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## **Prefiguring China's Digital Silk Road to Europe: Connecting Switzerland**

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Since about 2015, the Digital Silk Road (DSR) has become an important component of the Belt and Road Initiative (BRI), making its way into major Chinese policy documents. In practice, however, the DSR, just like the overarching BRI, is not easy to define. On the one hand, the DSR has a tangible material base, which mostly remains invisible. This includes the fiber-optic networks, data centers, and smart cities built together with BRI's energy and transport projects.<sup>[1]</sup> Fiber-optic networks enable digitalization, whilst supporting the financial services and communication which are fundamental to other BRI infrastructure projects. Yet, most people are unaware of the materiality of these digital infrastructures, assuming that our emails, text messages, online orders, financial transactions and social media posts are stored somewhere in "the cloud".<sup>[2]</sup> This is not surprising, as most digital infrastructures are buried underground, in the ocean, or hidden in remote data centers.

On the other hand, the DSR is also a broader and vaguer branding effort and narrative, enabling the Chinese government "to promote its global vision across a range of technology areas and projects".<sup>[3]</sup> Often, it is private or state-owned companies, rather than the Chinese government, driving this endeavor, "using the DSR label to gain policy support to pursue overseas commercial expansion".<sup>[4]</sup> It has thus come to embrace "virtually any telecommunications or data-related business operations or product sales by China-based tech firms" along the BRI.<sup>[5]</sup>

Hence, the DSR comprises both tangible socio-material practices of ICT firms and a discursive construct.

Switzerland provides an interesting example. The Swiss BRI agreement builds on long-standing diplomatic and economic relationships with Beijing. In 1950 Switzerland was one of the first countries to recognize the People's Republic of China (PRC). Furthermore, it was a Swiss company, the elevator producer Schindler, that established the first-ever joint venture with China, in 1980. In 2014, the two countries ratified a Free Trade Agreement (FTA), and the PRC is now Switzerland's third-biggest trading partner. In 2019, Switzerland was among the first Western European countries to sign a BRI Memorandum of Understanding (MoU). Although no official BRI infrastructure projects have been established in the country so far, the DSR had already begun to manifest itself in Switzerland—even before Xi Jinping's official launch of the BRI in 2013.

**Learning to produce cables**

Chinese cables play a central role in increasing global and Chinese connectivity. A historical review reveals, however, that much of the Chinese fiber and cable-making know-how, which is now crucial to building the DSR, originated abroad. At the same time, foreign cables, including those from Swiss cable makers such as Dätwyler, also provide connectivity to major infrastructure sites within China, including sites of Huawei and Ant Financial, two companies that are active in the BRI's framework. From this perspective, the DSR appears less a simple move from China to abroad, and more a historical and multidirectional entanglement of people, knowledge, ideas, technologies, and infrastructures.

Spurred by advances in laser technology in the 1960s, commercial fiber-optic production took off in the 1980s and 1990s.<sup>[6]</sup> In comparison to their competitors from the United States, Japan, and Western Europe, Chinese companies did not initially have experience or success in this industry. Supported by state policies, however, they have learned by importing optical-fiber manufacturing equipment and through joint ventures with foreign companies. By the mid-2000s China had turned into one of the global centers of the fiber optics and cable industry.<sup>[7]</sup>

Oversupply, low prices, and the growing quality of fibers from the top Chinese producers are increasingly creating concerns among producers in other parts of the world. This has resulted in an ongoing investigation into antidumping in relation to Chinese fibers in the European Union. Nevertheless, Chinese fibers continue to be sold in Europe and are often the basis for connecting China with Europe in the framework of the BRI.

### **Establishing fiber-optic connections, laying the basis of the DSR**

The global spread of Chinese fiber-optic connections began in the 1990s; much earlier, if we take into consideration preceding infrastructures, such as railroads or the British colonial telegraph lines. Previously, Great Britain and the United States especially had long controlled the global telegraph and, subsequently, coaxial and fiber-optic cable industries. The first undersea fiber-optic cables used for regular traffic were introduced in the 1980s, with American, British, French, and Japanese operators at the forefront. They followed the routes of earlier telegraph and coaxial networks, continuing to materially reflect “the imagined sources of friction and security of [...] the Cold War era”.<sup>[8]</sup>

Chinese transnational optical cables appeared almost a decade later. The first was a Chinese submarine optical cable connecting China and Japan in 1993.<sup>[9]</sup> and the first submarine fiber-optic cable to Europe (FLAG) was built in 1997.<sup>[10]</sup> Generally, submarine optical cables carry almost all data traffic. Terrestrial cables play a greater role in connecting China and Europe, as they have more stable connections and lower latency (due to the shorter distances) and are easier to install and maintain.<sup>[11]</sup> The earliest terrestrial fiber-optic cable between China and Europe (TEA) was a Chinese initiative from the Ministry of Posts and Telecommunications in 1992.<sup>[12]</sup> It officially opened in 1998, connecting Shanghai and Frankfurt via Russia.<sup>[13]</sup>

Drawing on historical legacies, the major arrival points of Chinese terrestrial cables today are Moscow, St Petersburg, Helsinki, Stockholm, London, and Frankfurt am Main. Moreover, there are important submarine cable landing-points on the coasts of southern France, Portugal, and southern Italy. Switzerland is now connected to China via undersea cables through Italy and France and via terrestrial networks through Germany.

The number of transnational Chinese optical cables has been growing fast.[\[14\]](#) China Telecom alone has 12 independent terrestrial cables and five independent submarine cables that connect Europe.[\[15\]](#) Two more cable connections, the “Silk Road North Line” (via Kazakhstan) and “Silk Road South Line” (or PEACE cable, via Pakistan and undersea) are currently under construction.

Other global operators are also increasing cable production and there is fierce competition. According to some observers, Chinese companies were part of one fifth of all cable projects worldwide between 2016 and 2019.[\[16\]](#) However, the Chinese government aims to seize 60% of the global fiber-optic communications market, to gain both commercial and strategic advantages.[\[17\]](#)

## **Equipping the DSR**

Along these cable networks, there are data centers and PoPs or “Points of Presence.” These access points are located inside data centers, connecting two or more different countries’ networks with each other. The three big, mostly state-owned Chinese telecom operators—China Telecom, China Unicom, and China Mobile—all have a growing number of data centers and PoPs in Europe. London and Frankfurt are especially popular locations, also for historical reasons that relate to existing telegraph and banking infrastructures.

Between 2016 and 2020, these three competing companies all registered local branch offices in Switzerland, launched with ostentatious opening ceremonies containing visual and discursive references to the DSR (see Figure 1). While these openings are all relatively recent, Chinese-Swiss collaborations in this field date back to the 2000s.

PoPs and data centers are equipped with opto-electronic components such as switches and routers that can transmit, direct, convert, or amplify data. The two most well-known competing Chinese component providers are ZTE and Huawei. In Switzerland, ZTE’s enterprise was liquidated soon after it began. Huawei, on the other hand, has grown consistently, despite concerns related to labor laws and cyber security. With the exception of Russia, Europe was initially low on the agenda of Huawei founder Ren Zhengfei, who prioritized emerging markets. In fact, Switzerland was the last country in Europe where Huawei opened an office, in 2008.[\[18\]](#) Today, the company also hosts a large research center in Zurich. According to some Huawei employees, in light of increasing US–China friction, Switzerland emerged as a more neutral but still research-intensive alternative to the US, where the center was originally to be located.



*Figure 1: Banner “Your Digital Silk Road to China” presented at the China Telecom Switzerland opening ceremony in November 2019 (photo by the author).*

### **The effects of the BRI’s digital side in Switzerland**

The effects of the overarching BRI in Switzerland have been modest so far, mainly down to its MoU. In contrast to the Sino-Italian MoU, for example, the Sino-Swiss MoU focuses on cooperation in BRI projects located in third countries and in the financial sector. As a result, the MoU has raised relatively little criticism in Switzerland. As of 2020 only some big Swiss companies like ABB or the banks Credit Suisse and Vontobel, which have close relationships with China, have reportedly participated in such projects—both prior to and following the BRI’s 2013 launch.[\[19\]](#)

Related to this, the effects of the BRI’s digital side are stronger in Switzerland than those of other BRI aspects, although they are somewhat difficult to pinpoint. It is particularly difficult to relate the effects of transnational cable networks to Chinese companies alone, as some of the bigger European (though not Swiss) telecommunication providers also have cross-border networks spanning Europe and China. Nevertheless, the effects of the fiber-optic connections between China and Europe remain tangible. While individual end-users may not be aware of this, Chinese enterprises in Switzerland and Swiss multinational enterprises with premises in China feel especially strongly the difference that improved fiber-optic connections make.

These enterprises, such as the multinational Swiss Bühler Group or the China Construction Bank's Zurich branch, are currently also the main target group for Chinese telecommunication companies in Switzerland.

Finally, the geopolitical question of who contributes components and builds, controls, or has potential access to data networks always lingers in the background. Vulnerability to cyber security threats, whether perceived or actual, is certainly one effect of the DSR that the Swiss public, companies, and politicians need to address.

## Concluding remarks

My discussion of the DSR in Switzerland raises three key points. First, we need to consider the BRI in general and the DSR in particular—not only since their official launch in the 2010s, but over a longer time frame. In fact, Chinese fiber-optic cable-making, laying transnational cables, and selling active components to Europe began in the 1990s; a move that was being prepared since at least the 1950s.<sup>[20]</sup>

Second, the case of Switzerland shows (once more) how the BRI plays out completely differently on the ground, even among neighboring countries. It is certainly no coincidence that to date there are neither official BRI projects, nor dubious surveillance smart city projects within Switzerland—a small, but nevertheless economically highly competitive country with a solid direct democracy.

Finally, like other BRI components, in Switzerland the DSR does not represent concerted government action. While often owned by the state, aided by government policies, and publicly supported by Chinese diplomats, Chinese ICT companies in Switzerland are still often competitors. Nevertheless, taken together, Chinese digital infrastructures are certainly playing a crucial role in the digitalization of Switzerland, a fact that most residents would not even have dared to imagine a few years ago.

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## Notes

[1] Hong Shen, “Building a Digital Silk Road? Situating the Internet in China’s Belt and Road Initiative,” *International Journal of Communication* 12 (2018): 2683–2701.

[2] Tung-Hui Hu, *A Prehistory of the Cloud* (Cambridge, MA: The MIT Press, 2015).

[3] Eurasia Group, “The Digital Silk Road: Expanding China’s Digital Footprint,” April 8, 2020, 1, accessed May 30, 2021, <https://www.eurasiagroup.net/files/upload/Digital-Silk-Road-Expanding-China-Digital-Footprint-1.pdf>.

[4] Ibid.

[5] Paul Greene and Paul Triolo, “Will China Control the Global Internet Via Its Digital Silk Road?,” May 8, 2020, accessed May 30, 2021, <https://carnegieendowment.org/2020/05/08/will-china-control-global-internet-via-its-digital-silk-road-pub-81857>.

[6] Jeff Hecht, *City of Light: The Story of Fiber Optics* (New York: Oxford University Press, 1999).

[7] Based on personal interviews and observations at industry conferences. See also IGI Consulting, *China Telecom Volume 2: Fiber Optics Markets and Opportunities* (Boston, MA: Information Gatekeepers Inc, 2001), 101–7; Xiaolan Fu, *China's Path to Innovation* (Cambridge: Cambridge University Press, 2015), 242–43.

[8] Nicole Starosielski, *The Undersea Network* (Durham: Duke University Press, 2015), 45.

[9] China Academy of Information and Communications Technology, “White Paper on China International Optical Cable Interconnection (2018)”.

[10] Submarine Telecoms Forum, “Submarine Telecoms Industry Report” (Sterling, Virginia: Terabit Consulting and Submarine Telecoms Forum, 2012), 51. This is an international cable, but Chinese companies share some bandwidth in this cable.

[11] China Unicom representative, personal written conversation, April 19, 2021.

[12] Jiahe Liu 刘家河, “国际通信大陆桥——亚欧陆地光缆系统工程(TAE),” *电信工程技术与标准化 Telecom Engineering Technics and Standardization*, no. 03 (1993): 2.

[13] Shanghai Yearbook Compilation Committee, *上海年鉴 Shanghai Yearbook*, ed. Jianxin Pan 潘建新 (Shanghai: Shanghai Bureau of Statistics, 1999), 213.

[14] “Chinese cables” refer to cables that have landing points in mainland China or Hong Kong and are operated by China Telecom, China Unicom, or China Mobile. This does not mean that they (fully) own these cables. Rather, it is common that cable owners rent out their cable capacities, that cables have multiple owners, and that multilateral development banks play a role in financing the cables, see Kieran Clark, “Submarine Telecoms Industry Report: 2020/2021 Edition” (Submarine Telecoms Forum, Inc., October 23, 2020), sec. 2, accessed May 30, 2021, <https://subtelforum.com/products/submarine-telecoms-industry-report/>. Nowadays, transnational cables are commonly owned by a consortium of telecom operators based in different countries. However, individually owned cables by big investors such as Google, Facebook, Amazon und Microsoft are increasing fast.

[15] China Telecom Europe, “CTE Solutions Overview: Digitally Transform Your Business with Cross Border Connectivity Solutions and Services,” July 27, 2020, accessed May 30, 2021, [https://www.chinatelecomeurope.com/wp-content/uploads/2020/08/CTE-Company-brochure\\_27July2020.pdf](https://www.chinatelecomeurope.com/wp-content/uploads/2020/08/CTE-Company-brochure_27July2020.pdf).

[16] Charles Perragin, “Verkabelter Ozean,” *Die Tageszeitung: taz*, July 8, 2021.

[17] Jonathan E. Hillman, “Sale of Huawei’s Underseas Cables Could Leave Risks Unaddressed,” *Axios*, June 4, 2019, accessed May 30, 2021, <https://www.axios.com/sale-of-huaweis-underseas-cables-could-leave-risks-unaddressed-388845c5-efa8-413d-95d2-06fe93de9c06.html>.

[18] For details on the history of Huawei Switzerland, see Lena Kaufmann, “Altdorf – Shanghai – Shenzhen – Liebfeld: Swiss-Chinese Entanglements in Digital Infrastructures,”

in *Data Centers: Edges of a Digital Nation*, ed. Monika Dommann, Hannes Rickli, and Max Stadler (Zurich: Lars Müller Publishers, 2020), 262–89.

[19] Katrin Büchenbacher, “Ausländische Firmen haben kaum Chancen auf Beteiligung an Chinas Neuer Seidenstrasse,” *NZZ*, May 5, 2020, accessed May 30, 2021, <https://www.nzz.ch/nzz-asien/neue-seidenstrasse-zwischenbilanz-fuer-die-schweiz-nzz-asien-ld.1554970>.

[20] See James W. Cortada, *The Digital Flood: The Diffusion of Information Technology across the U.S, Europe and Asia* (Oxford: Oxford University Press, 2012).