

# Digital Solutions Centre in Central Asia

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# Abstract

The central proposition of this report is that Kazakhstan is in pole position to become the digital hub of Central Asia through the creation of a Digital Solutions Centre (DSC). Kazakhstan has already made progress towards a digital transformation with its whole-of-government approach to e-government following models such as Republic of Korea's National Information Society Agency (NIA) and Singapore's GovTech which set the pace for the rest of the economy and society to follow. A DSC would focus on evidenced-based research and recommendations to policy-makers for the adoption of emerging digital technologies across the whole of the economy, what can be called the supply value chain (SVC), addressing issues such as digital agriculture, the automation of industry 4.0 through the networked use and management of process sensors and the Internet of Things, intelligent transport networks and digital customs, a national QR code for the digitalisation of financial services and payment systems, and the adoption of internationally-recognized digital standards to promote digital trade and investment. A DSC would accelerate Kazakhstan's digital transformation in all sectors, including areas such as social welfare, an interoperable health system, online lifetime education services in the age of the COVID-19 pandemic and progress towards the social development goals (SDGs), especially those associated with green digitalisation, renewables, and energy conservation.

Neighbouring countries from Central and North Asia (Mongolia) should be invited to participate in the governance of the DSC which would be outward-looking, sharing the best practices from Kazakhstan and globally, aiding neighbours to accelerate their own digitalisation programmes, and inviting world experts to share their knowledge and experience. The report surveys other sub-regional organisations that play an important role in the economic and social development of Central Asia and the numerous UN agencies and multilateral bodies

that offer support and find that none is exclusively 'owned' and 'governed by' Central Asia republics. A DSC that was 'local' in the sense of ownership would be uniquely well positioned to address many of the long-standing issues and areas of conflict that have divided rather than united neighbouring countries by reinforcing diplomatic efforts with real solutions, for example, applying digital technologies to monitor and regulate scarce water supplies under sub-regional cooperative management. A DSC would offer Central Asia solutions of its own, under its own sub-regional collective controls.

The report examines three possible models for such a DSC and ways to fund it. The preferred model is initial funding by Kazakhstan with funding also from participating neighbouring countries who will be directly represented in the governance of the DSC. An advisory and observer status would be available to multilateral or regional funding bodies who would be invited to provide additional financial and technical support to specific projects recommended by the DSC. The proposal for a DSC arose from The Memorandum of Agreement (MoA) between the Ministry of Digital Development, Innovations and Aerospace Industry of Kazakhstan (MDDIAI) and UNESCAP was undersigned on April 20, 2021.

The summary of the report was presented at the technical consultation meeting delivered by the ESCAP secretariat and the MDDIAI on 14 July 2021 to review and discuss the progress and plan of on-going activities including establishing the digital solutions center. The main participants that attended the consultations with ESCAP from Kazakhstan were representatives from MDDIAI and MOFA including experts from KazAID, Zerde and Qazinnovations.

## Keywords

Digital Solutions Centre, Central Asia, Cloud Computing, Information and Communications Technology, ICT, Asia-Pacific Information Superhighway, Digital Transformation, Digitalisation, Sustainable Development Goals.



# Abbreviations and Terminology

AI	Artificial Intelligence – an advanced form of Machine Learning (ML)
ALTD	Asian Land Transport Infrastructure Development
AIFC	Astana International Finance Centre
AP-IS	Asia Pacific – International Superhighway
Big Data	Large scale data sets originated from a wide variety of sources
Blockchain	A transparent ‘distributed’ digital ledger in which transaction entries are immutable and from which smart contracts can be automated
CAC	Central Asian Countries
CDNs	Content Distribution Networks
Digitalisation	The application of digital tools and technologies to government, business and consumer economic and social activities that results in new working arrangements for each, for example, e-Govt, platform businesses, social media
Digital Transformation	The nationally planned promotion of digitalisation to whole-of-government, whole-of-economy and whole-of-society resulting in the possibility of user-led procedures and processes in each sector
DSC	Digital Solutions Centre
ESG	Environmental, Social, and Governance
GBPP	Green Bridge Partnership Programme
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GHG	Green House Gases
GIS	Geographic Information System
GovTech	Government Technology Agency
GTGP	GovTech Global Partnership

## Abbreviations and Terminology (cont'd)

HW & SW	Hardware & Software
IaaS	Infrastructure-as-a-Service
IGTIC	International Green Technologies and Investment Projects Centre
Innovation	A new way of using digital technologies, such as AI or blockchain
Invention	The creation of new digital technologies such as algorithms
IoT	Internet-of-Things )
ISP	Internet Service Provider
IXP	Internet Exchange
LEO	Low Earth Orbiting Satellite
ML/AI	Machine Learning/Artificial Intelligence
NAC	North Asian Countries
Open RAN	An intelligent Radio Access Network (RAN) integrated on general purpose platforms with open interface between software defined functions
PaaS	Platform-as-a-Service
SDGs	Sustainable Development Goals
SVC	Supply Value Chain
TASIM	Trans-Eurasian Information Super Highway
TEA	Trans-Europe-Asia
TNECs	Transnational Economic Corridors

# 1. Introduction

This Report has been commissioned by UNESCAP following the Memorandum of Agreement (MOA) between the Ministry of Digital Development, Innovation, and the Aerospace Industry (MDDIAI) of the Republic of Kazakhstan and UNESCAP in April 2021 that covers, among other initiatives, the opportunity to establish a Digital Solutions Centre (DSC) to research and propose a package of solutions to policy-makers using emerging digital technologies to accelerate an economic and social digital transformation. The MOA covers five areas as follows:

## Box 1: MOA Between MDDIAI and UNESCAP

1. Organise expert consultations and intergovernmental meetings in North and Central Asia on advancing and implementing the Asia Pacific Information Superhighway (AP-IS)
2. Research the possible options for a DSC in Kazakhstan “as a sub-regional affiliated body to the AP-IS to support Central Asian countries and Mongolia (and other countries) ...”
3. Cooperative in joint activities and projects in North and Central Asia and beyond, top support the *SPECA Thematic Working Group on Innovation for Sustainable Development*
4. Cooperate for the formulation and implementation of the 2<sup>nd</sup> phase action plan for the AP-IS 2022-2026
5. Cooperate for the delivery of the High-level Regional Forum on Digital Transformation, engaging innovation business partners of Asia and the Pacific region

This Report specifically addresses point 2 of the MOA, however in considering the tasks of the DSC the other points will be considered where relevant. The Terms of Reference (TOR) issued by UNESCAP had called for “an action-based report for establishing a *Digital Solution Centre* for *Central Asia* in Kazakhstan.” The provisional title was a *sub-regional centre* and in the following Report the reference is to a *Digital Solutions Centre* (hereinafter just DSC) in the plural on the understanding that the tasks to be performed would likely be multiple or as the TOR puts it “to provide various digital solution packages for policy makers.”

The objective outlined in the TOR, and point 3 above in the MOA, is “to promote a seamless *SPECA* digital market in line with digital connectivity and transformation.” As stated on its

website the “United Nations Special Programme for the Economies of Central Asia (SPECA) was launched in 1998 to strengthen subregional cooperation in Central Asia and its integration into the world economy. The countries of SPECA are Afghanistan, Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan.” The areas of focus of SPECA are listed as:

### SPECA Key Areas of Work

1. Water, Energy and Environment
2. Sustainable Transport, Transit and Connectivity
3. Trade; Statistics
4. Innovation and Technology for Sustainable Development
5. Gender and SDGs.

## RESEARCH OBJECTIVE

The objective of the report is to propose up to three scenario options based on assumption that a DSC be established in Kazakhstan. Each scenario will propose a set of feasible focus and functions, governance, and funding aimed to create a DSC that has appeal across the sub-region of Central Asian Countries (CACs) and Mongolia (North Asian Country (NCA)). Due to the wide scope of anything related to digitalisation and to digital transformation the Report develops a conceptual framework within which to identify the focus and functions of a DSC. The framework is outlined in the methodology section of the Report.

## METHODOLOGY

The methodology starts with a literature review and a mapping of relevant sub-regional initiatives, notes the broad scope of the digitalisation and digital transformation process and develops a conceptual framework to manage the analysis.

1. A literature review has been the first step in preparing this report, including an extensive mapping of the many organisations and agencies and their mandates that are focused upon promoting the economic, social and cultural wellbeing of the sub-region, including the achievement of the UN Sustainable Development Goals (SDGs) – see Annex A. The importance of this is twofold: first, to come to a judgement whether a DSC would needlessly duplicate the efforts already being made by others, and second to identify areas in which a DSC could co-operate with other agencies across the sub-region, where cooperation implies the exchange of information, data and knowledge, and collaborate with them, which implies working together on joint projects or programmes such as research and advice to policy-makers.
2. The literature review was supplemented by interviews conducted by Zoom videoconferencing. Each interview lasted around one hour, and most were conducted within Kazakhstan following the MOA – see Annex B. Arising from the interviews came a clearer vision of what value-added contribution a DSC could make both to Kazakhstan and the sub-region. As Kazakhstan already has Zerde (National Infocommunication Holding) an agency for the promotion of IT and the digital transformation in Kazakhstan,<sup>2</sup> for a DSC to add value it needs to reach outwards across the sub-region to create a rising tide that raises all boats. This is the consensus of those interviewed.
3. As there are no universally agreed definitions of digitalisation or digital transformation it is important to start with a clarification of their meaning as used in this report which is in line with the terminology of UNESCAP.
  - **Digitalisation** - is defined as the application of digital tools and technologies to government, business and consumer economic and social activities that results in new working arrangements for each, for example, e-Govt, platform businesses, pay-as-you-go cloud computing, streamed entertainment business models, social media, etc.
  - Examples would range from the use of drones equipped with monitoring software to analyse water purity, agricultural land use, etc; FinTech adoption by banks and financial institutions using AI and online financial tools; automated Industry 4.0 (i4.0) using sensors to all parts of the production process; online platforms to support e-commerce and online services, etc. In all these cases the shape and nature of the business ‘model’ undergoes

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<sup>2</sup> Zerde (2021) *Digital projects in Kazakhstan*  
[https://zerde.gov.kz/en/activity/digital\\_projects/](https://zerde.gov.kz/en/activity/digital_projects/)

fundamental and irreversible changes and with it the need for a digitally skilled workforce.

- **Digital transformation** – is defined as a nationally planned promotion of digitalisation to whole-of-government, whole-of-economy and whole-of-society.
  - Examples would range from the use of smartphones and QR codes to pay *all* government services, such as arranging the payment of duties, taxes and charges, or making applications for permits, licences and registrations to the use of AI to proactively alert citizens to personal health risks, and Government encouragement for

the private sector to similarly innovate with cloud-computing based digital services that support, for example, the portability of consumer data across the economy to maximise the competitive delivery of services, etc.

4. A conceptualisation is necessary for the components of a DSC strategy for digital transformation. Digital transformation inevitably embraces a wide landscape of emerging digital technologies and possible applications, such as the examples below in Table 1, but on its own a listing of digital technologies and areas for their application is too broad and lacks a focus.

**Table 1. Examples of Emerging Digital Technologies**

Infrastructures	Information	Applications/Services
<b>Networks</b>	<b>Data</b>	<b>Algorithms</b>
Fast broadband Internet	Data Systems	AI in FinTech
5G, 6G	Big Data	AI in e-government
Networked IoTs (sensors)	Data portability	AI in social media
Cloud computing (IaaS, PaaS)	Cybersecurity	AI in health diagnosis
Virtual networks	Data ownership	AI in marketing
Platforms	Data privacy	AI in biotechnology
Interconnected networks	Data sharing	AI in nanotechnology
Interoperable networks	Data standards	AI in emissions reduction
Network standards	Data categorisation	AI in resource management
Intelligent Transport Network	Blockchains	AI in autonomous vehicles

Source: Author's contribution

Note: In each of these areas, which are selected for illustration only, to facilitate and promote them there are important issues of laws, regulations and policies that need to be identified and solutions provided by a DSC.

Two additional ways offer a more focused approach. First, a DSC needs to connect issues that are closely related to each other. For example, if FinTech is a leading sector then it is important that it is supported by cloud computing networks, AI applications and 4G/5G networks together with any necessary changes to laws and regulations. If meeting a country's nationally determined contributions (NDCs) to the Paris Agreement on Climate Change is an issue, then a DSC needs to have proposals for local digital auditing of emissions and the use of AI in emissions reduction. Cataloguing issues into

function 'boxes' is one way of identifying the connections.

- **Mega issues** that affect all countries of the sub-region, are overarching and pose serious challenges to economies and society such as climate change, renewable energy sources, population ageing, rapid urbanisation, water conservation, etc.
- **Foundational issues** upon which the digitalisation of the economy and digital transformation require as a pre-requisite,

namely an infrastructure of digital networks, of transport and logistic systems, but also a comprehensive system of digital literacy and skills training.

- **Applications and service issues** that allow economies and societies to make the digital transformation.

Second, in recognition that different countries are at different stages of the digitalisation process, and that a DSC needs to have the capacity to offer digital solutions advice to governments across the sub-region, a two tiered architecture can be used that also embraces the SDGs.

- **The high-level tier** is a focus on whole-of-government digital transformation, which, following the Singapore example of GovTech<sup>3</sup> classifies its services and applications as Government, Business and Citizens. The corresponding example from the Republic of Korea would be the National Information Society Agency, NIA.<sup>4</sup> So a DSC advising the Government of Kazakhstan for example would focus its functions on providing digital solution packages that addressed the whole-of-government and whole-of-economy use of frontier digital technologies such as AI and blockchains, but would also proffer that advice to other countries where it was appropriate and explore, for example, opportunities for CACs to jointly research AI through their universities and applied research institutes and develop common and harmonised standards and guidelines for AI development and deployment.
- **A lower-level tier along the supply value chain (SVC)** that focuses the functions of the DSC

upon applications of frontier digital technologies to specific sectors of the economy accompanied by recommendations for policy and legal and regulatory changes. For example, advancing digital agriculture through the use of drone applications, remote controlled field ploughing, seeding, pest-control and watering, the use of digitally-enabled contract farming, etc. *by sharing the knowledge and experience of all such projects across the sub-region as well as global best practice.* Another example would be a focus upon the foundation issue of sharing ways to enhance digital literacy and skills. *Through a focus on specific sectors along the SVC the DSC could offer a cherry-picking approach to digital transformation based upon developing lead sectors within an economy.* Given the growing interconnectedness of digitalised sectors, such as the complementarity between online payment networks and e-commerce and e-agriculture, the transformation of one entire sector would likely trigger it in another.

- **The SDGs** are relevant to all issues covered by the DSC. For example, a GovTech approach to clean water, a basic SDG, might recommend for all resources including water supplies be subject to smart metering and the use of economic charging, while a project-based SVC approach might focus upon specific digitally-controlled technologies to purify water *drawing upon the experience of other CACs or global best practices*, which would complement smart metering and economic charging at the user end.

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<sup>3</sup> GovTech Singapore <https://www.tech.gov.sg/>

<sup>4</sup> National Information Society Agency  
<https://eng.nia.or.kr/site/eng/04/1040400000002016093002.jsp>

**Figure 1. GovTech's SVC Classifications based on SDGs**



Source: John Ure (2021)-Author

Figure 1 shows the high-level tier using the GovTech classifications and the lower-level tier showing a simplified version of sectors from infrastructure to foreign trade along the SVC, together with a commitment to achieving the SDGs with each sector and across all sectors. At all times, when the DSC researches any given project or programme, the relevant SDGs are explicitly stated within the objectives of the research and policy advice.

Applying these dimensions responds to a reality that needs to be addressed, namely that not all CACs or Mongolia are at the same stage of digital development. In most there are leading sectors,

such as Fintech, the use of smartphone apps, especially for social media interaction and for citizens to access online services of e-government, but in other sectors, such as agriculture or manufacturing, the digitalisation process is in its very early stages and the digital divide remains wide between urban and rural communities. By contrast, Kazakhstan is relatively well-developed along the path of digitalisation and is preparing for a digital transformation of its economy and society.

## 2. Digitalisation in Central Asia and a GovTech Approach for a DSC

The proposition of this Report can be summarised as follows:

- The digital transformation of a country will be an uneven process, most likely starting with e-government for the public sector and in leading sectors, such as FinTech and mobile phone apps and social media, in the private sector. Whereas the focus of the public sector is upon *innovation* through the adoption of frontier digital technologies, the private sector will likely be the source of *invention* of the new technologies and the new business models that arise from them, such as data-driven platform-based two-sided markets – a two-sided market occurs when an operator of a platform can charge vendors and advertisers in the one side and users on the other. These markets tend to be dominated by digital start-ups such as Amazon, Alibaba, Facebook and Google. Their influence and the scope of the state's adoption and promotion of digital technologies will trigger the pace at which other sectors also digitalise, such as agriculture, manufacturing and logistics, as digital networking begins to connect all sectors.
- This process can be guided by a DSC-sponsored digital transformation strategy that identifies and promotes whole-of-society, whole-of-economy, whole of government technological innovation based upon

'everything digital' and 'everything transformational.' 'Everything digital' implies all state-sponsored but private sector developed innovations to be digitally based. 'Everything transformational' implies a shift from a focus on the supply-side to citizen and user-centric and community-side focused. Countries that are not so far down the digital pathway will pick and choose their priorities from the strategy. For example, a digital economy relies upon citizens having a digital ID, so the progression is from a paper-based ID to a smartcard ID to an online digital ID. This Report is being written on a computer that is turned on by recognising the fingerprint of the author.

- The process is important because digital development in the countries of Central Asia is uneven; world rankings of the state of digital and network readiness show (Table 2) Kazakhstan as significantly ahead of other Republics, followed by Uzbekistan, then Kyrgyzstan and near-neighbour Mongolia (in North Asia) with Tajikistan trailing. No data was available for Turkmenistan, although there is a digital plan for 2019-2025.<sup>5</sup>
- The guidance for global best practice for the DSC will come from examples from the Republic of Korea (NIA), from Singapore (GovTech) and other advanced digital economies.

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<sup>5</sup> BT Business (July 2020) Digitalization Underway in Turkmen Economy' <https://business.com.tm/post/5764/digitalization-underway-in-turkmen-economy>



**Table 2. Ranking and rating of Central Asia countries on various network readiness indices.**

Country	2020 Network Readiness Index – Portulans Institute (Number of countries)	Cisco Global Digital readiness 2019 (Number of countries)
Kazakhstan	56 (134)	49 (141)
Uzbekistan	NA	80 (141)
Mongolia	89 (134)	88 (141)
Kyrgyzstan	94 (134)	84 (141)
Tajikistan	109(134)	106 (141)

Sources: The Network Readiness Index 2020, Portulans Institute, [https://networkreadinessindex.org/wp-content/uploads/2020/11/NRI-2020-V8\\_28-11-2020.pdf](https://networkreadinessindex.org/wp-content/uploads/2020/11/NRI-2020-V8_28-11-2020.pdf); Cisco Global Digital readiness 2019, [https://www.cisco.com/c/m/en\\_us/about/corporate-social-responsibility/research-resources/digital-readiness-index.html#/](https://www.cisco.com/c/m/en_us/about/corporate-social-responsibility/research-resources/digital-readiness-index.html#/)

The National Information Society Agency (NIA)<sup>6</sup> of the Republic of Korea and GovTech of Singapore<sup>7</sup> are two leading global examples of strategies for digital transformation.

### Box 2: Digital Transformation Strategies in Republic of Korea and Singapore

#### Republic of Korea

In the Republic of Korea, the role of government in the promotion of a digital transformation started with nascent e-government services in which Korea soon became a world leader.<sup>8</sup> The World Bank Group (2016) *Bringing Government into the 21st Century: The Korean Digital Governance Experience*,<sup>9</sup> has an excellent account of how lessons were learned from early errors to achieve world leadership. Korea’s National Information Society Agency (NIA)<sup>10</sup> was established in 1987 under the Ministry of Science and ICT and the Ministry of Interior and Safety of Korea, as a “national think-tank for the informatisation and communication and the agency is providing optimal methodologies, strategies and solutions to the government and the other public agencies, local autonomies and relevant public and private enterprises.”<sup>11</sup> Under the impact of COVID-19, Korea launched a USD62 billion Korean New Deal consisting of a Green New Deal to reduce Green House Gas emissions and a Digital New Deal to strengthen Korea’s competitiveness in fields of the future such as 5G, big data, and AI. These were announced by President Moon Jae-in at 6th Emergency Economic Council Meeting in June 2020.

#### Singapore

Singapore similarly created a national digitalisation agency, GovTech in 2016 arising from a journey which began with a national computerisation programme in the 1980s, then to an Intelligent Island by 2000 – by 2013 Singapore was ranked just behind Seoul as the world’s leading Smart Cities – and transforming Singapore into a Smart Nation by the 2020s – see Our Journey & Milestones. Examples of a Smart Nation include, for example for citizens, smart parking whereby each parking space has a number which can be booked and paid for by mobile phone calibrated in minutes, a COVID-19 Track & Trace mobile app and portable dongle that allow controlled entrance into public amenities, and a Government QR code that enables citizens to pay all government taxes and fees by a mobile app. Business services include a Government Commercial Cloud that provides “innovations and capabilities of commercial cloud computing platforms to less sensitive Government systems”, a Networked Trade

<sup>6</sup> National Information Society Agency (NIA) <https://www.aseanrofund.com/our-partners/national-information-society-agency-nia>

<sup>7</sup> GovTech (2021) [Digital Government Transformation \(tech.gov.sg\)](https://tech.gov.sg/)

<sup>8</sup> Centre for Public Impact (2016) Building world-beating e-government in South Korea, <https://www.centreforpublicimpact.org/case-study/building-a-world-leading-e-government/>

<sup>9</sup> World Bank Group (2016) Bringing Government into the 21<sup>st</sup> Century: The Korean Digital Governance Experience, <http://documents.worldbank.org/curated/en/934391468011726182/pdf/106581-REVISED.pdf>

<sup>10</sup> National Information Society Agency (NIA) <https://www.aseanrofund.com/our-partners/national-information-society-agency-nia>

<sup>11</sup> National Information Society Agency (NIA) <https://www.aseanrofund.com/our-partners/national-information-society-agency-nia>

Platform (NTP) that provides a one-stop shop for customs declarations and connects the trade value chains, a Business Grants Portal (BGP) enables businesses apply for grants without having to approach many different government agencies. Among the numerous Government services is a data sharing Smart Nation Sensor Platform that “will be one of the anchor initiatives that will enable everyone and everything, everywhere, to be connected all the time in Singapore.”<sup>12</sup>

Many high-income economies have GovTech-type national digital transformation agencies. It is a concept championed by The World Bank. To quote:

*“GovTech is a whole of government approach to public sector modernization. GovTech emphasizes **three aspects** of public sector modernization: citizen-centric public services that are universally accessible, a whole-of-government approach to digital government transformation, and simple, efficient and transparent government systems.”*

The GovTech Global Partnership (GTGP) was established by the World Bank's Governance Global Practice in December 2019, supported by funding from the governments of Austria, the Republic of Korea and Switzerland. It could reasonably be said that GovTech is a way to give consistency to the frameworks of national plans for the digital transformation of economies and societies using the best practices as developed by countries such as Korea and Singapore.

GovTech would therefore seem to be a good starting point to examine the possible roles of a DSC. In fact, Kazakhstan has over the years enjoyed close cooperation with Korea, is home to over 100,000 ethnic Koreans, is Korea's major trading partner in Central Asia, and has consciously followed elements of Korea's development model.<sup>13</sup> The collaboration continues into 2021 with a joint agreement to produce satellites and a digital transformation of

the water supply.<sup>14</sup> Kazakhstan is also seen as having followed the Singaporean mixed-economy approach with a strongly interventionist government combined with social protections such as public housing, education, and health.<sup>15</sup> In November 2018 the two countries signed a Bilateral Investment Treaty but no digital technologies at the time were specified,<sup>16</sup> a point that reflects Kazakhstan's continuing over-reliance upon extractive industries and traditional manufacturing, which is motive enough to look towards a digitalisation of its entire Supply Value Chain (SVC). The lessons from GovTech are that success will be heavily dependent upon three factors: a positive role played by the state, partnership with the private sector and an openness to foreign investment and frontier digital technologies such as AI, 3-D printing, data analytics, etc. The combination in Kazakhstan of the Singapore and Korean models suggests a DSC could make a significant difference.

## KAZAKHSTAN

As noted above, Kazakhstan is very much the digital leader in Central Asia. In 2016 a regional presentation of the World Bank Report on Digital Dividends held in Almaty noted that since 2006 – all quotes below are from this report – the number of internet users in Kazakhstan has increased from 8.3% to 68.1% – thanks largely to the development of a modern telecom infrastructure in the country. This has also helped raise Kazakhstan's ranking in the 2014 UN E-Government Survey to 28<sup>th</sup> position, and to 62<sup>nd</sup>

<sup>12</sup> GOVTECH Singapore – Products and Services [Products and Services \(tech.gov.sg\)](https://tech.gov.sg)

<sup>13</sup> Interview, Mr Ilyas Ospanov President of Qazinnovation, MDDIAI, 13th April 2021

<sup>14</sup> QAZAQ TV (June 2021) 'Kazakhstan and South Korea intend to jointly produce satellites' <https://qazaqtv.com/en/news/business/9281-kazakhstan-and-south-korea-intend-to-jointly-produce-satellites>

<sup>15</sup> Amanbekov, Timur, Nazarbayev University Repository (1 May 2020) 'The Implementation of the Singaporean Model in Kazakhstan: Applying or Appealing?' <https://nur.nu.edu.kz/handle/123456789/4624>

<sup>16</sup> Invest Kazakhstan (November 2020) 'Kazakhstan and Singapore's strategic partnership strengthens by \$2BN' <https://www.cnbc.com/advertorial/2018/11/21/kazakhstan-and-singapores-strategic-partnership-strengthens-by-2bn.html>

place in the 2014-15 Global Competitiveness Report of the World Economic Forum for the number of internet users and 58<sup>th</sup> for users of broadband internet, out of a total of 144 countries. “Digital Kazakhstan 2020” was seen as “creating a digital platform to increase competitiveness of sectors of the economy and increasing standards of living are the main objectives of this program.” At a meeting of CAREC in June 2021,<sup>17</sup> the representative of Kazakhstan noted that the government was moving beyond Digital Kazakhstan to give a greater focus upon human-centric and smartphone-based services and complementary changes to business processes; in other words, a process of digital transformation. A good example of this comes from Korea’s NIA see presentation at <https://www.youtube.com/watch?v=DNROJHEObRA>

It is unlikely a DSC would replicate the precise models of the NIA or GovTech because the resources available are less in Kazakhstan, the digital foundations along the SVC are not as well developed, and the system of government is different. Nevertheless, Kazakhstan does seem to be in a position to make the necessary leap forward by exploiting frontier and emerging digital technologies, especially those associated

with AI, FinTech, Big Data analytics, Industry 4.0 generally, blockchain applications, smart city applications and digital technologies designed to manage natural resources, renewables, and combat GHG emissions.

### **KazAid**

KazAid has established international cooperation with numerous aid agencies, notably the US Agency for International Development (USAID), Japan International Cooperation Agency (JICA), German Society for International Cooperation (GIZ), Korea International Cooperation Agency (KOICA), Slovak Agency for International Development Cooperation (SlovakAid), and the Czech Agency for International Development (CzDA). The goals of KazAid include assisting the social and economic development of a partner country and the gradual transition of a partner country towards prioritising environmental protection and climate change issues. This is important because it demonstrates Kazakhstan’s commitment to sub-regional as well as international cooperation at the political level and collaboration at the programme and project level.

Objectives of official development assistance include (Box 3):

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<sup>17</sup> ADB/CAREC Zoom 25<sup>th</sup> June 2021.

### Box 3: KazAid Development Assistance aimed at the following sectors:<sup>18</sup>

1. Agriculture and food security.
2. Environmental protection, including assistance for the development of global and regional environmental initiatives.
3. Rational use of natural resources.
4. Assistance in addressing transboundary water problems.
5. Facilitation of simplification of border-crossing procedures.
6. Conflict management and security.
7. Combating illegal drug trafficking and transnational crime, including human trafficking, illegal migration and arms trafficking.
8. Education and science.
9. Healthcare.
10. Good governance.
11. Support for business activity and improvement of the business climate.
12. Development of regional and international trade, including through improvement of access of landlocked countries to transport and other infrastructure.
13. Other sectors included in the main directions of Kazakhstan's state policy in the field of official development assistance.

## THE KYRGYZSTAN

The Kyrgyz Government collaborates with Kazakhstan and has signed a Memorandum of Understanding (MoU) with Zerde, and the country has reiterated its “willingness to collaborate with all countries in the region to solve common problems and to advance the development of the Kyrgyzstan with the help of digital technology. One of the main priorities for the country at present is increasing digital literacy among the population.” This highlights two crucial issues: using digitalisation in ways that can overcome regional problems and deliver mutual benefits, such as in the management of water and land resources, and in the need to raise digital skills levels. The representative of Kyrgyzstan at the CAREC meeting in June<sup>19</sup> stressed the importance Kyrgyzstan placed upon rural Internet connectivity and the need to create an independent Internet for the sub-region. Notably Kyrgyzstan has promoted Internet Exchange connectivity through IXPs (see below) with several neighbouring countries. Kyrgyzstan has also created a digital skills platform with gender equality a priority issue.

## TAJIKISTAN

The World Bank reports Tajikistan “sees an integral role for itself in the digital development of the region. For instance, using the infrastructure of a gas pipeline from Turkmenistan to China, via Tajikistan (and the Kyrgyz Republic), the Tajik Government plans to lay a new fiber-optic telecom link. Another link is planned as part of the railroad connection from Tajikistan to Turkmenistan, via Afghanistan.... Tajikistan's highest development priorities are independence from energy sources, food security, and exiting the current communications deadlock. The country aspires to take advantage of the regionalisation of digital technologies in order to leverage transit information flows.” The mention of fiber along new roads and rails would also seem to complement UNESCAP's Asia Pacific-Information Superhighway (AP-IS) initiative.

## UZBEKISTAN

The steps taken by Uzbekistan to digitalise the economy and society are referenced by the “ICT

<sup>18</sup> Embassy of the Republic of Kazakhstan in the Republic of Estonia, On the Establishment of the Kazakhstan Agency for International Development “KazAid”, <https://www.gov.kz/memleket/entities/mfa-tallin/press/news/details/150184?lang=en>

<sup>19</sup> ADB/CAREC Zoom 25<sup>th</sup> June 2021.

Infrastructure Development Program 2015-2019” (9 projects) and the “E-Government Development Program 2013–2020” (28 projects) and the launch of an [Open Data Portal](#). These and other developments are further discussed by an ADBI report in 2021.<sup>20</sup> At the CAREC meeting in June 2021<sup>21</sup> Uzbekistan added its voice to those seeking to cooperate across the region, noting Digital Uzbekistan 2030 focused upon infrastructure development including 5G and digital literacy and skills, all foundational issues.

## CENTRAL ASIA

All the Republics of Central Asia have experienced a challenging period of transition following their dissolution from the Soviet Union, yet while their trajectory has not been uniform, collectively they can become a major force for economic development and social improvement, especially if they can achieve the abolition of poverty, which is predominantly related to weak

rural economies, and the digitisation of their supply value chains (SVC) that would encourage greater trade and exchange between them. But trade alone is unlikely to play that role for two reasons: first, all these economies are currently too dependent upon primary exports to overseas markets such as China, Russia, East Asia and the West; second, none of them have yet developed a thriving domestic market in e-goods and e-services nor in well-developed e-payments and financial services. They also lack large and active venture capital markets to support start-ups and accelerators. There is therefore a need for systematic digitalisation projects and programmes along their national SVCs (see Table 1 above) to raise value-added productivity and create new markets and new market dynamics based upon platform businesses, social media, and mobile apps. Examples of where digital technologies can make a difference along the SVC are given in Table 3.

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<sup>20</sup> Gulnoza Kuldosheva (April 2021) Challenges and Opportunities of Digital Transformation in the Public Sector in Transition Economies: Examination of The Case of Uzbekistan: ADBI

<https://www.adb.org/sites/default/files/publication/696281/adbi-wp1248.pdf>

<sup>21</sup> ADB/CAREC Zoom 25<sup>th</sup> June 2021.

**Table 3. A Selected Summary of a Digitalised SVC**

Infrastructure	Agric/Rural	Environment	Industry	Govt & Services	Trade
<b>Broadband</b> 1. AP-IS 2. Internet 3. IXPs 4. 5G/6G 5. Satellite, drones, GIS 6. Cloud computing	<b>Digital Agric</b> 1. Rural/Urban digital SVC and agric. extension 2. Geo-spatial Landscaping, precision farming 3. Biotechnology 4. Food security	<b>SDGs/ESG</b> 1. “Green” Digital tech and water monitoring and conservation 2. Renewable energy, conservation and smart technologies 3. GHG emission reductions 4. Social including gender equity 5. Environmental conservation and circular economy 6. Disaster management	<b>4IR</b> 1. New technologies 2. ESG – green technologies 3. Sensors/IoTs 4. ML/AI algorithms 5. Blockchain 6. Multiple Industry sectors, e.g. (i) Fintech (ii) E-vehicles (iii) HW & SW 7. Logistics e.g., warehousing	<b>Transformation</b> 1. Digital platforms (i) E-Govt (ii) Banking and payment systems 2. Cloud 3. Cyber security 4. Digital ID 5. E-health 6. E-learning and digital literacy 7. Digital Divide 8. Digital legal and regulatory frameworks 9. Promotion of R&D & start-ups & venture capital 10. Green and digital tech transfers	<b>Cross-border</b> 1. Intelligent Transport Networks 2. Cross-border finance and payments 3. Digital customs procedures 4. Platforms for digital technology cross-border investments 5. Tourism and travel

Sources: Author’s contributions

However, Kazakhstan does not need to be the only source of such innovations and investment for the sub-region; it can act as a model for digitalisation as a prelude to a more radical thorough-going digital transformation that awaits these economies in due course. If South Korea and Singapore – among others, China being another example – are the poles of attraction for Kazakhstan, then given its ‘gravity’ within the sub-region in terms of GDP, its proximity, and its own digital transformation, Kazakhstan itself can become the pole of attraction for the other sub-regional economies.<sup>22</sup>

Packages of digital solutions will normally include

both references to the frontier technologies involved and the frameworks that enable them to happen. Those recommended frameworks need to include the procedures by which neighbouring economies can work out the details of their collaboration. One way in which could be achieved is through a DSC platform for the sub-region.

<sup>22</sup> The gravity theory of trade states that trade between two economies will be proportional to their respective market sizes and inversely related to the distance (or the costs of transportation) between them.

For an explanation see UNESCAP (201) *Introduction to the basic gravity model* [https://www.unescap.org/sites/default/d8files/knowledge-products/Day1\\_S2\\_Gravity\\_intro.pdf](https://www.unescap.org/sites/default/d8files/knowledge-products/Day1_S2_Gravity_intro.pdf)



### 3. Sub-Regional Integration and a DSC

For Regional Economic Cooperation and Integration (RECI) as an ESCAP paper in 2016 points out, “geography has only been an enabling and not a determining factor ...”<sup>23</sup> The paper lists ten major sub-regions in the world and places Central Asia third from last in terms of a composite integration index. The lack of monetary and financial integration is followed by a lack of cross-border trade and investment, and cross-border mobility. Using the enabling trade index of the World Economic Forum, the services trade restrictions index, the logistics performance index, and the Doing Business index of the World Bank the paper shows among five Asian sub-regions for which data is available, the Central Asia sub-region comes second to last on the enabling trade index and the services trade restriction index, and last on the logistic performance index. It did slightly better on the Doing Business index. However, the WEF index data only covers four of Central Asia’s countries – Armenia, Azerbaijan, Kyrgyzstan, and Kazakhstan – which may bias the numbers in either direction. The author of the paper does add that encouragingly “Central Asia is now moving somewhat faster on regional economic integration.”<sup>24</sup>

This recognition is amply reflected in Annex A which lists many of the organisations, programmes and projects that have over recent years focused ways to being about greater economic integration with cross-border connectivity, trade, and investment. Among these, CAREC (Central Asia Regional Economic Cooperation) with its strategic framework CAREC 2030 is described as “the main regional network that has served as the platform for many of Central Asia’s institutional strengthening efforts, especially in areas of cooperation, energy, and trade more generally.” Otherwise, the paper notes, “most of these institutions are little more than

networks and forums of groups of countries than rule-based legal structures” and even CAREC, which is primarily funded by the ADB based in Manila, the Philippines, has its CAREC Institute based outside Central Asia in Urumqi, Xinjiang Province, China. The general lack of country ownership of these organisations, agencies and programmes is seen as a weakness going forward if they are to be locally sustainable.

Drawing a lesson from this, ideally a DSC would be country-owned or owned on a country-shared basis, with additional support from multilateral organisations as necessary, for example, on a programme and project basis. In addition, there is scope for support from local private sectors, maybe represented through chambers of commerce – one suggestion has been to create a sub-regional international chamber of commerce from the participating economies – as well as multinational companies. There is also scope for additional support for particular programmes and projects from initiatives such as China’s One Belt, One Road, Korea’s Eurasia Initiative, the sub-sub-regional Eurasia Union that includes Russia, and the ECE’s SPECA which is co-led and co-financed by UNESCAP on a project basis. In fact, there is no shortage of investment and development banks and agencies and in many cases, they represent different international vested interests.<sup>25</sup> However, what Annex A does show is that there is no single sub-regional agency that has a focus upon the policy and regulatory frameworks – as opposed to specific projects and programmes – that are necessary for the digitalisation of their economies to work toward their regional integration and their eventual digital transformation. The closest example is probably CAREC – see below.

<sup>23</sup> UNESCAP (April 2016) *Enhancing regional economic cooperation and integration in Asia and the Pacific* [https://www.unescap.org/sites/default/d8files/event-documents/E72\\_5E.pdf](https://www.unescap.org/sites/default/d8files/event-documents/E72_5E.pdf) and UNESCAP (2017) <https://www.unescap.org/sites/default/d8files/knowledge-products/RECI%20Report%20ebook-%20Final%2013Nov2017.pdf>

<sup>24</sup> As both the WEF and the World Bank have combined Europe and Central Asia for 2018 no direct updated comparisons are available.

<sup>25</sup> A full list of Development Banks is available [here](#). In addition there is the Eurasian Development Bank of the Eurasia Union, the China-backed Asian Infrastructure Investment Bank (AIIB), supported by the Silk Road Fund (SRF), and the New Development Bank that includes both China and Russia.

## 4. Transnational Economic Corridors (TNECs) and IXPs

One powerful step in the direction of sub-regional integration is the creation of transnational economic corridors (TNECs) which utilise frontier digital technologies. UNESCAP, which produces web-toolkits for integrated planning of infrastructure corridors,<sup>26</sup> has pointed to several TNECs as past initiatives centred around the Asian Land Transport Infrastructure Development project (ALTD) endorsed in 1992 resulting in the Asian Highway Network (2006), the Trans-Asian Railway Network (2009) and the Asian Dry Ports Network (2013), but progress since then has been piecemeal. In 2020, Azerbaijan announced agreement with Turkmenistan to lay a Trans-Caspian fibre-optic cable,<sup>27</sup> but the original proposal to build a Trans-Eurasian Information Super Highway (TASIM) was concluded in Baku in November 2008 as the first leg that would eventually link Germany to China, a forerunner of the AP-IS concept, including reference to the 650 Gbit/s terrestrial fibre-optic cable along the Trans-Europe-Asia (TEA) to Russia.<sup>28</sup>

It should be noted that where there is a road or a rail there will naturally be a fibre cable, partly to support transport management and partly to provide additional broadband capacity and Internet access to the region. A role for a DSC could encompass the monitoring and mapping of such capacity with policies to ensure equal access among Internet Service Providers (ISPs) and Content Distribution Networks (CDNs).<sup>29</sup>

A further policy initiative would be to link these corridors to Internet Exchange Points (IXPs) within each of the republics to facilitate the efficient and low-cost transit of digital traffic across the sub-region and between the sub-region and Europe to the West and Asia to the East. One successful initiative has been the creation by the Internet Society of Kyrgyzstan of an IXP in Osh city in the Fergana Valley with connectivity to China, Tajikistan, and Uzbekistan.<sup>30</sup> This aligns closely with the *AP-IS Strategic Initiatives 2019-2022* policy paper that states “Establish a sufficient number of IXPs at the national and sub-regional levels and set out common principles on Internet traffic exchange.”<sup>31</sup>

Another important initiative is Shymkent – Tashkent – Khujand Economic Corridor (Kazakhstan, Uzbekistan, Tajikistan) supported by the ADB, notably attributed in the report to the improved relations between Kazakhstan, Tajikistan, and Uzbekistan;<sup>32</sup> and the China-Kyrgyzstan-Uzbekistan connecting the Fergana Valley with China via Kyrgyzstan is another potential gain.<sup>33</sup> However, of concern are reports of a diversion and ‘politicisation’ of cross-border routes between the Kyrgyz Republic and Tajikistan reducing the opportunities for intermingling of the people between the two countries following border clashes in late April

<sup>26</sup> See UNESCAP (2019) *Online Workshop Series Web-Toolkit for Integrated Planning of Infrastructure Corridors* <https://www.unescap.org/sites/default/d8files/event-documents/Trainings%20May%20CN%2020210429.pdf>

<sup>27</sup> BT Business Turkmenistan (April 2020) ‘Azerbaijan Approves Interstate Agreement on Laying Trans-Caspian Fiber-Optic Cable’ <https://business.com.tm/post/5383/azerbaijan-approves-interstate-agreement-on-laying-transcaspien-fiber-optic-cable>

<sup>28</sup> Azintelecom (December 2017) *Trans-Eurasian Information Super Highway (Tasim) Bangkok, Thailand 12-13.12.2017* [https://www.unescap.org/sites/default/files/Trans-Eurasian%20Information%20Superhighway%20\(TASIM\).pdf](https://www.unescap.org/sites/default/files/Trans-Eurasian%20Information%20Superhighway%20(TASIM).pdf)

<sup>29</sup> In the USA, the Fiber Optic Sensing Association (FOSA) is calling for the Transport Secretary to introduce a Fiber-Enabled Interstate Roadway Metrics to measure and monitor the capacity to ensure it is fully shared. Fiber Broadband Association (March 2021) ‘FOSA calls for Fiber-Enabled Interstate Roadway Metrics’

<https://www.fiberbroadband.org/blog/fosa-calls-for-fiber-enabled-interstate-roadway-metrics>

<sup>30</sup> Internet Society (May 2021) ‘The traffic exchange point in the Fergana valley (FVIXP) – successfully implemented’ <https://isoc.kg/news/fvixp-successfully-launched-in-osh/>

<sup>31</sup> UNESCAP *Asia-Pacific Information Superhighway (AP-IS) Strategic Initiatives 2019-2022* <https://www.unescap.org/sites/default/files/S2.1%20AP-IS%20Implementation%20Strategic%20Initiatives%202019-2020%2C%20ESCAP.pdf>

<sup>32</sup> CAREC/ADB (January 2021) *A Road Map for Shymkent–Tashkent–Khujand Economic Corridor Development* <https://www.adb.org/sites/default/files/publication/691231/road-map-shymkent-tashkent-khujand-corridor.pdf>

<sup>33</sup> UNESCAP (March 2021) *Infrastructure Financing in Kyrgyzstan* <https://www.unescap.org/sites/default/d8files/event-documents/Infrastructure%20Financing%20in%20Kyrgyzstan.pdf>



2021.<sup>34</sup> It seems that one of the issues involved was the use of drones to monitor water levels,<sup>35</sup> and while at first it may seem unlikely that a DSC could directly contribute to an improvement of relations between two neighbours, a package of policies and regulations that arrange for a cooperative joint management of scarce resources and their joint conservation is a step that diplomacy could secure. Digital technologies are tools of empowerment and can provide new means to finding solutions to long standing grievances, rivalries, and resentments within the sub-region. TNECs and the transit of people, goods and services are by definition part and parcel of sub-regional integration.

## 5. Green Digitalisation, Transformation and Climate Change

The word ‘green’ does not appear in *Digital Kazakhstan* the national digital vision for Kazakhstan in 2017. The concept of ‘green’ as in preserving natural sources such as water, fish stocks, “and specially protected natural areas” . Kazakhstan initiated the Green Bridge Partnership Programme (GBPP) in 2010-2011 which was adopted as an outcome of two Ministerial Conferences on Environment and Development and adopted by three UN resolutions, supported by two regional commissions, ESCAP and ECE and in the document “Future We Want” of the General Assembly in 2012. Nevertheless, in 2017, ‘green’ and ‘digital’ were not yet seen as convergent issues.<sup>37</sup>

Yet in 2021 the issue of climate change and the need to reduce Green House Gases (GHG) is seen almost universally as unavoidable if economic growth – even driven by digitalisation – and social health are to be sustainable. Only the immediacy

In summary, the UNESCAP paper identifies three major issues for regional integration: improved connectivity across the sub-region, outward-oriented and business-friendly policies, and good governance. Another UNESCAP paper in 2020 focusing on North and Central Asia,<sup>36</sup> identifies four focus areas from the programme of SPECA for digital transformation: e-commerce, the financial sector, agriculture and supply chains and logistics. In particular the report notes that “Legal frameworks are not fully mature to effectively support the digital economy.” In all of the above, and especially in the legal and regulatory policy frameworks, a DSC could play an important and constructive role.

of the COVID-19 pandemic matches the urgency for action. The collapse of a melting Himalayan glacier in February 2021 that destroyed the Uttarakhand dam in India killing over 150 people is a recent reminder of the costly risk to human life and infrastructure including the generation of hydroelectric power.<sup>38</sup> Since 2001 Kazakhstan, along with Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan has been a member of the Regional Environmental Center for Central Asia (CAREC) with a mandate to support projects funded mostly by the European Union and the UN, for example, the Aral Sea Basin project. Environmental CAREC is only a sub- implementing body of the regional component of the CAMP4ASB the institutional target of which is EC IFAS. Kazakhstan was a host to the region scale of ESCAP’s and ECE’s greening initiatives and events starting from 2006-2007 through 2010-2011, 2016 and reported through 2022. GBPP and green centres are outcomes of these initiatives in 2021 Kazakhstan opened the *International*

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<sup>34</sup> The Diplomat (June 2021) *What Happened at the Kyrgyz-Tajik Border?* Video: Dr Madeleine Reeves minute 31.58 <https://thediplomat.com/2021/06/what-happened-at-the-kyrgyz-tajik-border/>

<sup>35</sup> BBC News (April 2021) *Deadly fighting on Kyrgyzstan-Tajikistan border kills at least 31* <https://www.bbc.com/news/world-asia-56940011>

<sup>36</sup> UNESCAP (December 2020) *Realising Digital Potential in North*

*and Central Asia* [https://unece.org/sites/default/files/2020-12/E\\_Background\\_paper\\_-\\_Realizing\\_digital\\_potential\\_in\\_North\\_and\\_Central\\_Asia.pdf](https://unece.org/sites/default/files/2020-12/E_Background_paper_-_Realizing_digital_potential_in_North_and_Central_Asia.pdf)

<sup>37</sup> Green Bridge Partnership Programme 2011-2020 <https://sustainabledevelopment.un.org/partnership/?p=2237>

<sup>38</sup> BBC (February 2021) ‘Uttarakhand dam disaster: Race to rescue 150 people missing in India’ <https://www.bbc.com/news/world-asia-india-55975743>

Center for Green Technology and Investment and the associated joint-stock company the *International Green Technologies and Investment Projects Centre (IGTIC)* for “sustainable urban development, green business development, transfer and adaptation of green technologies and best practices, development of green funding, development of renewable energy sources, and capacity-building for green growth.”<sup>39</sup> Its scope was truly sub-regional: Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan and Turkmenistan, Iran, Afghanistan, Mongolia and Azerbaijan. Besides a Green Policy Platform, the Ministry of Energy also operates a Green Finance Platform and a Green Industry Platform. The initiative grew out of the UN’s National Action Plan to Promote the Green Bridge Partnership Program 2021-2024 that has as its objectives the environmental aspects of the UN’s SDGs.

Kazakhstan was an early backer of the GBPP initiated by the 6th Ministerial Conference on Environment and Development of the Asia-Pacific region (UNESCAP, Astana, 2010), and presented to the 7th Pan-European Ministerial Conference "Environment for Europe" (UNECE, Astana, 2011).

The reasons why a GBPP ‘Action Plan’ was seen as necessary was because:

- Lack of capacity (social and technical) in the most developing countries
- The current approach, short term projects and fragmented actions are not effective.
- Transboundary issues and many of the green projects (energy networks, food security,

**Box 4: The main directions and sectors:**<sup>40</sup>

1. Strengthening governance: national and international
2. Informational infrastructure, outreach and education
3. Green Business and Technologies
4. Financial and economic mechanisms
5. Standards for green economy
6. Conservation of mountain, water and other ecosystems
7. Sustainable energy, its availability and efficiency
8. Food security
9. Urban Infrastructure & Transport
10. Adaptation to climate change and natural disasters

trade and transport, etc.) are required for joint actions.

- Professional and long-term technical platforms to support sustainable investment, technologies and innovations are needed.
- There is need of independent (from narrow interests) assessment and support of green policy and technologies – as the base of trustable, stable, and long-term national reforms and corruption prevention.

If the general aims of the GBPP are to overcome these sub-regional challenges, Kazakhstan’s specific national targets up to 2050 are given as follows:

**Table 4. Kazakhstan’s GBPP National Targets (2020, 2030, 2050)**

Sector	Targets	2020	2030	2050
Water resources	Eliminate water gap on national and sub-regional levels	Provide all population with access to water	By 2040 provide agriculture with water	
Agriculture	Wheat yields (ton/ha) Water for irrigation	1.4 450	2.0 330	
Energy efficiency	Reduce energy-intensity of GDP	25% (10% by 2015)	30%	50%

<sup>39</sup> Green Policy Platform: Ministry of Energy, Kazakhstan (2021) Kazakhstan - Establish International Center for Green Technology and Investment <https://www.greengrowthknowledge.org/big-e/kazakhstan-establish-international-center-green-technology-and-investment>

<sup>40</sup> UN SDG Partnership Platform, Green Bridge Partnership Programme 2011-2020, <https://sustainabledevelopment.un.org/partnership/?p=2237>

Renewable energy	Solar and wind not > 3% by 2017		-30%	50%
Reduced GHGs in energy sector	Levels of 2012	-15%	-40%	

Source: UNECE CEP-19, Green Bridge Partnership Programme A mechanism to unlock the benefits of collaborative action on green economy, [https://unece.org/fileadmin/DAM/env/cep/CEP-19/ppp/CEP-19Item6\\_c\\_GE.Kazakhstan.e.pdf](https://unece.org/fileadmin/DAM/env/cep/CEP-19/ppp/CEP-19Item6_c_GE.Kazakhstan.e.pdf)

As part of Kazakhstan’s efforts to promote greener economies across the sub-region the Astana International Finance Centre (AIFC) has promoted ‘green finance’ through the creation in 2018 of a Green Finance Centre to provide financial backing to environmentally-friendly projects. As a result, Kazakhstan entered the Global Green Finance Index for the first time in 2021.<sup>41</sup> Other sources of green funding – Global Environmental Facility (GEF), Climate Investment Funds, Green Climate Fund (GCF) – are listed in a UNESCAP paper Infrastructure Financing in Kyrgyzstan.

Funding, such as blended finance where state funds are used to underwrite the risk taken by private sector investors, are as important to promoting the use of digital technologies to green projects as they are to venture capital and digital start-ups. The relevance of digital technologies to advance the green agenda **is** if anything more visible and available today than in 2011. Sensors and the Internet-of-Energy, smart meters, autonomous machines, blockchains for digital audit reviews and smart contracts, drones and Big Data analytics and AI for predictive monitoring and planning for future needs together with

digital platforms and dashboards for the digest, formatting, presentation, and transmission of information to and from control centres and distributed to all relevant stakeholders are technological enablers. Woven into packages of reforms, innovative management methods and policy prescriptions they can make a difference. But as the reasons for the GBPP above make clear, key to everything is a willingness for stakeholders to cooperate by sharing information and collaborate by a joint management of resources where this is applicable.

A DSC could draw lessons learnt from the sub-regional mechanisms and may be liaising with both the Regional Environmental Centre for Central Asia (CAREC, 35-40% of project funding went to its operation without any core funding), the ADB-supported Central Asia Regional Economic Cooperation (CAREC), UN-SPECA and other agencies at both a sub-regional and a country-level with a specific focus upon harmonising efforts to create the legal and regulatory conditions and data standards necessary to apply frontier digital solutions on a collaborative basis.

<sup>41</sup> AIFC (April 2021) ‘Kazakhstan entered the Global Green Finance Index being № 1 in Eastern Europe & Central Asian region’

<https://aifc.kz/press-relizy/kazakhstan-entered-the-global-green-finance-index/>

## 6. Framework for a DSC

### KEY PRINCIPLES

1. The DSC should be an internationally recognised non-commercial and 'trusted party' for governments of the sub-region.
2. This is best achieved by being jointly 'owned' by the participating countries.
3. The DSC should be outward-looking, serving the needs of the sub-region and collaborating with the private sector.
4. The DSC should focus on evidence-based research combining strategic advice on the use of emerging digital technologies to solve problems with advice on the policy, legal and regulatory changes necessary to achieve success.

### VISION FOR A DSC

1. Digital Transformation for the Sustainable Development Goals
2. Kazakhstan as a Caspian Digital Hub
3. Secure a sustainable post-COVID 19 future, and the elimination of poverty.

### KEY OBJECTIVES

1. Evidence-based research combining strategic recommendations on the use of emerging digital technologies to solve major challenges (mega, foundational and /transformational) with advice on the policy, legal and regulatory changes necessary.
2. Contribute to the peaceful and green digital development of the sub-region.
3. Secure backing including financial support from Kazakhstan and at least one other

country of the sub-region, together with support from development banks and other multilateral agencies.

### FOCUS AND TARGETS OF A DSC

1. Accelerate the digital transformation of Kazakhstan and of the subregion with policy advice on the application of emerging technologies to major challenges.
2. Accelerate the digitalisation of the sub-region to the point of readiness for digital transformation.
3. Boost sub-regional digital trade and investment, with cooperation and collaboration across projects.
4. Garner support for the AP-IS and complementary initiatives to eliminate the digital divide as the foundation of wider progress towards the SDGs.

### MAIN CLIENTS

1. The Government of Kazakhstan
2. The Governments of other participating countries
3. Funders of research projects and programmes, such as development banks, UN and aid agencies

## 7. The Focus and Functions of a DSC: Three Scenarios

No issues are more fundamental, or perhaps more difficult to achieve, across Central Asia than cooperation and a collaborative approach to the management of water resources. Creating cooperation and collaboration in any one area of policy between neighbouring countries will feed off the demonstrative benefits of cooperation and collaboration in other areas, and none lends itself more readily to this than issues of digitalisation, from the digitalisation of trade, customs procedures, the establishment of intelligent cross-border transport systems along TNECs and transborder e-commerce and e-payments systems, to the sharing of best-practice in the laws and regulations and standards that facilitate domestic economic and social digital transformation. The more precedents that can be set the more likely it is for others to follow, and the all-important issue of trust grows in the governance of the processes involved, as digital transparency and auditing – for example, the use of blockchains – become the nemesis of corruption and nepotism.

### CATEGORISATION OF CHALLENGES

The above sets a wide canvass for a DSC to cover. Too wide in the sense that the DSC will need to focus in on the solutions that offer the highest value added and ideally early gains. Does water management, for example, fit the bill? In terms of value-added it is difficult to think of an issue of greater urgency or one that, if successful, would deliver greater economic and social dividends. But a likely early gain it would appear not. Nevertheless, disasters and conflicts can concentrate minds, and the digital solutions that a DSC could propose will greatly strengthen diplomatic efforts to bring trial agreements. An issue such as water conservation is clearly a mega challenge.

### MEGA CHALLENGES IN IDENTIFYING FOCUS AREA AND FUNCTION OF A DSC

Therefore, one category of focus and function of a DSC is to provide digital solutions to mega challenges, that is challenges that are serious, large in scale, of long duration and they are common across the sub-region. Other mega challenges would include (i) battling climate change and its disastrous economic and social impacts through the adoption of ‘green digital solutions’ ranging from finance to technologies to green practices; (ii) increasing urbanisation that creates opportunities, especially around concepts such as smart cities, but also creates significant threats as in the case of pandemics, health and sanitation projects; population ageing that has major implications for tackling poverty and for the need for higher productivity among those of working age.

### FOUNDATIONAL CHALLENGES

Another category is foundational. This includes physical and virtual infrastructure such as fast broadband networks, ubiquitous wireless networks, cloud computing as well as road and rail networks, and in virtual space Big Data and autonomous networks connecting devices, the Internet-of-Things, machines, buildings, and people. It also includes human capital in digital literacy and skills or how to build and to use these things. The World Bank estimates that the impact of the pandemic is likely to leave global output 2% below pre-pandemic levels by end of year and *per capita* incomes are unlikely to rebound for most emerging economies until 2022.<sup>42</sup> Therefore building the foundations of the digital economy has to be a priority for most CACs and the DSC can make a major contribution if it is affiliated to the AP-IS programme that includes sub-regional connectivity.

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<sup>42</sup> The World Bank (June 2021) *Global Recovery Strong but Uneven as Many Developing Countries Struggle with the Pandemic's Lasting*

Effects <https://www.worldbank.org/en/news/press-release/2021/06/08/world-bank-global-economic-prospects-2021>

## A DIGITAL TRANSFORMATION STRATEGY FOR A DSC

Built upon the foundational challenges are all the network apps, digital tools and projects that give rise to the digital transformation of the economy and society. A DSC will need to develop a Digital Transformation Strategy that is sufficiently flexible to be adapted to the needs of different

countries within the sub-region. Table 5 combines the key diameters of Figure 1 and Table 3 using the framework of the categories of challenges outlined above: mega, foundational and digitally transformative. The proposal for the DSC is that a digital strategy should start by addressing at least one key challenge from each category alongside the SDGs generally.

**Table 5. Digital Transformation Strategy**

<b>Mega challenges</b> – pandemics, climate change, GHGs, urbanization, ageing population, poverty						
<b>← Digital Transformation →</b>						
Government Sector		↔	Business Sector		↔	Citizen
Sector						
<b>← Supply Value Chain →</b>						
Infrastructure Trade	Agric/Rural	Environment	Industry	Govt/Services		
Examples: Cloud First policy Rural Internet 5G/6G	Examples: Digital agric.+ agric. extension for food security Blockchain for contract farming	Examples: Dashboard for water supplies & disaster management Renewables Emissions audits	Examples: Industry 4.0 Digital start-up programme	Examples: Application of AI Smart City/Big Data analytics Data sharing portal Digital currency E-laws and regs	Examples: e-trade and e- payments ITS and paperless customs e-standards	
<b>Foundational challenges</b> – physical, virtual and ubiquitous (cellular, WiFi, IoT) fast broadband Internet network, cloud computing, intelligent road networks + digital literacy and skills						
<b>Digital Solutions Packages</b> –						
<ul style="list-style-type: none"> <li>• Whole-of Government digital apps, e.g. cloud-based COVID-19 track and trace</li> <li>• Whole-of-Economy digital apps e.g. platform enterprises</li> <li>• Whole-of-Society digital apps e.g. QR code payments linking to personal accounts</li> </ul>						



These categories help define the scenarios for a DSC.

### Box 5: Scenario 1

The DSC initially focuses upon the challenges *such as* the following as a centre to serve the sub-region and all participating republics.

#### Focus

- **Mega challenge** – post-COVID-19 recovery and ‘build back better’. This would focus initially on health issues such as a national data base using cloud to register and monitor health events, a track and trace dashboard to keep both the health community and citizens aware of the state and location of risks, fast broadband connections between hospitals and clinics, standardised protocols for the exchange of data, a set of fit-for-purpose privacy and security laws, regulations and guidelines for doctors, patients and others, and the promotion of investment in health solutions.
  - **Quick gains** – from a cloud-based database and dashboard
  - **Medium-term gains** – broadband connectivity between all health establishments
  - **Long-term gains** – investment in health solutions, vaccines, etc.
- **Foundational challenge** – the need for adequate levels of digital literacy and higher standards of digital skills cuts across all sectors is a basic pre-requisite for digital transformation and was identified by the country respondents of a CAREC survey in 2021 as a high priority need. A best practice example of a government’s drive to increase digital literacy and skills comes from Korea in the 2000s, where a campaign ranged from youth, and workers to pensioners and even to prisoners.<sup>43</sup> A DSC could orchestrate a similar approach.
  - **Quick gains** – digital literacy classes and online teaching
  - **Medium-term gains** – digital skills courses, hackathons, etc.
  - **Long-term gains** – human capital productivity enabling use of frontier technologies.
- **Digitalisation as a strong tool for SVC along with a Digital Transformation process** – digital agriculture was another priority identified in the CAREC survey. Agricultural landscaping by drones and LEOs, the use of remote ploughing, seeding, watering, irrigation, weeding by digitally-controlled autonomous machines, the introduction of digital processes for product cleaning, sorting, packing, and distribution known as ‘agricultural extension which creates a digital supply value chain from farm to supermarket, and the use of blockchain and smart contracts for ‘contract farming’ are all global best practices.
  - **Quick gains** – improved agricultural productivity
  - **Medium-term gains** – more agile business decisions by farmer and vendors
  - **Long-term gains** – food security
- **Digitalisation and SDGs** – the DSC should review the entirety of each country’s ability to achieve the SDGs and identify the most urgent gaps and the most feasible ways in which frontier digital technologies can offer solutions. Issues of poverty, social and economic inequality and lack of access to basic services, the quality of life and of the environment should all be assessed for the post-COVID-19 era. A digital platform can be devoted to this task with assistance to national statistical bureaux on ways to collect, clean, store and present the necessary data.
  - **Quick gains** – Evidence-based stocktaking for planning purposes.

<sup>43</sup> World Bank (2016) *Bringing Government into the 21st Century: The Korean Digital Governance Experience* <http://documents1.worldbank.org/curated/en/934391468011726182/pdf/106581-REVISED.pdf>

- **Medium-term gains** – Relevance of post-COVID-19 policies for better outcomes.
- **Long-term gains** – Greater chance to meet the SDG targets by 2030.
- **Digital Transformation opportunity in whole-of-government** – ubiquitous networking, including a government cloud for secure transactions, leverages both infrastructure in the form of promoting interconnecting future generation networks of fixed cable, mobile (Open Ran, 5G, 6G), WiFi, IoTs, satellite and cloud-based virtual networks to support new sets of standards and operating principles which give governments the ability to introduce innovative services very quickly and, with the use of AI, to make them citizen-centric and accessible by smartphone.
  - **Quick gains** – eases the introduction of new and innovative citizen-centric services.
  - **Medium-term gains** – Open Ran gives government and operators greater choice of vendors.
  - **Long-term gains** – solves the technical side of the digital divide, namely networks to access.

### **Functions**

1. Research frontier digital technologies for whole-of-government best practice solutions including financing following a GovTech model.
2. Create a dashboard and platform for all projects, technologies, timelines and KPIs.
3. Liaise with Kazakhstan's Centre of Excellence, Technology Platforms, and other agencies such as the IFC and the National Centre for Agriculture (NASEC).
4. Liaise with governments and similar agencies and organisations in participating republics.
5. Liaise with multilateral organisations such as development banks and UN agencies, and sub-regional organisations as listed in Annex 1, notably CAREC and SPECA.
6. Work closely with the AP-IS as an affiliated body.

### **Funding**

1. Kazakhstan Government
2. At least one other government of Central Asia or Mongolia from ENEA
3. The World Bank
4. UN agencies
5. ADB and co-partnership with CAREC
6. Non-conflicting support-in-kind or seconded personnel from the private sector

### **Governance and Staffing**

1. DSC Director appointed with the agreement of a Board of Governors.
2. Board of Governors representing (i) the funding countries and major funding agencies; (ii) advisory representatives from affiliated organisations.
3. BoG to (i) approve the annual budget allocations; (ii) staff appointments; (iii) top line research projects.
4. Co-Partnership with ADB/CAREC – one representative from DSC and CAREC to attend each other's Board meetings.
5. Option for DSC nodes to be established in neighbouring countries.

### **Staffing**

1. Research - Team leader plus (i) at least one invited international expert on an annual contract; (ii) research staff including specialist and generalists.
2. Administration - admin staff including a treasurer, a secretary and chief liaison office.



## Box 6: Scenario 2

The DSC is *initially established in Kazakhstan* to meet *local* challenges as illustrated below with the intention to reach out to other republics and expand its operations to the sub-region as shown in Scenario 1.

### Focus

- **Mega challenge** – post-COVID-19 recovery and ‘build back better’. This would focus initially on health issues such as a national data base using cloud to register and monitor health events, a track and trace dashboard to keep both the health community and citizens aware of the state and location of risks, fast broadband connections between hospitals and clinics, standardised protocols for the exchange of data, a set of fit-for-purpose privacy and security laws, regulations and guidelines for doctors, patients and others, and the promotion of investment in health solutions.
  - **Quick gains** – from a cloud-based database and dashboard
  - **Medium-term gains** – broadband connectivity between all health establishments
  - **Long-term gains** – investment in health solutions, vaccines, etc.
  
- **Digitalisation and SDGs** – the DSC should review the entirety of the country’s ability to achieve the SDGs and identify the most urgent gaps and the most feasible ways in which frontier digital technologies can offer solutions. Issues of poverty, social and economic inequality and lack of access to basic services, the quality of life and of the environment should all be assessed for the post-COVID-19 era. A digital platform can be devoted to this task with assistance to national statistical bureaux on ways to collect, clean, store and present the necessary data.
  - **Quick gains** – Evidence-based stocktaking for planning purposes.
  - **Medium-term gains** – Relevance of post-COVID-19 policies for better outcomes.
  - **Long-term gains** – Greater chance to meet the /SDG targets by 2030.
  
- **Digital Transformation opportunity in whole-of-government** – ubiquitous networking, including a government cloud for secure transactions, leverages both infrastructure in the form of promoting interconnecting future generation networks of fixed cable, mobile (Open Ran, 5G, 6G), WiFi, IoTs, satellite and cloud-based virtual networks to support new sets of standards and operating principles which give governments the ability to introduce innovative services very quickly and, with the use of AI, to make them citizen-centric and accessible by smartphone.
  - **Quick gains** – eases the introduction of new and innovative citizen-centric services.
  - **Medium-term gains** – Open Ran gives government and operators greater choice of vendors.
  - **Long-term gains** – solves the technical side of the digital divide, namely networks to access.

### Functions

1. Research frontier digital technologies for whole-of-government best practice solutions including financing following a GovTech model.
2. Create a dashboard and platform for all projects, technologies, timelines and KPIs.
3. Liaise with Kazakhstan’s Centre of Excellence, Technology Platforms, and other agencies such as the IFC and the National Centre for Agriculture (NASEC).
4. Liaise with multilateral organisations such as development banks and UN agencies, and sub-regional organisations as listed in Annex 1, notably CAREC and SPECA.
5. Work closely with the AP-IS as an affiliated body.

## Funding

1. Kazakhstan Government
2. The World Bank
3. UN agencies
4. Non-conflicting support-in-kind or seconded personnel from the private sector

## Governance and Staffing

1. DSC Director appointed with the agreement of a Board of Governors.
2. Board of Governors representing (i) the Government of Kazakhstan and major funding agencies; (ii) advisory representatives from affiliated organisations.
3. BoG to (i) approve the annual budget allocations; (ii) staff appointments; (iii) top line research projects.

## Staffing

1. Research - Team leader plus (i) at least one invited international expert on an annual contract; (ii) research staff including specialist and generalists.
2. Administration - admin staff including a treasurer, a secretary and chief liaison office.

## Box 7: Scenario 3

The DSC becomes an affiliate of the AP-IS focused upon the challenges of digital infrastructure development, Internet-based digital apps and services, and digital data sharing and Big Data analytics.

### Focus

- **Foundational challenge** – there is a sub-regional need for investment in broadband networks and Internet Exchanges (IXPs) especially post-COVID-19 to support sustainable recovery and create future resilience. For example, the proposed Co-deployment and infrastructure planning in Kyrgyzstan, Kazakhstan & Mongolia.
  - **Quick gains** – agreements for jointly support and invest in sub-regional digital communications, including the harmonisation of technical standards.
  - **Medium-term gains** – the construction of IXPs to boost the reliability and reduced the cost of intra-regional Internet traffic.
  - **Long-term gains** – fast intra-regional broadband highways.
- **Digitalisation and SDGs** – the DSC should review the entirety of each country’s ability to achieve the SDGs and identify the most urgent gaps and the most feasible ways in which frontier digital technologies can offer solutions. Issues of poverty, social and economic inequality and lack of access to basic services, the quality of life and of the environment should all be assessed for the post-COVID-19 era. A digital platform can be devoted to this task with assistance to national statistical bureaux on ways to collect, clean, store and present the necessary data.
  - **Quick gains** – Evidence-based stocktaking for planning purposes.
  - **Medium-term gains** – Relevance of post-COVID-19 policies for better outcomes.
  - **Long-term gains** – Greater chance to meet the /SDG targets by 2030.

### Functions

1. Research frontier digital technologies best practice solutions including financing.
2. Create a dashboard and platform for all projects, technologies, timelines and KPIs.

3. Liaise with governments and similar agencies and organisations in participating republics.
4. Liaise with multilateral organisations such as development banks and UN agencies, and sub-regional organisations as listed in Annex 1, notably CAREC and SPECA.

### **Funding**

1. Participating governments
2. The World Bank
3. UN agencies
4. ADB and co-partnership with CAREC
5. Non-conflicting support-in-kind or seconded personnel from the private sector

### **Governance and Staffing**

1. DSC Director appointed with the agreement of a Board of Governors (BoG)
2. Board of Governors representing (i) the funding countries and major funding agencies; (ii) advisory representatives from affiliated organisations.
3. BoG to (i) approve the annual budget allocations; (ii) staff appointments; (iii) top line research projects.

### **Staffing**

1. Research - Team leader plus (i) at least one invited international expert on an annual contract; (ii) research staff including specialist and generalists.
2. Administration - admin staff including a treasurer/secretary and chief liaison office.

## **COMPARISON OF SCENARIOS**

**Table 6. Comparing Scenarios**

	<b>Scenario 1</b>	<b>Scenario 2</b>	<b>Scenario 3</b>
Focus	Digitalisation and Digital Transformation	Digital Transformation	AP-IS Digital Strategy
Participating CACs or NACs	Kazakhstan plus at least one other	Initially only Kazakhstan	Countries supporting the AP-IS
CACs or NACs funding	Participating countries	Kazakhstan	Participating countries
World Bank and UN agencies funding	Yes	Yes	Yes
Partnering with CAREC	Yes	No	On a project basis
ADB funding	Yes	No	On a project basis

## **GOVERNANCE AND STRUCTURE**

Arising from scenarios 1, 2 and 3 there needs in all cases to be a salaried director appointed and a Board of Directors (meeting via video conference, otherwise travel/accommodation expenses to be paid by sponsors)

**Table 7: Staffing Requirements and Estimated Salary based on Scenario(s)**

Scenario	Staffing requirements	Salary estimates
<p><b>One</b></p> <p><b>Two</b></p> <p><b>Three</b></p>	<ol style="list-style-type: none"> <li>Director appointed by mutual agreement of the Governments involved.</li> <li>Director appointed by Kazakhstan.</li> <li>Director appointed by agreement between UNESCAP and the Governments involved</li> </ol>	<p>Initially a 3-year contract. All cases salary around <b>USD1,500</b> per month at national level and USD 15,000 per month at international level</p>
<p><b>One</b></p> <ol style="list-style-type: none"> <li>Research staff</li> <li>Admin staff</li> </ol>	<ol style="list-style-type: none"> <li>Six staff to cover initially five areas of research; one should be an international expert on contract for at least one year; at least one should have expertise in data processing, web management and computer graphics.</li> <li>Three staff covering treasury, secretarial work and a chief liaison offer</li> </ol>	<ol style="list-style-type: none"> <li>1.1 International expert USD5,000-10,000 a month</li> <li>1.2 Team leader USD1,200 a month</li> <li>1.3 Others USD1,000 a month</li> <li>2. All USD800+ a month</li> </ol>
<p><b>Two</b></p> <ol style="list-style-type: none"> <li>Research staff</li> <li>Admin staff</li> </ol>	<ol style="list-style-type: none"> <li>Three staff to cover initially three areas of research; one should be an international expert on contract for at least one year; at least one should have expertise in data processing, web management and computer graphics.</li> <li>Two staff, one covering treasury and secretarial work and one a chief liaison offer</li> </ol>	<ol style="list-style-type: none"> <li>1.1 International expert USD5,000-10,000 a month</li> <li>1.2 Senior USD1,200 a month</li> <li>1.3 Junior USD800-1,000 a month</li> <li>2. All USD800+ a month</li> </ol>
<p><b>Three</b></p> <ol style="list-style-type: none"> <li>Research staff</li> <li>Admin staff</li> </ol>	<ol style="list-style-type: none"> <li>Two staff to cover initially two areas of research; one at least one should have expertise in data processing, web management and computer graphics.</li> <li>Two staff, one covering treasury and secretarial work and one a chief liaison offer</li> </ol>	<ol style="list-style-type: none"> <li>1.1 Senior USD1,200 a month</li> <li>1.2 Junior USD800-1,000 a month</li> <li>2. All USD800+- a month</li> </ol>
<p><b>All</b></p>	<ol style="list-style-type: none"> <li>Office rental (equivalent to 5 rooms approx. 100 sq.m)</li> <li>Office furniture – desks, chairs, filing cabinets, computers and/or tablets and/or smartphones, printers, cabinets, miscellaneous.</li> <li>Hardware computers and/or tablets and/or smartphones, printers, and server + software (2 workstations)</li> <li>Operating costs – broadband, electricity, water, stationery, cleaning, etc.</li> </ol>	<ol style="list-style-type: none"> <li>USD1,600 per month</li> <li>USD6,600 one time</li> <li>USD10,000 one time</li> <li>USD600 a month</li> </ol>

## 8. Timelines

**Scenario One:** In the event that the Government of Kazakhstan approves to fund and host a DSC and if the MOA can be extended to include this, the timeline will be initially determined by the budget cycle of the Kazakhstan Government, and the time it takes to recruit a director, research staff and admin staff, the time it takes to invite other countries to participate, the time it takes to attract other funding organisations, and the time it takes to recruit a Board of Directors.

Assuming all the above can be completed within six months, which may be somewhat optimistic, the establishment of a DSC would involve a procurement process of office space, office furniture and accounts with utilities for the supply of water, electricity, broadband connections, etc.

All the above could be completed, if some urgency were attached to it, say within one year.

Concurrently a conversation between UNESCAP and the participating countries should agree an initial prioritisation of research projects and programmes.

For illustration, September 2022 could be the target month for the start of the DSC.

**Scenario Two:** should Kazakhstan be initially the only country participating in the DSC the timetable above could be shrunk to say six months with an actual start date in April 2022. This could leave the door open for other countries to participate in subsequent years, in which case scenario two could be a transition to scenario one.

**Scenario Three:** as this scenario involves UNESCAP in negotiation with many potential participating countries the process could well extend beyond one year. If Kazakhstan were to agree to participate, the timeline for a launch of the DSC could be as in Scenario One with other countries joining in over subsequent years.

**Table 8. Scenario Timelines**

Months	1	2	3	4	5	6	7	8	9	10	11	12
<b>Scenario One</b>												
Upon approval of funds by the Govt of Kazakhstan: - recruitment of a Director, Board of Directors, research and admin staff - countries invitation to participate, attracting funding organisations - procurement process of office space/furniture/accounts with utilities												
Conversation between UNESCAP and participating countries on initial prioritisation of research projects and programmes												
<b>Scenario Two</b>	1	2	3	4	5	6	7	8	9	10	11	12
Kazakhstan being the only participating country in the DSC and upon approval of funds: - recruitment of a Director, Board of Directors, research and admin staff - procurement process of office space/furniture/accounts with utilities												
<b>Scenario Three</b>	1	2	3	4	5	6	7	8	9	10	11	12
With the involvement of UNESCAP and participating countries: - recruitment of a Director, Board of Directors, research and admin staff - countries invitation to participate, attracting funding organisations, conversation between UNESCAP and participating countries on initial prioritisation of research projects and programmes												

## 9. Conclusion

The greatest need of Central Asia as a sub-region is a peaceful path to prosperity, and as enablers to reaching this objective, digitalisation and a digital transformation of the economies and societies of the sub-region can make significant contributions.

A DSC needs to be owned by at least one Central Asian republic, Kazakhstan and ideally by at least one other, in order to create the foundations of trust among the countries of the sub-region without dependency – funding support yes, affiliation yes, dependency no – upon the interventions of multilateral agencies and international organisations. Such an initiative would not be without precedent as there are organisations founded by Central Asian Republics engaged in economic, social, and cultural exchange and development, for example the EEU, the Turkic Council, the Center for Emergency

Management and Disaster Risk Reduction (CESDRR) and the Regional Environmental Center for Central Asia (CAREC) which is not to be confused with the ADB-supported CAREC Institute in China, but none of these has a remit specifically to produce digital policy solutions even where digital solutions may be involved in their work. ADB-supported CAREC is the closest to such a remit and it is anticipated that a DSC and CAREC would work in close cooperation for policy networking across the sub-region and possibly find projects and programmes for joint collaboration. For instance, support for the AP-IS and its associated projects, from infrastructure to digital networking and applications, to data dashboards and platforms could be one such area.

Because the depth of digital development, including infrastructure and sector applications, is

higher in Kazakhstan than among neighbouring republics, the nature of the focus and functions of a DSC needs to straddle the requirements of all participating countries if it is to serve the sub-region. This suggests that a DSC should be offering a model of digital transformation that can be drawn upon to be applied to specific sectors along each country's SVC leading to a whole-of-economy approach.

The interests of Kazakhstan lie in the digitalisation process assisting other republics develop their own markets for trade with Kazakhstan which can contribute to a peace dividend. The interests of the other republics are served by being able to share the knowledge, lessons, investments, and successes of Kazakhstan as well other role models such as Singapore and the Republic of Korea, and they would benefit even more from a peace dividend.

Placing the focus of the DSC onto three possible categories of issues, mega, foundational and those that build upon the foundational issues make it is possible to delineate what the work of the DSC could be. Issues such as smart city development and urbanisation and integrated transport and virtual networking in addition to issues such as adding digital resilience to health and education services in response to a pandemic or managing greenhouse gas emissions and meeting climate change targets are mega issues and foundational issues and governments across the sub-region have no choice but to address them. Issues of raising the productivity of sectors that are strategic to the economy and of universal digitalisation of services and administration supporting a digital transformation of an economy and society both require solutions to the foundational issues and cannot ignore the mega issues.

The issue of focus and functions of a DSC will be decided by a combination of the resources available to it and the urgency of the advice on the solutions required, such as a need for a DSC to show early gains and the choice by governments of their priorities.

There are three scenarios presented in the report for a DSC. In Scenario 1 the DSC serves both Kazakhstan as a GovTech with the focus on digital transformation and reaches out to other Central Asian Republics with a focus on the digitalisation of their SVCs. In Scenario 2 the DSC is essentially serving Kazakhstan as a GovTech with the focus on digital transformation but is always capable of extending its reach to other Central Asian Republics and migrating towards Scenario 1. Republic will judge their capacity and commitment to leapfrog into becoming predominately digital economies and societies. In Scenario 3 the focus is upon the realisation of the programme of the AP-IS.

The governance of the DSC would not vary much between the scenarios. In Scenario 1 a Director and Board of Directors would be appointed including representatives of funding bodies and of participating Central Asia Republics, and the DSC would seek a co-partnership with CAREC with representatives on each other's BoD. An option would be to establish DSC nodes in participating Central Asia Republics. In Scenario 2 the BoD would be open to other Central Asian Republics as and when they choose to participate, but initially there likely would be no co-partnership with CAREC and presumably no nodes in other countries. In Scenario 3 the structure would be like Scenario 1.

However, the scope of the research projects might differ between scenarios and therefore the staff arrangements would differ. See Table 7. In each case it is recommended to appoint an international specialist on an annual contract to benefit from global best practice experience and gain international recognition for the DSC.

In scenarios one and two the funding of the DSC would involve the government of Kazakhstan to set a benchmark for local ownership, together with funding from multilateral agencies such as The World Bank and UN agencies. In Scenarios 1 and 3 funding come from each of the participating

Central Asian Republics, but not in Scenario 2 unless and until they agreed to join.

Funding would be invited from the ADB in scenarios involving project collaboration with CAREC. While no direct monetary funding is assumed from the private sector, support-in-kind through the donation of equipment, such as software for analytical work, or the secondment of experts for special projects could be considered where there are no conflicts of interests.

It is recommended that the DSC is established and funded for an initial 3 years followed by a review.



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## Annex A: Agencies for a DSC to liaise for cooperation.

UN Agencies	
<ul style="list-style-type: none"> <li>• <a href="#">Food and Agriculture Organization</a> (FAO)</li> <li>• <a href="#">OCHA</a> (Office for the Coordination of Humanitarian Affairs)</li> <li>• <a href="#">UN Astana Civil Service Hub</a></li> <li>• <a href="#">UNDRR</a> (<a href="#">The Sendai Framework for Disaster Risk Reduction</a>)</li> <li>• <a href="#">UNDP</a> <a href="#">SDGs</a></li> <li>• <a href="#">UNECE</a> (United Nations Economic Commission for Europe)</li> <li>• <a href="#">UNEP</a> (UN Environment Program)</li> <li>• <a href="#">UNESCO</a></li> <li>• <a href="#">UNRCCA</a> (UN Regional Centre for Preventative Diplomacy for CA)</li> <li>• <a href="#">UNESCAP</a> <a href="#">APCICT</a></li> <li>• <a href="#">UNESCAP-SONCA</a> (Subregional Office for North and Central Asia)</li> </ul>	<ul style="list-style-type: none"> <li>• Combat rural poverty, for sustainable management of natural resources,</li> <li>• Humanitarian issues including refugees and remittances.</li> <li>• Inspired by the Agency of Civil Service Affairs of the Republic of Kazakhstan jointly with UNDP in Kazakhstan.</li> <li>• Disaster Risk Reduction</li> <li>• Cross-cutting agency for development</li> <li>• Cross-cutting most CAR SDG development issues.</li> <li>• Govt-level diplomacy for peacekeeping</li> <li>• Supports the ICT4D through govt training modules.</li> <li>• Cross-cutting issues for CAR governments</li> <li>• Capacity building through ICT related training modules for members of ESCAP</li> <li>• Facilitate transformation of landlocked countries into “land-linked” countries through trade integration, as well as transport, energy, and ICT connectivity</li> </ul>
Cross-cutting regional and International agencies	
<ul style="list-style-type: none"> <li>• <a href="#">ADB</a></li> <li>• <a href="#">ADB Institute</a></li> </ul>	<ul style="list-style-type: none"> <li>• Regional cross-cutting agency sponsoring CAREC.</li> <li>• Development strategies</li> </ul>
<ul style="list-style-type: none"> <li>• <a href="#">CAREC</a> (Central Asia Regional Economic Cooperation) its strategic framework <a href="#">CAREC 2030</a></li> <li>• CAREC Program <a href="#">CAREC Institute</a></li> </ul>	<ul style="list-style-type: none"> <li>• Cross-cutting most CAR development issues and regional organisations.</li> <li>• economic and financial stability; trade, tourism, and economic corridors; infrastructure and economic connectivity; agriculture and water</li> <li>• Since 2013, working to be an environmental knowledge hub in the region.</li> </ul>
<ul style="list-style-type: none"> <li>• <a href="#">CESDRR</a> (The Center for Emergency Management and Disaster Risk Reduction)</li> </ul>	<ul style="list-style-type: none"> <li>• Organise emergency responses between Kyrgyzstan Tajikistan Turkmenistan Uzbekistan</li> </ul>
<ul style="list-style-type: none"> <li>• <a href="#">Eurasian Economic Union</a> (EEU) – the Eurasian Economic Commission (EEC) is the executive body.</li> <li>• Digital Initiatives Office, EEC</li> </ul>	<ul style="list-style-type: none"> <li>• An international economic union and free trade zone comprising countries located in central and northern Asia and Eastern Europe including Russia,</li> </ul>

	Armenia, Belarus, Kazakhstan, and Kyrgyzstan.
<ul style="list-style-type: none"> <li>• <a href="#">Economic and Social Council (ECOSO)</a></li> </ul>	<ul style="list-style-type: none"> <li>• Cross-cutting development issues especially ESG and SDGs but Kazakhstan, Kyrgyz Republic, Mongolia are not members</li> </ul>
<ul style="list-style-type: none"> <li>• Interstate Commission on Sustainable Development (<a href="#">ICSD</a>) supported by UNEP</li> </ul>	<ul style="list-style-type: none"> <li>• Develop the Regional Environmental Action Plan (REAP) and a <a href="#">Framework Convention for the Protection of the Environment for Sustainable Development in Central Asia</a>.</li> </ul>
<ul style="list-style-type: none"> <li>• <a href="#">Islamic Organization for Food Security (IOFS)</a> 36 members states internationally</li> </ul>	<ul style="list-style-type: none"> <li>• Provide expertise and technical know-how on various aspects of sustainable agriculture, rural development, food security, and biotechnology</li> </ul>
<ul style="list-style-type: none"> <li>• The International think tank for Land Locked Developing Countries <a href="#">LLDC</a> (based in Mongolia)</li> </ul>	<ul style="list-style-type: none"> <li>• Producing and disseminating research and studies on trade-related topics, aid-for-trade, transport, and transit, as well as databases on issues of interest to landlocked developing countries</li> </ul>
<ul style="list-style-type: none"> <li>• <a href="#">Turkic Council</a> (Formed 2009) by the Nakhichevan Agreement</li> </ul>	<ul style="list-style-type: none"> <li>• Members: Azerbaijan, Kazakhstan, Kyrgyzstan; Turkey, Uzbekistan + Observer status Hungary</li> <li>• Partners: UNDP, <a href="#">UNAOC</a>, <a href="#">OSCE</a>, <a href="#">BSEC</a> &amp; <a href="#">PABEC</a>, <a href="#">WCO</a>, <a href="#">CICA</a>, <a href="#">UNOSSC</a>, <a href="#">UNWTO</a>, <a href="#">ECO</a>, <a href="#">OIC</a>, <a href="#">ICSS &amp; SIGA</a></li> <li>• To promote regional economic and social cooperation in line with the Charter of the UN, including creating favourable conditions for trade and investment, expanding interaction in the fields of science, technology, education, health, culture, sports and tourism, and enhancing legal cooperation.</li> </ul>
<b>Programmes being run across Central Asia</b>	
<ul style="list-style-type: none"> <li>• <a href="#">Aid for Trade in Central Asia – Phase IV</a> run by UNDP, supported by the Kyrgyz Republic and funded by Finland.</li> <li>• <a href="#">Central Asia Trade Intelligence portal</a> by UNDP and funded by Finland</li> </ul>	<ul style="list-style-type: none"> <li>• Promote inclusive and sustainable growth patterns in rural areas and within green productive sectors.</li> <li>• UNDP, International Trade Centre (ITC), governments of the Republic of Uzbekistan, the Republic of Kazakhstan, the Kyrgyz Republic, the Republic of Tajikistan.</li> </ul>
<ul style="list-style-type: none"> <li>• <a href="#">Central Asia Investment Partnership (implemented through C5+1)</a></li> </ul>	<ul style="list-style-type: none"> <li>• US International Development Finance Corporation (DFC), Astana International Financial Centre to raise investments for Kazakhstan and Uzbekistan to raise over \$1 billion over 5 years to support projects that advance private-sector led growth and increase economic connectivity within Central Asia and the broader region</li> </ul>

<ul style="list-style-type: none"> <li>• <a href="#">Digital CASA (Central Asia South Asia) Program</a> supported by The World Bank</li> </ul>	<ul style="list-style-type: none"> <li>• Afghanistan, Kyrgyz Republic, Uzbekistan, dialogue with Kazakhstan (include significant focus on AI and link to regional digital agenda), Tajikistan</li> </ul>
<ul style="list-style-type: none"> <li>• <a href="#">CAREC (Regional Environmental Center for Central Asia)</a> – country offices in Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan</li> <li>• <a href="#">GBPP</a> (Green Bridge Partnership Programme)</li> <li>• <a href="#">Green Climate Change Fund</a>/ ADB</li> <li>• <a href="#">International Green Technology Investment Centre</a> (IGTIC)</li> </ul>	<ul style="list-style-type: none"> <li>• CAREC was established in 2001 by a joint decision of all five Central Asian states, the EU and UNDP. See Annual Report</li> <li>• The GBPP was initiated by Kazakhstan, the Charter has been signed by 16 countries and 16 NGOs from Kazakhstan, Russia, Finland, Kyrgyzstan, Germany, Austria, Turkey, Estonia, Uzbekistan and Tajikistan to improve access to green technology and investment</li> </ul>
<ul style="list-style-type: none"> <li>• International Fund for Saving the Aral Sea (<a href="#">IFAS</a>)</li> <li>• <a href="#">Central Asia Nexus Dialogue Project</a> implemented by CAREC</li> </ul>	<ul style="list-style-type: none"> <li>• Created as an inter-state organisation between Kazakhstan, Republic of Kyrgyzstan, Republic of Tajikistan, Turkmenistan, Republic of Uzbekistan.</li> </ul>
<ul style="list-style-type: none"> <li>• <a href="#">Ready4Trade Central Asia (2020-2023)</a> Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan funded by EU</li> </ul>	<ul style="list-style-type: none"> <li>• Create, launch and promote trade facilitation online platforms</li> </ul>
<ul style="list-style-type: none"> <li>• <a href="#">SPECA (UN Special Programme for the Economies of Central Asia)</a> supported by UN agencies, World Bank, USAID and EU</li> </ul>	<ul style="list-style-type: none"> <li>• Objective of the <a href="#">Innovation Strategy for Sustainable Development</a> is to formulate and implement innovation policies for sustainable development</li> </ul>
<b>Regional Digital Plans and Strategies</b>	
<ul style="list-style-type: none"> <li>• <a href="#">AP-IS - Asia Pacific Information Superhighway (AP-IS)</a> Supported by UNESCAP and SPECA</li> </ul>	<ul style="list-style-type: none"> <li>• The Master Plan 2019-2022 has identified four thematic pillars: Connectivity, Internet traffic management, E-resilience, Broadband for all.</li> <li>• <a href="#">IXP development</a></li> </ul>
<ul style="list-style-type: none"> <li>• <b>STKEC</b> (Skymkent) – Tashkent – Khujand Economic Corridor (Kazakhstan, Uzbekistan, Tajikistan) supported by the ADB <a href="https://www.adb.org/sites/default/files/publication/691231/road-map-shymkent-tashkent-khujand-corridor.pdf">https://www.adb.org/sites/default/files/publication/691231/road-map-shymkent-tashkent-khujand-corridor.pdf</a></li> <li>• See also <a href="#">Smart Cities Concept</a> below - SHYMKENT: Implementation of a blockchain platform based on the Collaborative Innovation approach (Budget investments in the amount of 40 million tenge = &gt; USD 90 million)</li> </ul>	<ul style="list-style-type: none"> <li>• Six areas:(i) improvement of road and railway transport connectivity, (ii) modernisation of border crossing points (BCPs) and border management, (iii) development of horticulture value chains, (iv) modernisation of sanitary and phytosanitary (SPS) measures and development of food quality certification services, (v) development of regional tourism, and (vi) development of special economic zones (SEZs) and industrial zones.</li> </ul>
<ul style="list-style-type: none"> <li>• <a href="#">TASIM</a> (Trans-Eurasian Information Superhighway) Eventually running from Frankfurt to Hong Kong and Shanghai <a href="https://www.unescap.org/sites/default/files/Trans-Eurasian%20Information%20Superhighway%20(TASIM).pdf">https://www.unescap.org/sites/default/files/Trans-Eurasian%20Information%20Superhighway%20(TASIM).pdf</a></li> </ul>	<ul style="list-style-type: none"> <li>• A regional initiative aimed at creation of transnational fibre-optic backbone targeting primarily the countries of Eurasia from Western Europe to Eastern Asia</li> </ul>
<b>Kazakhstan – Technology Platforms (under ministries) = applied R&amp;D</b>	
<ul style="list-style-type: none"> <li>• Electronic Industry</li> <li>• GovTech</li> <li>• FinTech</li> <li>• AgriTech</li> <li>• GreenTech</li> </ul>	<ul style="list-style-type: none"> <li>• Legal and institutional conditions for import substitution and export development</li> <li>• Develop the state as a digital ecosystem to support civil society services and business.</li> <li>• Develop FinTech as the basis of the <a href="#">Astana International Financial Centre</a></li> <li>• Goal is intensive development using digital technologies.</li> </ul>

<ul style="list-style-type: none"> <li>• GeoTech</li> <li>• SpaceTech</li> <li>• Smart City</li> <li>• Artificial Intelligence</li> <li>• Industry 4.0</li> </ul>	<ul style="list-style-type: none"> <li>• Develop the commercialisation of ‘green’ technologies focused on market demand.</li> <li>• Develop a national spatial data infrastructure for the Republic of Kazakhstan.</li> <li>• Create a medium-sized remote zoning of the Earth and contribute technologies.</li> <li>• Spread best practices &amp; integrated digital solutions based upon established standards.</li> <li>• Provide an infrastructure for storing, manging and analysing data using AI.</li> <li>• Digitalise a critical mass of market-driven enterprises with some state support</li> </ul>
<b>Kazakhstan – Technology Centres of Excellence (being formed) = Legal and development frameworks</b>	
<ul style="list-style-type: none"> <li>• Robo Tech</li> <li>• Additive Tech</li> <li>• Med Tech</li> <li>• Industry 4.0</li> <li>• E-Industry</li> <li>• Oil&amp;Gas</li> <li>• AgriTech</li> </ul>	<ol style="list-style-type: none"> <li>1. Partnerships with international organisations/companies</li> <li>2. Infrastructure (labs., experimental &amp; certification centres, etc)</li> <li>3. Partnership with industry</li> <li>4. Analytical competencies, foresight, strategic vision</li> </ol>
<b>Kazakhstan – Data Centres, Technoparks and innovation Centres</b>	
<ul style="list-style-type: none"> <li>• 40+ Data Centres</li> <li>• National Information Technologies</li> <li>• Main Technoparks</li> </ul>	<ol style="list-style-type: none"> <li>1. 65% Kazaktelecom; 35% TransTeleCom</li> <li>2. Server centre for government agencies <ul style="list-style-type: none"> <li>• Science Fund</li> <li>• Fostering Productive Innovation Project (World Bank)</li> <li>• “Qazinnovations” National agency for innovation development</li> <li>• “Zerde” National ITC Holding</li> <li>• The Autonomous Cluster Fund "Park of Innovative Technologies"</li> <li>• International Technopark of IT start-ups Astana Hub</li> <li>• AIFC Fintech Hub</li> <li>• Technopark of Innovation Cluster of Nazarbayev University</li> <li>• Park of Innovative Technologies Alatau</li> <li>• Huawei Kazakhstan Joint Innovation Center</li> <li>• The Regional Environmental Centre for Central Asia (CAREC)</li> </ul> </li> </ol>
<b>Kyrgyzstan – Data Centres, Technoparks and innovation Centres</b>	
<ul style="list-style-type: none"> <li>• 6 Data Centres</li> <li>• IXP</li> </ul>	<ol style="list-style-type: none"> <li>1. Data Centre of National Bank of the Kyrgyz Republic</li> <li>2. The first commercial Data Processing Center (2018, NSP company)</li> <li>3. ElCat Data Center (by IPTP Networks company, Bishkek)</li> <li>4. Data Center construction within the Digital CASA project (from 2019-2024)д</li> <li>5. Innovation, Digital Technology, and Economic Research Center (IDTEAM)</li> <li>6. Ferghana Valley Internet Exchange Point (FVIXP, 2019).</li> </ol>
<b>Uzbekistan – Data Centres, Technoparks and innovation Centres</b>	

<ul style="list-style-type: none"> <li>• 6 Data Centres</li> <li>• IXP</li> <li>• Technoparks</li> </ul>	<ol style="list-style-type: none"> <li>1. 5 data centres (Tashkent), run by three organisations. Independent Telecom Innovations Metrotelecom, Independent Telecom Innovations ITI-IX and IPlus.</li> <li>2. Huawei Uzbekistan Data Center (for irrigation engineers, agriculture) <ul style="list-style-type: none"> <li>• Technology park in Tashkent (2019, former Mirzo Ulugbek Innovation Center).</li> <li>• Technology park in Andizhan (2020).</li> <li>• Similar parks will be established in Nukus, Bukhara, Namangan, Samarkand, Gulistan and Urgench.</li> </ul> </li> </ol>
<b>Mongolia – Data Centres, Technoparks and innovation Centres</b>	
<ul style="list-style-type: none"> <li>• Data Centre for Government</li> <li>• Innovation Centres &amp; Technoparks</li> </ul>	<ul style="list-style-type: none"> <li>• The Mongolia National Data Center (NDC, has the capacity to store and share all databases of all the government departments).</li> <li>• Mongolia National Remote Sensing Center (NRSC, a research institute under the Meteorological Agency of Mongolia. They operate the satellite data storage system for MODIS, NOAA and FY satellites)</li> <li>• Mongolian Innovation and Technology Center at Mongolian National University</li> <li>• National Information Technology Park.</li> <li>• Atal Bihari Vajpayee Centre for Excellence in Information &amp; Communication Technology (Ulaanbaatar).</li> <li>• National IT Park incubator, CLUB Co-working, the Women’s Business Center, and the Start-up Council of the Mongolian National Chamber of Commerce and Industry</li> </ul>
<b>Turkmenistan – Data Centres, Technoparks and innovation Centres</b>	
<ul style="list-style-type: none"> <li>• Technopark</li> </ul>	<ul style="list-style-type: none"> <li>• Technology Center (within the Technopark in Turkmenistan)</li> </ul>
<b>National Digital Plans and Strategies</b>	



<ul style="list-style-type: none"> <li>• <a href="#">Digital Kazakhstan</a> (2018-2022) Note: ICT spending in Kazakhstan in 2020 &gt;USD 900 million (website gives data from 2007)</li> <li>• <a href="#">Smart City Concepts</a> – see for Examples of financing models for smart city projects</li> </ul>	<ul style="list-style-type: none"> <li>• The goal of which is to improve the living standards of every citizen of the country using digital technologies.</li> <li>• The goal is ubiquitous broadband Internet access with 4G/5G mobile; increased online public services to reduce bureaucracy and corruption and add transparency to government agencies.</li> <li>• Most important is to increase general digital literacy for the development of the domestic IT sector.</li> <li>• Funding: 2018-22 &gt; USD250 million; anticipated from the quasi-public sector around USD 395 million</li> <li>• Source: <a href="http://adilet.zan.kz/rus/docs/P1700000827">http://adilet.zan.kz/rus/docs/P1700000827</a></li> <li>• Year of implementation: 2017-2021 to create network communication between all city services.</li> <li>• The aim is to increase safety and efficient use of electricity and reduce energy consumption by up to 50%.</li> <li>• Financing: see website for examples of financing models for smart city projects, including SHYMKENT (see above)</li> </ul>
<ul style="list-style-type: none"> <li>• Kyrgyzstan Concept of the <a href="#">Digital Kyrgyzstan National Digital Transformation Program</a> (2019-2023) <a href="https://unece.org/fileadmin/DAM/env/EMA/UNDA_2018-2021/UNDA_Kyrgyzstan_gap_analysis_2019_E.pdf">https://unece.org/fileadmin/DAM/env/EMA/UNDA_2018-2021/UNDA_Kyrgyzstan_gap_analysis_2019_E.pdf</a></li> <li>• <a href="#">“Taza Koom” Kyrgyzstan</a> ICT spending in 2019 was USD 168 million (data from 2015 onwards)</li> </ul>	<ul style="list-style-type: none"> <li>• “Sanarip Kyrgyzstan” (translation Digital Kyrgyzstan) implementation 2019-2023.</li> <li>• Create an open digital society, transition to digital governance, provision of digital conditions for citizens in interaction with state bodies and local self-government bodies, including anti-Covid procedures. Ensuring transparency.</li> <li>• The aim is the automation of the activities of government agencies, the introduction of electronic payments, providing high-quality fibre-optic communications in the regions.</li> <li>• Financing the project: World Bank has allocated USD 50 million for Digital CASA.</li> <li>• Year of implementation: 2017-2040.</li> <li>• The project is a key component of the Kyrgyzstan Sustainable Development Strategy for 2018-2040.</li> <li>• The aim is to build a world-class digital infrastructure based on green technologies and clean energy, everyone's access to digital knowledge, and turning Kyrgyzstan into a regional hub of the digital Silk Road for digital business and digital innovation (digital enabling environment).</li> <li>• Financing involves 500 million soms (USD5.8 million) allocated from the state budget, and</li> </ul>

	<p>the World Bank additionally allocated USD50 million for this program.</p> <ul style="list-style-type: none"> <li>• Source: <a href="http://kabar.kg/news/realizatsiia-programmy-taza-koom-pomozhet-iskliuchit-korruptsiu-deputat/">http://kabar.kg/news/realizatsiia-programmy-taza-koom-pomozhet-iskliuchit-korruptsiu-deputat/</a></li> </ul>
<ul style="list-style-type: none"> <li>• <a href="#">E-Mongolia</a> – see <a href="#">Digital nation</a></li> </ul>	<ul style="list-style-type: none"> <li>• Electronic government project 2012-202 developed by the Communications and Information Technology Authority, consists of 181 online government services, including services such as E-barimt (VAT promotion system under the Ministry of Finance) and E-halamj (social welfare services under the Ministry of Labor and Social Protection).</li> <li>• A further 492 government services are planned with mobile operators Mobicom, Unitel, and Skytel not charging data rates during the first year.</li> <li>• The aim includes dissemination of information and liberalisation of the telecommunications sector.</li> <li>• “According to recent government research based on the total number of public services accessed in 2019, citizens are expected to save a total of 3,581 hours per year as a result of the 181 services currently available through e-Mongolia.”</li> <li>• A source: <a href="https://blogs.bsg.ox.ac.uk/2021/02/08/how-to-build-a-digital-nation-perspectives-from-mongolia">https://blogs.bsg.ox.ac.uk/2021/02/08/how-to-build-a-digital-nation-perspectives-from-mongolia</a></li> </ul>
<ul style="list-style-type: none"> <li>• <a href="#">The concept of the formation of electronic government in the Republic of Tajikistan</a> (2012-2020)</li> </ul>	<ul style="list-style-type: none"> <li>• The aim is the digitalisation of all government bodies and a transition to e-government, increasing the efficiency of the executive bodies, openness of information on the activities of executive bodies, the formation of a unified system of information exchange.</li> <li>• Financing the project: no information available.</li> </ul>
<ul style="list-style-type: none"> <li>• <a href="#">Concept for the development of the digital economy in Turkmenistan</a> (2019-2025)</li> </ul>	<ul style="list-style-type: none"> <li>• The project will implement an electronic document management system.</li> <li>• The aim a high-quality, safe, low-cost and smart access to high-speed Internet and mobile communications, a stable and competitive market for communications and telecommunications, reducing the digital gap between cities and rural areas</li> </ul>
<ul style="list-style-type: none"> <li>• <a href="#">Uzbekistan E-Government Development Program 2013–2020</a></li> <li>• <a href="#">Digital Uzbekistan 2030</a></li> </ul>	<ul style="list-style-type: none"> <li>• ADB assistance in four priority areas, namely: property registration, business registration, public procurement and public access to information with a focus on (i) developing a government-public and government-business interface strategy, (ii) phased strategies for the Government's four priority areas, (iii) action plans for piloting e-government applications, and (iv) piloting e-government applications.</li> </ul>

	<ul style="list-style-type: none"> <li>• First years of implementation: 2020–2022. The project aims to improve e-government, improve Internet connectivity.</li> <li>• The aim is to go beyond the 30% of public services that provided by e-government with high-quality, safe, low-cost and smart access to high-speed Internet and mobile communications, a stable and competitive communications and telecommunications market, reducing the digital gap between cities and rural areas.</li> <li>• Financing: The World Bank has allocated around USD 300 million: source - <a href="https://lex.uz/docs/5031048">https://lex.uz/docs/5031048</a></li> </ul>
<b>Other national and global agencies to collaborate with</b>	
<ul style="list-style-type: none"> <li>• <a href="#">GEF</a> (The Global Environment Facility)</li> <li>• <a href="#">KOICA</a> (The Korea International Cooperation Agency)</li> <li>• <a href="#">ILO</a> (International Labour Organisation)</li> <li>• <a href="#">ISRIC</a>- World Soil Information</li> <li>• <a href="#">IUCN</a> (Int Union for Conservation of Nature)</li>   <li>• <a href="#">UNESCO</a> (UN Educational, Scientific and Cultural Org)</li> <li>• <a href="#">UNFCCC</a> (UN Framework Convention on Climate Change)</li> <li>• <a href="#">UN Water</a></li> <li>• <a href="#">UN World Institute for Development Economics Research</a></li> <li>• <a href="#">UN WTO</a></li> <li>• <a href="#">World Data System</a> (WDS)</li>   <li>• <a href="#">WHO</a> (World Health Organisation)</li> <li>• <a href="#">WMO</a> (World Meteorological Association)</li> </ul>	<ul style="list-style-type: none"> <li>• Provides support to civil society and community initiatives.</li> <li>• Korean overseas aid agency for sustainable economic growth</li> <li>• All matters relevant to work processes and labour standards.</li> <li>• Member of the WDS (see below)</li> <li>• For Central Asia see <a href="https://www.iucn.org/regions/eastern-europe-and-central-asia">https://www.iucn.org/regions/eastern-europe-and-central-asia</a></li> <li>• Build peace through international cooperation.</li> <li>• Parent of the treaty of the 1997 <a href="#">Kyoto Protocol</a></li> <li>• Coordinates UN work on water and sanitation</li> <li>• UN-WIDER Development research focused on the SDGs.</li> <li>• WTO initiatives to support trade and tourism, etc.</li> <li>• An Interdisciplinary Body of the <a href="#">International Science Council</a> (ISC; formerly ICSU) to promote trusted data collection for scientific and social science purposes.</li> <li>• Health For All (HFA) <a href="#">data base</a> covering Europe</li> <li>• Multiple international datasets for global climate analysis</li> </ul>

# Annex B: Interviews Findings and Schedule

## A. Findings from Interviews

To aid understanding the following divides the findings into 10 categories.

### 1. Opinions of a Digital Solutions Centre (DSC)

- a. The role, the focus and membership/governance of a DSC needs to be clearly defined including how it can add-value.
- b. Support for its role as a research and advisory service to policymakers is generally supported if it can add value to what already exists.
- c. The consensus was that it should serve to promote *cross-border digital solutions* as a contribution to sub-regional (the assumption to start with is to involve Kazakhstan, Kyrgyzstan, and Mongolia) co-operation and collaboration.
- d. Uncertain whether this would imply a single DSC in Almaty or several DSC-hubs collaborating with a central hub in Almaty.

### 2. Agencies and CACs with which to collaborate.

- a. The most cross-cutting international agencies with digitalization mandate, besides SPECA and other UN and aid agencies, are CAREC-ADB funded and WB funded Digital Casa; neither have any direct involvement with the AP-IS infrastructure project being promoted by UNESCAP but both ADB and the WB place broadband Internet access high on their agendas; it has been suggested (UNESCAP discussion paper) that DSC be a 'hub' within the AP-IS to monitor and advise on its progress and its related projects such as local Internet access and cross-border international connectivity or 'docking'
- b. Agencies with Kazakhstan (and potentially other CARs) that are focused upon projects feeding into a digital transformation of the economy and society; in Kazakhstan these include Centres of Excellence focused upon legal, regulatory and policy recommendations, and Technology Platforms under each ministry focused upon digital projects; the CoE under the guidance of the MDDIAI and the IFC are in part focused on these issues and as the MDDIAI is the leading agency for such developments there may be a 'natural fit' for a DSC.
- c. The challenges and past failures were often referred to, but a few examples of cross-border collaboration were offered including the work of the IFC and the single window and RFID-systems initiated by the EAU.

### 3. Supply Value Chains, Laws, Regulations, Policies and Standards/Certifications

- a. Issues such as cross-border e-trade, e-payments, e-documentation, digital financial literacy and financial and technological support for start-ups and for i4.0 were frequently mentioned both in terms of digitalization plans and individual projects; seeing the scope of digital issues in terms of a SVC offers a way for a DSC to identify areas of greatest value-add that can quickly achieve improvements in productivity, for example as 'agricultural extension' programmes; a SVC analysis also allows a DSC to view cross-border opportunities either as a long supply value chain (imports raw materials and components => production and assembly => distribution and retail => exports) or as chains associated with sector imports and exports such as minerals or retail goods to neighbouring

countries using digital paperless processes such as blockchain payment contracts, customs declarations, etc.

- b. A DSC ‘deep dive’ into any one of these SVCs could come up with proposals for legal and regulatory changes, the adoption of international standards by trading partners, policies to support digital projects, for example those of CAREC or Digital Case or the UNDP digital skills programmes, etc.
- c. The need for updated or new laws, flexible regulations (e.g., sandboxes, trigger points, authorized agents, etc.) and policies came up frequently with respect to numerous sectors: for example, to help start-ups, to foster cross-border trade, to control the emission of greenhouse gases (GHGs), etc.
- d. Adopting international digital standards for all areas of the economy and trade, for example, developing a Kazakhstan QR code and ID4D and for the region should be a priority which a DSC could work on recommendations.

#### **4. Infrastructure and the AP-IS**

- a. The lack of Internet connectivity or slow speeds, narrow bandwidths were frequently raised as a problem; upgrading networks and investing in 5G is a Kazakhstan priority; the infrastructure aspect of AP-IS is less important in for Kazakhstan.
- b. But AP-IS remains within the UNESCAP domain; while neither ADB nor the WB are directly involved at this stage a clear AP-IS rollout plan with financing and cross-border agreements would be needed for international agencies to coalesce around AP-IS related projects.

#### **5. Strategic Enduring and Mega Issues**

- a. A number of issues were raised: food security, water and energy issues, climate change and the environment, Inter-access, health systems and the non-operability of their networks.
- b. Several times it was suggested that there was “little money” seen in environmental issues despite the scale of the problem and a range of initiatives being undertaken and supported by the international community and “early gains” would be needed, possibly including health benefits.

#### **6. Data**

- a. The need for data collection, storage, analytics was stressed by several interviewees to provide evidence-based policy advice and to close “the disconnect between policy-making and analytics”; whatever the issues-focus of a DSC, data collection and analytics needs to be a part of it.

#### **7. Best Practices**

- a. Kazakhstan has consciously followed best practices from Dubai, Republic of Korea, the UK, etc., adopting an open-market approach even when the role of the state remains important, with a focus upon economic growth; growth will only translate into welfare if there is a suitable economic and social environment to ensure wealth distribution is equitable for citizen welfare, such as health and safety regulations, etc. One of the reasons suggested for the promotion of e-government and transparency was a determination to support anti-corruption measures, for example, digital audits of financial transactions can combat money-laundering; for a DSC monitoring global best practices relevant to any project or policy initiative should be a basic requirement.

#### **8. Scenarios for a DSC**

- a. A DSC is seen as being *potentially* able to add value with a consensus that it should serve to promote *cross-border digital solutions* and focus upon *emerging and upgrading digital technologies* in light of

the fact that Kazakhstan in particular has already made steady progress in digitalization. There was also considerable support for the DSC to act as *a data analytics hub* and this could be consistent with it being affiliated with the AP-IS as it progresses or even with a multilateral organization.

## B: Conducted Interviews

Date	Dates of the interviews with representatives and the project staff
26 <sup>th</sup> March 2021	–The World Bank
30 <sup>th</sup> March 2021	The World Bank Working Group
31 <sup>st</sup> March 2021	The World Bank
7 <sup>th</sup> April 2021	UNDP in Kyrgyzstan
13 <sup>th</sup> April 2021	QazInnovations (part of MDDIAI)
22 <sup>nd</sup> April 2021	Committee on International Affairs, Defense and Security of the Mazhilis of the Parliament of the Republic of Kazakhstan and ex-Ministry of Ecology and Natural Resources
29 <sup>th</sup> April 2021	QazInnovations; JSC "Science Fund" of the Republic of Kazakhstan
29 <sup>th</sup> April 2021	Department of International Relations MDDIAI
5 <sup>th</sup> May 2021	Fintech Hub AIFC, Former Deputy Chairman of the board; Zerde National Infocommunication Holding and head of government-sponsored IT and start-up incubator Astana Hub.
12 <sup>th</sup> /26 <sup>th</sup> May 2021	Digital Transformation Centre under Zerde
17 <sup>th</sup> May 2021	KPMG Digital Village and Lead Expert
25 <sup>th</sup> June 2021 3 <sup>rd</sup> July 2021	Secretariat, International Think Tank for LLDCs