). From NWICO to WSIS: another world information and communication order? *Global Media and Communication*, 1(3), 264–272. doi: 10.1177/1742766505058123
- PEACE. (2018, December 12). *Hengtong Group and PCCW Global committed to enhancing connectivity diversity between Asia, Europe and Africa*. Retrieved from <http://www.peacecable.net/News/Detail/16601>
- PEACE. (2020, April 15). *Wet plant manufacture & integration of PEACE cable system delivering in advanced stages*. Retrieved from <http://www.peacecable.net/News/Detail/16621>
- PEACE. (n.d.). About Us. Retrieved from <http://www.peacecable.net/>
- Perlez, J., & Huang, Y. (2017, May 13). Behind China's \$1 trillion plan to shake up the economic order. *The New York Times*. Retrieved from <https://www.nytimes.com/2017/05/13/business/china-railway-one-belt-one-road-1-trillion-plan.html?auth=link-dismiss-google1tap>

- Pham, S. (2020, April 24). Facebook is spending \$5.7 billion to capitalize on India's Internet boom. *CNN*. Retrieved from <https://www.cnn.com/2020/04/22/tech/facebook-india-reliance-jio/index.html>
- Pham, S., & Gupta, S. (2020, July 28). India is blocking more apps in the wake of the TikTok ban. *CNN*. Retrieved from <https://www.cnn.com/2020/07/28/tech/india-china-apps-ban-hnk-intl/index.html>
- Puppy, M. (2019, Mar 15). China backs 'iron brother; Pakistan with primary weapons and complex exercises. *The Economic Times*. Retrieved from <https://economictimes.indiatimes.com/news/defence/china-backs-iron-brother-pakistan-with-primary-weapons-and-complex-exercises/articleshow/68418192.cms>
- Qiu, W. (2020, June 6). Global Marine Group fully divests stake in Huawei Marine Networks. *Submarine Cable Network*. Retrieved from <https://www.submarinenetworks.com/en/vendors/huawei-marine/global-marine-completes-sale-of-30-stake-in-huawei-marine-networks-for-85-million>
- Rauf, A. (2019). Pakistan-China Optical Fiber Cable Project: Opportunities and challenges. *Pivot*, 2019(1), 26–28.
- Ritzinger, L. (2015, August 5). *The China-Pakistan Economic Corridor*. Seattle, WA: The National Bureau of Asian Research. Retrieved from <https://www.nbr.org/publication/the-china-pakistan-economic-corridor/>
- Satariano, A. (2019, March 10). How the Internet travels across oceans. *The New York Times*. Retrieved from <https://www.nytimes.com/interactive/2019/03/10/technology/internet-cables-oceans.html>
- Schiller, D. (1999). *Digital capitalism: Networking the Global Market System*. Cambridge, MA: The MIT Press.
- Schiller, D. (2011). Power under pressure: Digital capitalism in crisis. *International Journal of Communication*, 5 (2011), 924–941.
- Schiller, D. (2014). *Digital Depression: Information Technology and Economic Crisis*. Champaign, IL: University of Illinois Press.
- Schiller, D. (2018). *Networks and the age of Nixon [Xinxizibenzhuayi de xingqiyukuozhang]*. Beijing, China: Peking University Press.
- Shahid, J. (2017, June 12). Army seeks fibre optic cables along CPEC. *Dawn*. Retrieved from <https://www.dawn.com/news/1310593>

- Sharma, S. (2019, June 4). Is China a new alternative to US hegemony. *Asia Times*. Retrieved from <https://asiatimes.com/2019/06/is-china-a-new-alternative-to-us-hegemony/>
- Sheehan, M. (2020, April 28). The Chinese and American Apps winning the next billion users. Chicago, IL: MacroPolo. Retrieved from <https://macropolo.org/the-chinese-and-american-tech-apps-winning-the-next-billion-users/>
- Shen, H. (2018). Building a digital Silk Road? Situating the Internet in China's Belt and Road Initiative. *International Journal of Communication*, 12 (2018), 2683–2701.
- Shi, A. (2019). China's role in remapping global communication. In *China's Media Go Global*. New York, NY: Routledge.
- Siddiqui, S. (2017, August 5). Pakistanis continue to face slow internet speed after cable system collapse. *The Express Tribune*. Retrieved from <https://tribune.com.pk/story/1474811/internet-speed-reduces-half-pakistan-another-submarine-cable-system-collapses>
- SimilarWeb. (2020, August 1). *Mobile App Ranking*. SimilarWeb. Retrieved from <https://www.similarweb.com/apps/top/apple/store-rank/pk/all/top-free/iphone/>
- Sloane, H. (2020, April 7). Precision politics: China's answer to GPS comes online. *The Diplomat*. Retrieved from <https://thediplomat.com/2020/04/precision-politics-chinas-answer-to-gps-comes-online/>
- Srnicek, N. (2017). *Platform Capitalism*. Cambridge, UK: Polity Press.
- Statcounter. (2020a). *Search engine market share Pakistan*. Statcounter. Retrieved from <https://gs.statcounter.com/search-engine-market-share/all/pakistan>
- Statcounter. (2020b). *Social media stats Pakistan*. Statcounter. Retrieved from <https://gs.statcounter.com/social-media-stats/all/pakistan>
- State Council. (2016). "Shisanwu" guojia xinxihua guihua [13th Five-year Plan for national information]. Retrieved from http://www.gov.cn/zhengce/content/2016-12/27/content_5153411.htm
- Suleman, M. (2020, June 30). How CPEC left behind the people of Gwadar. *The Diplomat*. Retrieved from <https://thediplomat.com/2020/06/how-cpec-left-behind-the-people-of-gwadar/>
- Sun, W. (2017). Pakistan-China relations: CPEC and Beyond. *Policy Journals*, 14(2), 3–12. doi: <https://doi.org/10.13169/polipers.14.2.0003>

- Swarajya. (2020, July 13). Google to invest \$10 billion in India over next 5 years, CEO Sundar Pichai Announces India digitisation fund. *Swarajya*. Retrieved from <https://swarajyamag.com/insta/google-to-invest-10-billion-in-india-over-next-5-years-ceo-sundar-pichai-announces-india-digitisation-fund>
- Taneja, S. (2019, May 18). *A complete assessment of the Cross-Border Optical Fibre Cable project under CPEC*. China-Pakistan Economic Corridor. Retrieved from <http://www.cpecinfo.com/archive/news/a-complete-assessment-of-the-cross-border-optical-fibre-cable-project-under-cpec/NzEyMw==>
- Telecompaper. (2020, February 26). PEACE cable to land in Seychelles in July 2021. *Telecompaper*. Retrieved from <https://www.telecompaper.com/news/peace-cable-to-land-in-seychelles-in-july-2021--1328036>
- TeleGeography. (2020). Submarine Cable Map, *TeleGeography*. Retrieved from <https://www.submarinecablemap.com/#/>
- USC. (2020, April 1). *USC satellite database*. Cambridge, MA: Union of Concerned Scientists. Retrieved from <https://www.ucsusa.org/resources/satellite-database>
- van Zoonen, L. (2016). Privacy concerns in smart cities. *Government Information Quarterly*, 33(3), 472–480. doi: 10.1016/j.giq.2016.06.004
- Vila Seoane, M. (2020). Alibaba's discourse for the digital Silk Road: The electronic World Trade Platform and 'inclusive globalization.' *Chinese Journal of Communication*, 13(1), 68–83. doi: <https://doi.org/10.1080/17544750.2019.1606838>
- Wang, R., Bar, F., & Hong, Y. (2020). ICT aid flows from China to African countries: A communication network perspective. *International Journal of Communication*, 14 (2020), 1498–1523.
- Web Desk. (2020, April 1). China's 'full' BeiDou navigation system to boost accuracy of Pakistan's missiles? *The Week*. Retrieved from <https://www.theweek.in/news/world/2020/04/01/china-full-beidou-navigation-system-to-boost-accuracy-of-pakistan-missiles.html>
- Wilson, J. (2017, January 5). *China's alternative to GPS and its implications for the United State*. Washington, DC: U.S.-China Economic and Security Review Commission. Retrieved from https://www.uscc.gov/sites/default/files/Research/Staff%20Report_China's%20Alternative%20to%20GPS%20and%20Implications%20for%20the%20United%20States.pdf
- Woo, R., & Gao, L. (2020, June 11). China set to complete Beidou network rivalling GPS in global navigation. *Reuters*. Retrieved from <https://www.reuters.com/article/us-space-exploration-china-satellite/china-set-to-complete-beidou-network-rivalling-gps-in-global-navigation-idUSKBN23J019>

- Wu, D. (2020, August 12). China's days as world's factory are over, iPhone maker says. *Bloomberg*. Retrieved from <https://www.bloombergquint.com/business/hon-hai-beats-profit-estimates-after-pandemic-spurs-apple-demand>
- Xi, J. (2017, May 14). Full text of President Xi's speech at opening of Belt and Road forum. *Xinhua Net*. Retrieved from http://www.xinhuanet.com/english/2017-05/14/c_136282982.htm
- Xinhua. (2016, April 30). Xijiping zhuchi zhonggongzhongyangzhengzhiju disanshiyici jitixuexi [Xi Jinping presided over the 30th collective study of the Political Bureau of the CPC Central Committee]. *Xinhua Net*. Retrieved from http://www.xinhuanet.com/politics/2016-04/30/c_1118778656.htm
- Xinhua. (2018, May 15). Guojadianwanggongsi yu bajisitanzhengfu qianshu molazhiliushudian gongchengjiaoyiwenjian [SGCC and Pakistan Government signed the Murrah direct current transmission project transaction document]. *Xinhua Net*. Retrieved from http://www.xinhuanet.com/energy/2018-05/15/c_1122835336.htm
- Xinhua. (2019, July 24). China will never seek hegemony: White paper. *Xinhua Net*. Retrieved from http://www.xinhuanet.com/english/2019-07/24/c_138253236.htm
- Yang, S. (2010, December 30). Beidou daohangweixin danshengji [Report of the innovation of China's BeiDou navigation satellites]. *News China*. Retrieved from http://www.china.com.cn/military/txt/2010-12/30/content_21646297.htm
- Yinug, F. (2020). *The 2020 SIA factbook: Your source for semiconductor industry data*. Washington, DC: Semiconductor Industry Association. Retrieved from <https://www.semiconductors.org/the-2020-sia-factbook-your-source-for-semiconductor-industry-data/>
- Zhao, Y. (1998). *Media, market, and democracy in China: Between the party line and the bottom line*. Champaign, IL: University of Illinois Press.
- Zhao, Y. (2010). China's pursuits of indigenous innovations in information technology developments: Hopes, follies, and uncertainties. *Chinese Journal of Communication*, 3(3), 266–289. doi: <https://doi.org/10.1080/17544750.2010.499628>
- Zhao, Y. (2015). The BRICS formation in reshaping global communication: Possibilities and challenges. In *Mapping BRICS media* (pp. 66–86). New York, NY: Routledge.
- Zhao, Y. (2018, February 7). *Presidents Faculty Lecture | China's Belt and Road Initiative*. Retrieved from <https://www.youtube.com/watch?v=EyocgEOYBHY&t=2135s>

Zhao, Y., & Wu, J. (2020). Understand China's development path: Towards socialist rejuvenation? *Javnost - The Public*, 27(2), 97–111. doi: <https://doi.org/10.1080/13183222.2020.1727274>

Zimmer, J. (2018, September 12). *Google owns 63,605 miles and 8.5% of submarine cables worldwide*. Broadbandnow. Retrieved from <https://broadbandnow.com/report/google-content-providers-submarine-cable-ownership/>