

Azerbaijan's Digitalization Efforts, Revitalization of the Liberated Territories, and Role of China's Huawei

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After the restoration of its territorial integrity, the government of Azerbaijan (GoA) started an immense reconstruction effort for critical infrastructure such as highways, railways, and airports in the conflict-affected territories. Alongside these projects, the GoA is devoting significant attention to building smart settlements through innovative and digital solutions to provide comfortable living conditions for the safe return of internally displaced people (IDP). As a part of a government-led recovery strategy for these territories' development, the GoA is also encouraging foreign companies to participate in the rebuilding process. The Chinese company Huawei is among the first group of high-tech vendors to gain a foothold in the digitalization process for the liberated territories by implementing key technologies and enhancing digital connectivity. This Chinese multinational technology giant has been involved in several national projects in Azerbaijan that have implemented new networking technology with smart solutions, as well as successfully employing its products and services in strategically important areas of the Karabakh region. This article sheds light on the effectiveness of these innovative policies and assesses whether the adoption of advanced digital solutions will enable achieving the sustainable socio-economic growth of Azerbaijan's liberated territories.

Keywords: Azerbaijan, China, Karabakh region, Revitalization, Digitalization, Huawei



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Introduction

The digitalization of Azerbaijan as an entire country has become one of the top priorities in recent years. The GoA is increasingly embracing digitalization by developing or outsourcing high-tech industrial technologies to simplify administrative tasks and enhance economic growth.¹ With the implementation of artificial intelligence (AI), big data, cloud computing, blockchain, and the Internet of Things (IoT) in multiple spheres of life,² the GoA-led digital transition policy has become a new direction of economic growth and social development.³ In the aftermath of the Second Karabakh War, Azerbaijan is devoting significant attention to the rehabilitation of essential infrastructure in the war-torn cities and villages throughout the liberated territories.

Within the framework of that rehabilitation effort, the GoA has invested in the development of emerging communication technologies.⁴ The innovation policy is currently deemed to be one of the main axes for improving the efficiency of the region’s economy and infrastructure. The post-war infrastructure and advanced digital connectivity, in collaboration with sophisticated AI assistance and innovative communication technologies, are projected to boost socio-economic development in the immediate future.⁵ The GoA-

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1 Mincom.gov.az, *President signs Decree on some measures to improve governance in the field of digitalization, innovation, high technologies and communications in Azerbaijan Republic*, April 27, 2021, available at: <https://mincom.gov.az/en/view/news/1322/president-signs-decree-on-some-measures-to-improve-governance-in-the-field-of-digitalization-innovation-high-technologies-and-communications-in-azerbaijan-republic> (accessed: March 1, 2022).

2 Huseynov. A., “Our goal is to bring Big Data analytics and artificial intelligence to Azerbaijan” (translation from Azerbaijani), *Fed.az*, April 8, 2021, available at: <https://fed.az/az/ikt/azad-huseynov-quotmeqsedimiz-big-data-analitikasini-ve-suni-intellekti-azerbaycana-getirmekdirquot-103920> (accessed: March 1, 2022).

3 Qasimli. V., “Digital transformation is a priority” (translation from Azerbaijani), *Azertag*, September 2, 2021, available at: https://azertag.az/xeber/Vusal_Qasimli_Reqemsal_transformasiya_prioritetdir-1866877 (accessed: March 2, 2022).

4 Economics.com.az, *Foreign support is an important factor in the process of restoration and development of Karabakh* (translation from Azerbaijani), January 27, 2021, available at: <http://economics.com.az/index.php/tebdirler/yenilikl-r/item/2058-zharabazhh-n-baerpa-s-vae-inkishaf-prosesindae-kharidzi-daestaek-muhum-amildir.html> (accessed: March 2, 2022).

5 Muradzade, N., “The digital aspect of the restoration of Karabakh”, *Azertag*, July 5, 2021, available at: https://azertag.az/xeber/Qarabagin_berpasinin_reqemsal_aspekti

led digital transition strategy also contributes to the implementation of the UN Sustainable Development Goals (SDG), which will touch every aspect of people's lives upon their return to the liberated territories. In addition to the construction of new facilities, the GoA plans to improve the quality of life and well-being of potential returnee populations in both urban and rural areas through innovative and people-centric technological solutions.⁶

When the GoA invited foreign companies to help rebuild the war-devastated region, the Chinese private telecommunications company Huawei took on a direct role in the planning, building, and managing of interoperable infrastructure there.

Hence, when the GoA invited foreign companies to help rebuild the war-devastated region, the Chinese private telecommunications company Huawei took on a direct role in the planning, building, and managing of interoperable infrastructure there.⁷ In fact, digital transformation is already having a profound impact on the Chinese economy as the central government invests productively and successfully develops one of the world's most sophisticated digital ecosystems.⁸ When it comes to the global digital ecosystem, China is among the main promoters of the intense expansion of the practices of sustainable digital inclusion globally – investing in, adopting, and building advanced technologies such as the AI ecosystem, cloud computing, blockchain, the 5th generation of mobile internet networks (5G), big data, and robotic process automation (RPA).⁹

Serh-1823735 (accessed: March 2, 2022).

6 Azertag.az, *President Ilham Aliyev received Rashad Nabiyeu in a video format on his appointment as Minister of Transport, Communications and High Technologies*, January 26, 2021, available at: https://azertag.az/en/xeber/President_Ilham_Aliyev_received_Rashad_Nabiyeu_in_a_video_format_on_his_appointment_as_Minister_of_Transport_Communications_and_High_Technologies_VIDEO-1697023 (accessed: March 4, 2022).

7 President.az, *Speech by President Ilham Aliyev in a video format at UN 77th session of Economic and Social Commission for Asia and the Pacific presented*, April 26, 2021, available at: <https://president.az/en/articles/view/51287> (accessed: March 3, 2022).

8 M.Zhao, R.Liu, and D.Dai, "Synergistic Effect between China's Digital Transformation and Economic Development: A Study Based on Sustainable Development", in Special Issue *Sustainable Management of Digital Business and Information Technology*, (ISSN 2071-1050), December 14, 2021, available at: <https://doi.org/10.3390/su132413773> (accessed: March 24, 2022).

9 Gov.cn, *Thirteenth Five-Year National Strategic Emerging Industry Development Plan* (translation from Chinese), available at: http://www.gov.cn/zhengce/content/2016-12/19/content_5150090.htm (accessed: March 24, 2022)

Azerbaijan's efforts to become a digitally empowered country

The National Strategy on Information and Communication Technologies for the Development of the Republic of Azerbaijan (2003-2012) was the first official document signed by the country's former president Heydar Aliyev in 2003 to promote the systematic development of the ICT sector in Azerbaijan.¹⁰ This document set the primary goals oriented towards the continuous improvement of technological standards in the country for the initial period. In this context, since the 2010s, incumbent President Ilham Aliyev has been leading the process of promoting a large-scale expansion of the domestic high-technology industry through numerous national initiatives including launching the E-Gov Development Center,¹¹ establishing ASAN service centres,¹² implementing Single Window systems,¹³ and creating high-tech parks¹⁴ to make society, the government, and the economy more digital.¹⁵ Azerbaijan's zeal in pursuing science, technology, and innovation-based policies is based on the GoA's belief that digital technologies are key to future effective governance and a competitive economy.¹⁶

Therefore, the GoA has been demonstrating growing interest in cooperation with China's Huawei. While attending the World Economic Forum in *Davos in 2011*,¹⁷ Ilham Aliyev met with the leadership of Huawei to discuss further joint cooperation efforts in communications

10 Anl.az, *Co-development with the ICT sector* (translation from Azerbaijani), February 21, 2014, available at: http://www.anl.az/down/meqale/hafta_ichi/2014/fevral/354102.htm (accessed: March 23, 2022).

11 Digital.gov.az, *About E-GOV Development Center*, available at: <https://www.digital.gov.az/en/page/about> (accessed: June 13, 2022).

12 Asan.gov.az, *General Information about the "ASAN service" centers*, available at: <https://asan.gov.az/en/about> (accessed: June 13, 2022).

13 Customs.gov.az, *Single Window*, available at: <https://customs.gov.az/en/faydali/innovativ-layiheler/bir-pencere> (accessed: June 13, 2022).

14 Mincom.gov.az, *Projects on innovation development in Azerbaijan presented*, October 26, 2018, available at: <https://mincom.gov.az/en/view/news/416/projects-on-innovation-development-in-azerbaijan-presented> (accessed: June 13, 2022).

15 President.az, *National Strategy for the development of the information society in the Republic of Azerbaijan for 2014-2020*, April 2, 2014, available at: <https://president.az/az/articles/view/11312> (accessed: March 23, 2022).

16 Digital.gov.az, *About E-GOV Development Center*, available at: <https://www.digital.gov.az/en/page/haqqimizda> (accessed: March 23, 2022).

17 President.az, *Working visit of Ilham Aliyev to Switzerland*, January 28, 2011, available at: <https://president.az/en/articles/view/1491> (accessed: March 23, 2022).

networks.¹⁸ Alongside such high-level dialogue, Ilham Aliyev also visited the Huawei's Exhibition Center in Beijing¹⁹ during his state visit to China at the invitation of China's President Xi Jinping in 2015.²⁰ During his visit to the exhibition centre, President Aliyev praised the company's activities and expressed satisfaction with its commitment to technological development in Azerbaijan. Similarly, in his speech at Beijing's Renmin University, Ilham Aliyev repeatedly underlined the importance of close collaboration with Chinese scientific research institutions and universities.²¹ Additionally, in 2019, Ilham Aliyev held a high-profile meeting with Huawei's then leadership to reaffirm the close cooperation in the field of intelligent settlement, digital government, digital economy, digital education, smart healthcare, and innovative agriculture.²² The direct supervision of President Aliyev over the digitalization process helped boost cooperation with China in the field of digital technologies. Indeed, the growing involvement of Huawei in the technological development of the country comes in the context of increasing political and economic ties between Azerbaijan and China over recent years.²³

The government is currently running the Azerbaijan Digital Hub programme, inaugurated in 2018, to stimulate the country's socio-economic development and digital transformation efforts.

Moreover, as part of its non-oil-sector development, Azerbaijan utilizes multilateral projects to advance national priorities.²⁴ Consequently, the government is currently running the Azerbaijan Digital Hub

18 President.az, *Ilham Aliyev met with Chairwoman of the "Huawei Technologies" Co., Sun Yafang*, January 26, 2011, available at: <https://president.az/en/articles/view/1500> (accessed: March 23, 2022).

19 President.az, *Ilham Aliyev visited Exhibition Centre of Huawei Company in Beijing*, December 10, 2015, available at: <https://president.az/en/articles/view/17128> (accessed: March 23, 2022).

20 President.az, *State visit of Ilham Aliyev to China*, December 11, 2015, available at: <https://president.az/en/articles/view/17170> (accessed: March 23, 2022).

21 President.az, *Speech by Ilham Aliyev at the Renmin University of China*, December 11, 2015, available at: <https://president.az/en/articles/view/17287> (accessed: March 23, 2022).

22 President.az, *Ilham Aliyev met with Huawei chairman in Beijing*, April 25, 2019, available at: <https://president.az/en/articles/view/32865> (accessed: March 23, 2022).

23 V. Guliyev, "Azerbaijan-China relations in the Context of Belt and Road Initiative", in A. Merthan Dundar & Gurhan Kirilen (eds), *APAM China Studies* (Ankara: Ankara University Press, 2021), p.129-150, available at: <http://apam.ankara.edu.tr/wp-content/uploads/sites/485/2021/02/APAM-Cin-Calismalari-I.pdf> (accessed: March 23, 2022).

24 Vergiler.az, *Azerbaijan Digital Trade Hub*, October 11, 2019, available at: <https://vergiler.az/news/economy/4754.html> (accessed: March 24, 2022).

programme,²⁵ inaugurated in 2018, to stimulate the country’s socio-economic development and digital transformation efforts.²⁶ Along with the implementation of the Azerbaijan Digital Hub programme, Azerbaijan is aiming to reduce its reliance on foreign countries such as Russia²⁷ and Ukraine^{28 29} for internet access; enlarge the capacity of transmission networks; and, ultimately, increase its pivotal role as a regional digital hub in the South Caucasus.³⁰

In the context of the Asia–Europe telecommunications corridor, several important intergovernmental agreements were signed in 2019

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between Azerbaijan, Kazakhstan, and Turkmenistan to upgrade domestic communication infrastructure and construct commercial undersea optical telecommunications cables.³¹ The resulting high-capacity subsea fibre-optic cable lines will connect Azerbaijan with Central Asian countries via the Caspian Sea floor

As part of its Digital Silk Way initiative, a project that facilitates the creation of a technological foundation for the implementation of the Azerbaijan Digital Hub programme, Azerbaijan

25 Adh.az, *About the Azerbaijan Digital Hub program*, available at: <https://www.adh.az/en/about>, (accessed: March 27, 2022).

AzerTelecom.az, *Key Dates*, April 25, 2019, available at: https://www.azertelecom.az/en/key_dates/ (accessed: March 27, 2022).

26 Azertelecom.az, *Azerbaijan Digital Hub program*, available at: <https://www.azertelecom.az/en/projects/key/> (accessed: March 24, 2022).

27 Gunduz, O., “Russia-Ukraine war: Azerbaijan may face another threat” (translation from Azerbaijani), *Facebook*, March 9, 2022, 4:14 pm., available at: https://m.facebook.com/story.php?story_fbid=1985122988356088&id=100005752170227 (accessed: June 14, 2022).

28 Gunduz, O., “If the Internet in Russia Collapses” (translation from Azerbaijani), *Yeni Azərbaycan*, March 15, 2022, available at: https://www.yeniazərbaycan.com/MEDIA_e67043_az.html (accessed: June 14, 2022).

29 Bayramov, R., *What would happen in Azerbaijan if the Internet in Russia collapses*, (translation from Azerbaijani), *Xəzər Xəbər*, Youtube video, March 14, 2022, available at: <https://www.youtube.com/watch?v=ld4WUw2Eiwc> (accessed: June 14, 2022).

30 Sultanov, A., “Azerbaijan: From the Energy and Transport Center to the Digital Center” (translation from Azerbaijani), *Trend*, February 2, 2021, available at: <https://az.trend.az/business/it/3374100.html> (accessed: March 26, 2022).

31 Trend.az, Azerbaijan, *Turkmenistan sign intergovernmental agreement on laying fiber-optic backbone cable line through bottom of Caspian Sea*, November 29, 2019, available at: <https://en.trend.az/azerbaijan/society/3156297.html> (accessed: March 25, 2022).

is investing heavily in critical digital infrastructure to improve the variety of broadband services and remove the remaining barriers to cross-border data flows, thereby catalysing the process of transforming Azerbaijan into a transnational digital hub along the Asia–Europe telecommunication corridor.³² Against this backdrop, the main internet service provider (ISP) that connects Azerbaijan to the global internet network – AzerTelecom LLC, a subsidiary of Bakcell – is currently working on delivering the regional digital backbone for boosting solid internet connectivity that binds together the networks of neighbouring countries in the wider Caspian Sea basin through the Azerbaijan Digital Hub programme.³³ Azerbaijan is proactively seeking to promote international partnerships under multinational consortiums for this project as part of its extensive efforts to become a centre of regional digital development within the framework of the Trans-Eurasian Information Super Highway (TASIM) intercontinental project.³⁴

During the 7th Meeting of the Azerbaijan-China Intergovernmental Commission on Trade and Economic Cooperation, held in Beijing on 28 February 2019, Azerbaijan’s Minister of Transport, Communications and High Technologies Ramin Guluzade and Minister of Economy Shahin Mustafayev met high-ranking representatives of both Huawei and China Telecom (the Chinese state-owned telecommunications firm) to discuss the further development of the TASIM project and to explore possible areas of cooperation on direct fibre connections via the Caspian Sea and Central Asia. The technical issues and physical security concerns of the potential transnational submarine fibre-optic cables that would run across the bottom of the Caspian Sea between Azerbaijan, Kazakhstan, and Turkmenistan, and the possibility of China’s potential involvement in this digital route project in the near future, were the

32 ADH.az, *Azerbaijan Digital Hub*, January 24, 2019, available at: <https://www.adh.az/en/> (accessed: 30 March 2022).

33 President.az, *Law of the Republic of Azerbaijan on Ratification of the Agreement between the Government of the Republic of Azerbaijan and the Government of Turkmenistan on Joint Construction, Ownership and Operation of Fiber-Optic Communication Lines on the Bottom of the Caspian Sea on the Azerbaijan-Turkmenistan Route by Communications Operators of the Republic of Azerbaijan and Turkmenistan* (translation from Azerbaijani), April 10, 2020, available at: <https://president.az/az/articles/view/36415> (accessed: March 25, 2022).

34 Mincom.gov.az, *Project Trans-Eurasian Information Super Highway (TASIM)*, available at: <https://mincom.gov.az/en/view/pages/83/tasim/> (accessed: March 25, 2022).

main topics of discussion during the meeting.³⁵

In April 2019, President Ilham Aliyev participated in the second Belt and Road Initiative (BRI) International Forum, at which AzerTelecom and China Telecom signed a Strategic Memorandum of Understanding (MoU) to create an Asia-Europe telecommunications corridor within the framework of the Azerbaijan Digital Hub programme with the aim of fostering cooperation and coordination on cross-border internet traffic between Europe and Asia.³⁶ China's decision to demonstrate support and provide assistance to this programme within the BRI was a significant commitment in the direction of deepening ties. In the context of increasing bilateral relations, Beijing will focus on extending its reach to the non-oil sectors in Azerbaijan and will play a central role in certain key areas, especially in the field of digital technologies, under the BRI deals, as Baku simultaneously seeks to initiate a digitalized Silk Road and strategically position itself at the centre of it.³⁷

There is a range of opportunities that China can utilize to reinforce its role in the region, as the partnership between China and Azerbaijan has been elevated to a historically unprecedented level in recent years. Since the establishment of diplomatic relations in 1992, both sides have committed to building strong and substantive relations by strengthening bilateral political cooperation. Although China was not geopolitically involved in the South Caucasus region, regarding the former Armenia–Azerbaijan conflict, official Beijing has repeatedly declared that it supports the resolutions of the United Nations Security Council on the matter, which urged the unconditional withdrawal of Armenia's armed forces from Azerbaijan's territories that the former occupied during First Karabakh War (1988–1994).^{38 39}

35 [Mincom.gov.az](https://mincom.gov.az), *Minister Ramin Guluzade meets with heads of Huawei and China Telecom in China*, February 28, 2019, available at: <https://mincom.gov.az/en/view/news/541/nazir-ramin-quluzade-chinde-huawei-ve-china-telecom-shirketlerinin-rehberliyi-ile-gorushub/> (accessed: March 26, 2022).

36 [AzerTelecom.az](https://www.azertelecom.az/en/key_dates/), *Key Dates*, April 25, 2019, available at: https://www.azertelecom.az/en/key_dates/ (accessed: March 27, 2022).

37 [AzerTelecom.az](https://www.azertelecom.az/en/news/2020/02/18/96.html), *Contribution of “Azerbaijan Digital Hub” Program To Digital Economy Building Discussed*, available at: <https://www.azertelecom.az/en/news/2020/02/18/96.html> (accessed: March 27, 2022).

38 [Azernews.az](https://www.azernews.az/nation/36541.html), *China's stance on Karabakh 'clear and unchanged'*, September 23, 2011, available at: <https://www.azernews.az/nation/36541.html> (accessed: June 9, 2022).

39 [Mfa.gov.cn](https://www.mfa.gov.cn/ce/cohk/eng/Topics/fyrbt/), *Foreign Ministry Spokesperson Zhao Lijian's Regular Press Conference*, October 23, 2011, available at: <https://www.mfa.gov.cn/ce/cohk/eng/Topics/fyrbt/>

The role of China's Huawei in the digitalization of Azerbaijan

Huawei has in fact already established an extensive business presence in Azerbaijan's information and communications technologies (ICT) industry with service provision and the contribution of extensive technical assistance at all levels since the early 2000s.^{40 41 42} For years, Huawei provided different forms of technical assistance and transferred technological solutions and services to Azerbaijan's domestic mobile network operators Bakcell,⁴³ Azercell, and Azerfon.⁴⁴ Comprehensive agreements on bilateral partnership between the GoA and China's Huawei have multiplied extensively over the past decade as the development of digital infrastructure has become a key pillar of the government-led project Azerbaijan 2030: National Priorities for Socio-Economic Development.⁴⁵

Although the company eventually expanded its business into building telecommunication networks, it also funded collaborative research initiatives with leading technical universities and conducted several ICT training courses⁴⁶ to prepare a highly skilled workforce with digital literacy within its Seeds for the Future programme.⁴⁷ Azerbaijan's

t1826262.htm (accessed: June 12, 2022).

40 Azerbaijan-news.az, *A presentation of Huawei Technologies Azerbaijan was held at Azerbaijan Technical University* (translation from Azerbaijani), April 22, 2014, available at: <https://www.azerbaijan-news.az/posts/detail/azerbaycan-texniki-universitetinde-huawei-technologies-azerbaijan-sirketinin-teqdimati-olmusdur-37598> (accessed: March 13, 2022).

41 Ictnews.az, *Huawei accelerates implementation of new technologies* (translation from Azerbaijani), June 6, 2012, available at: <http://ictnews.az/read.php?lang=1&result=ok&content=13753> (accessed: March 13, 2022).

42 President.az, *Ilham Aliyev viewed Bakutel-2017 exhibition*, December 6, 2017, available at: <https://president.az/en/articles/view/26208> (accessed: March 13, 2022).

43 People.com.cn, *Huawei SmartCare Wins the Bid for Bakcell Customer Experience Management Contract in Azerbaijan* (translation from Chinese), August 5, 2014, available at: <http://tc.people.com.cn/n/2014/0508/c183008-24992410.html> (accessed: March 19, 2022).

44 Trend.az, *Azercell extends its support to Formula 1 by even stronger network*, April 28, 2018, available at: <https://en.trend.az/business/it/2895075.html> (March 19, 2022).

45 President.az, *Order of the President of the Republic of Azerbaijan on approval of "Azerbaijan 2030: National Priorities for Socio-Economic Development*, February 2, 2021, available at: <https://president.az/en/articles/view/50474> (accessed: March 13, 2022).

46 Ictnews.az, *Huawei launches ICT development program for Azerbaijani students*, May 30, 2017, available at: <http://ictnews.az/read-48096-news-2.html> (accessed: March 16, 2022).

47 Huawei.com, *What is seeds for the future*, available at: <https://www.huawei.com/minisite/seeds-for-the-future/history.html> (accessed: March 16, 2022).

Ministry of Digital Development and Transport works closely with Huawei to continually engage students in the Seeds for the Future project. Each year, students at Azerbaijan Technical University (AzTU),⁴⁸ the Azerbaijan State University of Oil and Industry (ASOIU),⁴⁹ Nakhchivan University,⁵⁰ Nakhchivan State University,⁵¹ and Nakhchivan Teachers' Institute⁵² actively take part in this educational initiative. To date, dozens of Azerbaijani students and employees of domestic tech vendors had benefited from the aforementioned programme at Huawei's headquarters in Shenzhen.⁵³ Moreover, Huawei ICT Academies,⁵⁴ a global educational programme developed by Huawei, has been established within the Baku Engineering University (BEU) and the Baku State Vocational Training Center for Industry and Innovation to train local students by providing them with more comprehensive and in-depth understanding of ICT trends.⁵⁵

Furthermore, in 2019, the Baku Higher Oil School (BHOS) and Huawei agreed to set up an ICT Academy and a joint laboratory.⁵⁶ Within

48 Tehsil-press.az, *The Seeds for the Future project has been launched at the Azerbaijan Technical University* (translation from Azerbaijani), November 5, 2018, available at: <https://tehsil-press.az/index.php?newsid=34270> (June 12, 2022).

49 Asoiu.edu.az, *Huawei makes presentation of "Seeds for the Future" project at ASOIU*, May 18, 2022, available at: <http://asoiu.edu.az/en/news/147-huawei-sirketi-adnsu-da-geleceyin-toxumlari-adli-layihe-proqramin-teqdimatini-kecirib> (accessed: June 12, 2022).

50 Nu.edu.az, *The program of the seeds of the future in the ICT field have been started* (translation from Azerbaijani), available at: <https://nu.edu.az/az/nu/geleceyin-ikt-sahesindeki-toxumlari-adli-proqram-layihe-heyata-kecirilib> (accessed: June 12, 2022).

51 Nuhcixan.az, *Students from Nakhchivan have returned from a summer training camp organized by Huawei in China* (translation from Azerbaijani), July 27, 2019, available at: <https://nuhcixan.az/news/cemiyyet/18077-naxcivanli-telebeler-cinde-huawei-sirketinin-teskil-etdiyi-yay-telim-toplantisindan-qayidiblar> (accessed: June 12, 2022).

52 Azertag.az, *Students from Nakhchivan will have an internship at Huawei* (translation from Azerbaijani), June 2, 2017, available at: https://azertag.az/xeber/Naxchivanli-telebeler_Huawei_sirketinde_tecrube_kececekler-1067029 (accessed: June 12, 2022).

53 Asiatimes.com, *Inside Huawei's huge HQ campus in Shenzhen*, June 28, 2019, available at: <https://asiatimes.com/2019/06/inside-huaweis-huge-hq-campus-in-shenzhen/> (accessed: March 19, 2022).

54 Huawei.com, *Huawei ICT Academy: Building a Talent Ecosystem and Boosting the ICT Industry's Development*, available: <https://e.huawei.com/en/publications/global/ict-insights/201907041409/talent-ecosystem/huawei-ict-academy> (accessed: June 12, 2022).

55 Ted.az, *Huawei plans to establish training and practice laboratories in educational institutions*, September 3, 2019, available at: <https://ted.az/az/view/news/4873/nazirlik-tehsili-muessiselerinde-huawei-shirketinin-tedris-ve-tecrube-laboratoriyalarinin-yaradilmasi-nezerde-tutulub> (accessed: June 12, 2022).

56 Bhos.edu.az, *Baku Higher Oil School and Huawei signed a joint cooperation contract*, available at: <https://bhos.edu.az/en/news/1199> (accessed: June 12, 2022).

the framework of a bilateral agreement, Huawei would supply computer equipment and software to undergraduate students of the Process Automation Engineering Department of the BHOS. Accordingly, the students and junior researchers would conduct scientific research at the cutting-edge laboratory facilities built through the joint efforts of Huawei and BHOS. In addition, there are plans to open more Huawei ICT centres at ASOIU and AzTU.⁵⁷ By establishing a Huawei ICT Academy, partner universities can receive authorization from the company to conduct free and independent training.⁵⁸ These centres are expected to deliver training practical skills in the latest technologies.

Huawei, with extensive project experience innovative and intelligent solutions across the globe, is now leading efforts to build smart settlements and the broadband ecosystem that will accelerate the spread of solid internet connections in the highlands and mountainous areas of the Karabakh region with innovative yet affordable devices.

Most recently, in December 2021, Azerbaijan's Ministry of Digital Development and Transport, ADA University and Huawei Technologies Co., Ltd. signed an agreement to establish a joint research and development centre (R&D Center) to cultivate the next generation of indigenous technology experts under the Huawei-led training programme.⁵⁹ This newly established centre at Azerbaijan's ADA University focuses on the development of innovative technologies through close collaboration with Chinese engineers.⁶⁰

Moreover, in 2019, government agencies such as Azerbaijan's State Customs Committee, along with mobile network operators, signed a contract with Huawei for the modernization and automation of the entire customs system through the implementation of Single Window systems. The agreement aims to enhance proficiency in applying technological resources and make innovative technology more accessible to achieve

57 Trend.az, *Huawei opens academy in Azerbaijan*, April 17, 2016, available at: <https://az.trend.az/business/it/2519223.html> (accessed: June 12, 2022)

58 Huawei.com, *Facing the Digital Future, Building an ICT Talent Ecosystem*, available at: <https://www.huawei.com/cn/tech4all/stories/ict> (accessed: June 12, 2022).

59 Azertag.az, *Azerbaijan's Ministry of Digital Development and Transport, ADA University and Huawei sign MoU*, December 8, 2021, available at: https://azertag.az/en/xeber/Azerbaijans_Ministry_of_Digital_Development_and_Transport_ADA_University_and_Huawei_sign_MoU-1946306 (accessed: March 15, 2022).

60 Mofcom.gov.cn, *Huawei signed a memorandum of understanding with the Ministry of Digital Development and Transport of Azerbaijan and the ADA University* (translation from Chinese), December 14, 2021, available at: <http://az.mofcom.gov.cn/article/jmxw/202112/20211203228422.shtml> (accessed: June 13, 2022).

the national digitalization goals as a part of the e-governance strategy.⁶¹

Huawei, with extensive project experience innovative and intelligent solutions across the globe,^{62 63} is now leading efforts to build smart settlements and the broadband ecosystem that will accelerate the spread of solid internet connections in the highlands and mountainous areas of the Karabakh region with innovative yet affordable devices.⁶⁴ In this context, Huawei's digital solutions are being employed to track, accumulate and diagnose issues in agriculture, healthcare, and the environment to improve food safety and availability in relatively unpopulated rural areas.⁶⁵ Meanwhile, Huawei has deployed its AirPON end-to-end (E2E) hardware solution – a newly developed gigabit optical network services introducing speedy internet connection – in Aghali village of Zangilan district of the East Zangezur economic region of Azerbaijan.⁶⁶

In the wake of massive reconstruction works, Huawei's smart village concept and the digital services that envisage bolstering the revitalization of rural industries and the resettlement of IDPs are also being applied in Aghali village, specifically in the agriculture, education, healthcare, rural estate management, and renewable energy sectors.⁶⁷ In practice, Huawei's smart village concept, combined with powerful data analysis platforms, remote diagnostics services, surveillance tools, solid internet networks, and AI-enabled frontier technologies, can improve the quality

61 Anews.az, *Azerbaijani State Customs Committee introducing innovative technologies*, September 12, 2019, available at: <https://anews.az/en/azerbaijani-state-customs-committee-introducing-innovative-technologies-photo/> (accessed: March 19, 2022).

62 President.az, *Ilham Aliyev visited Jabrayil and Zangilan districts*, April 26, 2021, available at: <https://president.az/en/articles/view/51295> (accessed: March 10, 2022).

63 Ping. G., “Go far and build a smart city with a sense of gain, happiness and security”, *Huawei*, available at: https://e.huawei.com/cn/publications/cn/ict_insights/ict31-digital-government/cover/smart-city (accessed: March 7, 2022).

64 Guliyev, V., “How Huawei contributes to digitalization in Karabakh”, Op-Ed, *Daily Sabah*, January 11, 2022, available at: <https://www.dailysabah.com/opinion/op-ed/how-huawei-contributes-to-digitalization-in-karabakh> (accessed: March 3, 2022).

65 Azertag.az, *Huawei to apply its most advanced technologies in Karabakh*, April 28, 2021, available at: https://azertag.az/en/xeber/Huawei_to_apply_its_most_advanced_technologies_in_Karabakh-1767419 (accessed: March 4, 2022).

66 President.az, *Ilham Aliyev visited Jabrayil and Zangilan districts*, April 26, 2021, available at: <https://president.az/en/articles/view/51295> (accessed: March 10, 2022).

67 President.az, *Ilham Aliyev viewed works done under the “smart village” project implemented in Aghali village, Zangilan district*, October 21, 2021, available at: <https://president.az/en/articles/view/53631> (accessed: March 12, 2022).

of life and economic well-being of communities who are going to live in low-density rural areas rich in natural resources. Reportedly, another Huawei smart village project, covering 450 houses, is currently under construction in the Fuzuli district of the Karabakh economic region of Azerbaijan.⁶⁸ Once fully completed, these projects will tend to stimulate the region's socio-economic and environmental development and gradually help to overcome the technological gaps between urban and rural areas. As Huawei gains a major role in building the digital backbone of the Karabakh region, its ability to shape the region's high-tech landscape in the long term will grow exponentially.

Given that Azerbaijan also embraces Chinese technology for economic development purposes, and Azerbaijan's major domestic network operators still have strong ties to Huawei for collaboration on critical digital infrastructure, questions might be raised about the potential security issues that might be posed by Chinese tech firms.

Given that Azerbaijan also embraces Chinese technology for economic development purposes, and Azerbaijan's major domestic network operators still have strong ties to Huawei for collaboration on critical digital infrastructure, questions might be raised about the potential security issues that might be posed by Chinese tech firms. Chinese digital products and services, including those of Huawei, are much more affordable, faster, and come with greater regulatory flexibility compared with what other global tech suppliers offer, thus making them attractive. In contrast, Georgia, for example, in order to counter China's regional digital footprint, banished Huawei from Georgia's 5G network (following the signing of a memorandum of understanding with the USA).⁶⁹

However, the GoA is committed to ensuring the security and resilience of the nation's internet networks.⁷⁰ Consequently, in 2012, the GoA established the State Agency for Special Communications and Information Security to protect the country's network infrastructure

68 President.az, *Ilham Aliyev laid foundation stone for "smart village" in Dovlatyarli village, Fuzuli district*, October 18, 2021, available at: <https://president.az/en/articles/view/53507> (accessed: March 13, 2022).

69 Ge.usembassy.gov, *United States – Georgia Memorandum of Understanding on 5G Security*, January 14, 2021, available at: <https://ge.usembassy.gov/united-states-georgia-memorandum-of-understanding-on-5g-security/> (accessed: June 15, 2022).

70 President.az, *Decree of the President of the Republic of Azerbaijan on measures to improve activities in the field of information security* (translation from Azerbaijani), September 26, 2012, available at: <https://president.az/az/articles/view/6298> (accessed: June 15, 2022).

and avoid potential threats caused by network security issues.⁷¹ The agency provides cyber security guidance and ensures that the network security and privacy protection strategy is well implemented across the country. Moreover, the Cyber Security Center under the Ministry of Communications and High Technologies of the Republic of Azerbaijan was launched in 2012 to address systemic cybersecurity challenges.⁷² This centre is responsible for safeguarding network service continuity, reducing risks, and securing the digital transformation efforts of the government.⁷³ In light of the foregoing, while deploying its technologies, Huawei must be fully aware of the importance of privacy protection and committed to protecting the personal data of customers based on the country's personal data protection laws⁷⁴ and regulations.⁷⁵

Conclusion

The GoA is increasingly implementing emerging technologies and actively embracing all aspects of digitalization to build a high-quality digital government by pursuing practical and responsive policies. The COVID-19 pandemic has created a favourable environment for exploiting new digital solutions in widely diversified industries in the midst of lockdown and social distancing, and this has resulted in catalysing the digital transformation to close the technological gap.

With significant official support, innovation policies driven by advanced technologies will lay the foundation for the sustainable economic revitalization of the liberated territories. The deep integration of digital technology in numerous cities and villages

71 Dxm.gov.az, *About State Agency for Special Communications and Information Security*, available at: <https://dmx.gov.az/page/55/xritda> (accessed: June 15, 2022).

72 E-qanun.az, *On measures to improve information security* (translation from Azerbaijani), September 26, 2012, available at: <https://e-qanun.az/framework/24353> (accessed: June 15, 2022).

73 Cert.az, *Statute on Cyber Security Center under the Ministry of Communications and High Technologies of the Republic of Azerbaijan*, available at: <https://cert.az/en/about-us/statute1> (accessed: June 15, 2022).

74 E-qanun.az, *About Personal Information* (translation from Azerbaijani), May 10, 2010, available at: <https://e-qanun.az/framework/19675> (accessed: June 15, 2022).

75 Dataguidance.com, *Azerbaijan - Data Protection Overview*, November, 2021, available at: <https://www.dataguidance.com/notes/azerbaijan-data-protection-overview> (accessed: June 15, 2022).

across the liberated territories would increase the overall industrial capacity and consequently make the region an attractive foreign investment destination. Most importantly, the rapid reconstruction and digitalization process is expected to attract hundreds of thousands of IDPs back to their homes.

From the economic point of view, the widespread diffusion of critical technologies and exploitation of key digital advances will have profound effects on the country's economy, dramatically affecting the cost-efficiency of manufacturing production and reducing manufacturing costs; maximizing the quality of products; decreasing the price of goods and services; and ramping up the scale of production.

Nevertheless, strategically implementing and exploiting large-scale technological solutions in such a vast territory is no easy feat. In many cases, it requires meticulous planning and preparation, vast amounts of financial and technical capital, and plenty of time to deploy and install the necessary technologies. Thereafter, it remains to be seen whether it will, in practice, be possible to effectively apply all these technologies in multiple spheres of individuals' lives.

Presently, the government-led initiative heavily relies on investment from central government and, despite the massive investment, the process remains one of adaptation rather than innovation. Unfortunately, the pace of innovation is relatively slow and it remains a frustrating pursuit for many domestic tech vendors in Azerbaijan. In order to build digital independence and establish Azerbaijan as a digital development leader in the region, the GoA also needs to encourage private sector technology innovation, supporting small to medium-sized enterprises (SME) and innovative start-ups to enable the rapid advancement of digital services and build a high-quality indigenous entrepreneurial ecosystem. In addition, the lack of a skilled technical workforce poses another unprecedented challenge to the ongoing transition process. In this case, for overcoming skill shortages and fostering innovation, the government has to focus on launching nationwide workforce development programmes to boost digital prowess by systematically training a sufficient number of people who possess the essential technical skills that align with the needs of the Fourth Industrial Revolution. Clearly, without achieving

higher levels of human capital development and strengthening the competitiveness of knowledge-based industries, as well as without effectively coordinating of the implementation of innovative policies and providing substantial support to SMEs, attaining digital independence and distancing the country from foreign technology over the coming years will be difficult.