INFORMATION AND COMMUNICATONS TECHNOLOGY AND DISASTER RISK REDUCTION DIVISION

Fostering the Central Asian Digital Strategy with the Digital Solutions Centre for Sustainable Development *(DSC SD)*

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Table Of Contents

Foreword by IDS, IDD ESCAP

The strategic action plan for ESCAP is to continue implementating the Asia-Pacific Information Superhighway and facilitate the development of its Action Plan for 2022-2026 through subregional working groups.

Nowadays, digitalization of economies is going hand in hand with a fight against the COVID-19 pandemic. Economies, therefore, require preparation for the post-Coronavirus era. The regional digital divide creates a new reality where the top ten economies with 90 per cent access to the internet have left behind 2 billion people without access. Challenges of "unconnected" and "under-connected" are the new reality of Asia and the Pacific under COVID-19disease-related quarantine.

This digital divide is even more notable between nations, and is very broad leaving half of the population marginalized. Extending the internet to remote and rural areas has been a perennial developmental challenge. There is an increased demand for digital literacy and curriculum reform.

Policymakers from the whole region took a long time interpreting economic and life cycles, and had difficulty seeing digital development progress as multidimentional. The role of institutions and think tanks is essential, and their policies should support sustainable development. Another critical aspect that requires rethinking is governance and entry points to the inclusive digital economy, which should be balancing demand and supply chains for the benefit of society and the environment.

Traditional "business as usual" is not possible, and Asia and the Pacific region faces hotspots in both climate change impacts and spread of the COVID-19 pandemic. The online education system would need to find new ways of teaching and learning. On the positive side, howeversocial distancing is accelerating the processes of transformation.
There is therefore, an great opportunity for institutions to analyse the state ICT policy for regional development and create new knowledge products for decision-makers. The new knowledge package would help policymakers define their future at local and national level and encourage cross-regional collaboration.

The new digital learning skills and tools are easily available in open-source media. It would be useful to allocate time for a new project development and analysis, along with evaluation during social distancing. The whole process of strategic planning should start again. The next level of alternative scenarios of social development through the projects would require more engagement and collective visioning. With skillful facilitation, this visioning might become a powerful engine for strategic backcasting and foreward looking digital planning. It will help in articulating the next steps at individual and community levels.

This working paper is a result of research inputs of a mega trends and, overviews of on-going national and regional initiatives, compiled by a high- level Kazakhstani expert, whom IDD invited to team up in a RECI project (DA 11th tranch). The paper aims to facilitate institutional strengthening processes in the SPECA countries. It is built on the analysis of the mega-ICT trends and ICT- infrastructure and, supports the digital connectivity.

In a number of technical papers, ESCAP has already shown that ICT-infrastructure creates a foundation for all digital technologies. This infrastructure currently offers the co-deployment of fibre-optic cable systems along transport and energy infrastructures as an effective and cost-efficient means to develop universal seamless information and connectivity.

ESCAP keeps emphasizing and sensitising policymakers to invest in sustainable infrastructure to fight against pandemics like COVID-19 and beyond. There are great examples of carrier-neutral internet exchange points that promote intra-regional content exchange and improve reliance—quality and cost of internet connectivity.

We are entering an inspirational journey. The new structure The new structure will clear confusion and open up options for action through futures studies and education, digital mapping tools, anticipating, timing, deepening, and creating alternatives. The new economy will be a digital economy, based on digitising information and creating an information and communication infrastructure. This new digital economy will have technological, structural and process-related

opportunities, and the way economic values are created will change fundamentally.

We hope this working paper will be instrumental in uniting Central Asia as a platform. We want it to help high-level decision makers to develop a joint strategy and take actions towards a sustainable future.

For the attention and peer-review inputs of the SPECA WG on ITSD, 20-21 October 2021

Abstract

The key objective of this research paper is to facilitate development of a digital strategy in Central Asia on digital connectivity and transformation in the five Central Asian countries and Mongolia. This research paper consists of the analysis part of digital readiness including policy, overview of the flagship initiatives and strategies, and the draft Central Asia digital strategy for five Central Asian countries and Mongolia.

The paper highlights that climate change and green platform/data revolutions are exposing vulnerabilities of this group of *Landlocked Developing Countries* with renewed vigour. Threats within the water-energy-food *nexus* are on the rise. However, these mega-trends also create unprecedented opportunities for breakthroughs in integration and sustainable development.

Hence, this paper suggests a strategy called *as «Central Asia-as-a-Platform»* to develop an innovative competitive sub-regional advantages in the era of digital transformation. The working paper proposes to establish a *Subregional Digital Solutions Centre as a digital platform* for the implementation of the sub-regional digital strategy. *The subregional Digital Solutions Center for Sustainable Development (DSCSD) in Almaty*, as an united digital platform can play a crucial role to integrate the cooperative actions of UN agencies/regional offices, regioinal organizations and member States and to realize the proposed digital strategy.

Implementation will require vision, inspiration and regional cooperation from the states and community leaders, for the collective development of new values of the proposed *Central Asia Information Society.*

A radical formulation and promotion of the main transformative forces, should take place. Development partners and businesses that share ESG principles, as well as the goals of the *UN Secretary-General's Roadmap for Digital Cooperation*, are expected to support this endeavor.

Keywords

Green economy, digital, water, energy, food, climate change, information communication technologies, data, landlocked developing countries, integration, statistical, geospatial, values, society, justice, ESG nexus

Introduction

Analysis, vision and parts of proposed digital transformation strategy presented here are based on three mega-trends. These are climate change, and the green and digital (platform and data) revolutions.

Globally, digitalization began as the process of leveraging digital technology and data to improve business processes and models. Digital transformation[2] is the new development paradigm change and its processes use disruptive technologies, digital connectivity and networks including AI, IOT, and digital data. This development is for the whole of the societal fabric of value creation, with people as a priority. This is a process making institutions to change and innovate cultures of innovation - not just to enhance or support "business as usual".

The world is just beginning to view digital transformation from the perspective not only of the economy and business, but also of the social and cultural values that should form the basis of an *Information Society*.

Disruptive technologies continue to change traditional competitive advantages, business models, development strategies, notions and concepts, through distinctdigitalization and digital transformation stages. And, in this context Central Asia (CA) countries may find themselves largely at the starting stages, with some progressing better and some less .

Meanwhile, even before the pandemic the World Summit on Information Society (WSIS) was putting human capital and social issues at the centre of digital transformation. If these issues are put forward as the main priority in the subregion, then the governments concerned will be considered reformist. Such a step would be consistent with expert opinion that successful transformation always begins with a great vision. However, what is crucially important is a great vision plus common policy about the "Great Game": renewed struggle for the influence over Central Asia between global and regional powers, against the backdrop of explosive development of the platform economy.

Since the states of the subregion aspire to be players rather than pawns of international relations, their vital interest today is digital independence. They need to maintain a balance of power centres: FAGAM (Facebook, Amazon, Google, Apple, Microsoft), traditional multinational corporations, China (*country-as-a-platform strategy*) and the other global actors and geopolitical factors.If the countries concerned are to gain a competitive advantage, they must increasing the pursuit of their own regional platform strategy.

According to IMF/World Bank findings, regional cooperation is the main force that can cope with the consequences of the pandemic as well as with global challenges to ensure sustainable development. The leaders of the subregion have a historic chance to begin effective digital integration, based on common e-platforms and data sharing, to create a digital economy and Information Society. This innovative approach will ensure a "leap frog": from stagnation to breakthrough in economic, political and socio-cultural relations among the countries of the subregion.

This is the reason for the proposed *Digital Solutions Centre for Sustainable Development (DSCSD*), which would connect with UN agencies, global/regional organizations such as ADB, and regional platforms/initiatives such as the Asia-Pacific Information Superhighway (AP-IS) for digital connectivity .

Urgent action is particularly required due to climate change: Central Asia is warming faster than the

[2] It cites from a draft working paper of the ICT and Development Section (IDS) of ESCAP. The views expressed through IDS should not be reported as representing the views of the United Nations Economic and Social Commission for Asia and the Pacific.

global average[3].

This research paper is supported by a project entitled: "Addressing the transboundary dimensions of the 2030 Agenda through regional economic cooperation and integration (RECI) in Asia and the Pacific," from 2018 to December 2021. The RECI outcomes were reflected in Bishkek Declaration on "Strengthening Regional Cooperation to support Socioeconomic Recovery in the Wake of COVID-19"[4] on 20 November 2020. The Memorandum of Agreement (MoA) between the Ministry of Digital Development, Innovations and Aerospace Industry of Kazakhstan (MDDIAI) and ESCAP undersigned on 20 April 2021 is currently guiding implementation.

Scope of the Working Paper and Structure:

The objective of the research is to assess digital maturity: digital connectivity, infrastructure and, transformation, with a focus on the latter of five Central Asian countries and Mongolia. It includes (1) assessment of current national policy, flagship initiatives and strategies, regulatory framework (rules and regulations) and institutional capacities on digital connectivity, infrastructure, and digital transformation of target countries, (2) analysis of key relevant programs, and initiatives in the areas of digital connectivity, infrastructure in transformation. Based on the above analysis a strategy with policy recommendations and actions for promoting digital connectivity, infrastructure, and transformation in Central Asia has been developed.

To achieve the objective, Chapter 1 addresses key global and regional trends, factors and implications to be considered in analysing development of North and Central Asian institutions and digital transformation and makesrecommendations. Chapter 2 cover national and subregional programmes and initiatives on digital connectivity, ICT infrastructure and digital transformation to understand Central Asian countries' plans, efforts, and potential regional digital cooperation with conclusions/ recommendations.

The Chapter 3 presents a rationale for the Central Asia-as-a-platform strategy to ensure innovative regional competitive advantage. It provides justification for the special role of the DSCSD – as an instrument of the Strategy. It will provide high level policy-makers with quick solutions by using big data analysis, modeling, prognosis and research on digital transformation, in particular on Green-and-Digital transformation issues. The Centre's critical areas of application are specific: where CA countries cooperate and have a shared vision or perspectives are specified. Actions are outlined to required to achieve the main objectives and implement the recommendations.

[3] https://www.sciencedirect.com/science/article/abs/pii/S0048969721041279?via%3Dihub

[4] Ref 15th GC of SPECA of 20 November 2020 available at: https://www.unescap.org/sites/default/files/Bishkek%20Declaration_ENG_0.pdf

Box 1: Guiding UN UN and ESCAP Documents and Resolutions on Digital Deevelopment

- An In-Depth Study of Broadband Infrastructure in North and Central Asia (2014)
- The Bishkek Declaration on "Strengthening Regional Cooperation to support Socioeconomic Recovery in the Wake of COVID-19" on 20 November 2020
- Addressing the transboundary dimensions of the 2030 Agenda through regional economic cooperation and integration (RECI) in Asia and the Pacific" (2018 - 2021)
- The Digital Economy, as an Accelerator of Regional Integration in Asia-Pacific (2012)
- The SPECA Innovation Strategy for Sustainable Development (2020)
- Big data for environment and agriculture statistics (2021)
- ESCAP resolution 73/6 (2017), 'Implementation of the Asia-Pacific Information Superhighway initiative through regional cooperation', "reducing the digital divide" was included.
- ESCAP resolution 75/7 (2019), 'Advancing the implementation of the Asia-Pacific Information Superhighway initiative through regional cooperation', "reducing the digital divide" was included.
- ESCAP Committee on ICT and Science, Technology and Innovation, Third Session, 2020, the Committee called 'for the active participation of Governments, the private sector, international organizations, regional institutions and other stakeholders, as appropriate, in "bridging the digital divide"
- UN General Assembly resolution 68/302 (2014), "Modalities for the overall review by the General Assembly of the implementation of the outcomes of the World Summit on the Information Society", "bridging the digital divide" was used.
- UN General Assembly resolution 70/125 (2016), "Outcome document of the high-level meeting of the General Assembly on the overall review of the implementation of the outcomes of the World Summit on the Information Society", "bridging the digital divide" was used.
- The UN SG's 'Road map for digital cooperation: implementation of the recommendations of the High-level Panel on Digital Cooperation' (A/74/821) (2020) also mentioned 'digital divides' and 'bridging these divides'
- UNGIS report (input) 2021
- Digital connectivity was used in the report of ESCAP's Committee on ICT and Science, Technology and Innovation, Third Session.
- Digital connectivity was used in the UN SG's report 'Road map for digital cooperation: implementation of the recommendations of the High-level Panel on Digital Cooperation' (A/74/821) (2020)

1. Context and rationale

This chapter covers the context and rationale for development of the strategy and tools, dictated by global factors and trends. Aspects and values of decentralization, and the role of the platform-based economy are explored, as well as their key subregional implications. It ends with a summary of key highlights and recommendations.

1.1. Global factors and trends

Financially based globalization is being replaced by information-digital based globalization. The COVID-19 pandemic has had devastating effects on people's lives, especially in low and middle income countries. According to UN criteria, the five landlocked developing Central Asian nations and Mongolia, and leased developed states, are particularly vulnerable. Developed states are being sharply criticized for snatching up most of the supply of vaccines, treatments and diagnostics. The current crisis exacerbated the 2008 "global crisis of confidence" when the financial elite had to be bailed out by governments. There is a popular perception that authority is corrupt and therefore delegitimized. Citizens demand that their governments implement new reforms to provide accessible services by using modern technologies, including e-government, e-healthcare and e-education.

This is amplified by the effects of the climate change which increasingly undermines health and well-being. Some hope for this may come from the new UNFCCC's mechanism, combining penalties and compensations for governments, according to their level of carbon dioxide emissions, to be endorsed at COP-26 (November 2021, Glasgow).

However, disruptive technologies, exponential growth of data and artificial intelligence are creating a conflict between "data for profit and data for the common good".

The tougher and more comprehensive the technological race is, the more important a "human-centred" approach and human capital will be. Struggle for influence over Central Asia between global and regional powers is re-emerging and even intensifying, as given the traditional transnational corporations reset themselves to compete with global big-tech expansion.

In 2019, the EU has adopted a new Central Asia strategy with focus on connectivity - as "a response to the Belt and Road Initiative". The format of United States relations with Kazakhstan, Uzbekistan, Kyrgyzstan, Turkmenistan and Tajikistan C5 +1, was similar to the one in Russia, China, Japan, Korea, and, *de-facto,* Turkey and India. Protecting its sovereignty and independence is also Mongolia's top priority. Its "good neighbor" policy with Russia and China is counterbalanced by strengthening ties with the United States, Japan, South Korea, India, Germany, the United Kingdom, Australia, and Canada.

To this end, the subregion states need digital independence, to avoid the excessive influence of one of the centres of power and maintain a balance. While developing nations focus on achieving SDGs, observers are already warning: bitter rivalry between BigTech and traditional multinational corporations are wreaking havoc on the Global South. Looming crisis in the tech ecosystem is reflected in deepening digital divide, and they called it digital colonialism.[5]

The expansion and dominance of the Facebook, Amazon, Google, Apple, Microsoft (FAGAM), BigTech cartel on one hand, and the *country-as-a-platform strategy* (China) - on the other, has become, in the context of deepening digital divide, a major geopolitical factor.[6] As this progresses, the control over the trade in goods and services is shifting from countries to digital platforms. Furthermore, as trade, labour, and money grow increasingly digitized and are exchanged on platforms, countries need to rethink their

[5] https://www.aljazeera.com/opinions/2019/3/13/digital-colonialism-is-threatening-the-global-south/, also see SWOT, Annex…

[6] https://www.aljazeera.com/opinions/2019/3/13/digital-colonialism-is-threatening-the-global-south/

positions in the global flow of these goods. If they are to gain a competitive advantage, countries need to increasingly pursue a platform strategy.

China in recent years has set up a most effective, concerted country-as-a-platform strategy, by
Aggressively exporting its digital infrastructure,
Playing a critical role in the development of technical standards, and,
alongside the Belt and Road Initiative (BRI). The "Digital Silk Road" reperesents the investment of China in a country-as-a-platform strategy.[7]

Similarly, the FAGAM business model is to maximize cartel dominance, "monetizing" this market power by charging users or others, leading to sustained supernormal profits and/growth. The actions of BigTech in American and European IT markets and the government's response to anti-trust investigations are revealing as they are actions of governments against corporations and even allies against allies. It is difficult to see, therefore, why FAGAM would be interested in developing the competitive advantages of the Central Asian digital market as this is no longer 'emerging', but has local players capable of competing in certain niches. It is more likely that the tech giants will strengthen their monopoly position as they did with financial corporations and markets from 1990 to 2010.

Notably, in world "power centres" priority is not generally given to promoting economic cooperation and integration, such as that which potentially exists between the Central Asian countries. Instead, they are drawn into competing alliances within the Western groupings, or EAEU in the case of Kazakhstan and Kyrgyzstan, or programmes such as Chinese BRI's Digital Silk [8]

Developing unique points of control in the digital economy.

China's National Informatization Strategy calls upon China's internet companies to go out into the world and support the creation of a "Digital Silk Road": referring to the export of Chinese technology

Road and Green Silk Road. Data, the most valuable modern asset, is also increasingly a geopolitical tool: raw data collected from developing countries is used for creating and concentrating value within countries with strong AI prowess. Data enables effective management or manipulation of market interactions, as well as creating learning assets that can transform organizational processes and industry competitiveness. At the same time, data serves as a control mechanism over the individual users and workers who produce it.

On the more positive side, SG Roadmap on Digital Cooperation (2018) and several UN resolutions and documents stress multi-stakeholder roles in the digital era in reinvigorate global connectivity, a more equitable world, inclusion for all, global cooperation, capacity-building, protection of human rights, trust and security. There is proliferation of knowledge platforms - the Green Policy Platform, Green Industry Platform, and the Green Finance Platform of the Green Growth Knowledge Partnership (GGKP, partnership of GGGI, OECD, UNEP, UNIDO, the World Bank Group). The Asian Development Bank/CAREC report reinforces this: "Digital platforms are transforming how we work, socialize, and create economic value. A digital platform creates a virtual place for communities to interact and exchange information, goods, and services".

[7] https://platforms.substack.com/p/the-state-of-the-platform-revolution

[8] https://www.adb.org/sites/default/files/publication/674421/asian-economic-integration-report-2021.pdf

Decentralized economy and society. The world's economy and technology are increasingly becoming more accessible to all due to shared networking and improved communications. Underpinned by blockchain, they will not only impact how we trade but will also radically change how we make, design and produce physical and digital goods. This refers, for example, to cultural and creative industries, a crossroad of arts, technology, business, entertainment. One of the fastest growing industries sector in the UK, the world leader in this area, contributed £115.9 bln to the economy in 2019, a 43.6 per cent increase since 2010. Same dynamic can be observed in countries of Central Asia, where creative economy is also the most promising and fastest growing segment, already. The creative economy and the platform economy are converging, and the resulting impact is difficult to forecast: as it is a case with another sectors of economy emerging technologies is a coin that has two sides.[9] As the world becomes more inter-connected and closer together the power is shifted out of the hands of traditional governments and institutions to non-state actors, first of all, to civil society. Co-governance becomes a new relation between partners - government institutions, decision-makers and citizens/NGOs. Therefore, not only new economic, but also social values, such as **justice and solidarity,** emerge and are restored. The process is stimulated by unprecedented enhancement of transparency due to "technologies for integrity": blockchain, big data analytics, A.I., and e-governance, the same ones that are called, otherwise, disruptive technologies.

Digital platform: new pathways for creating new values. As an example of how this process can be controlled, Switzerland is currently building the world's universal transaction platform for a free and prosperous society that works for everyone. The project has been inspired by the technologies of Johann Gevers, founder of the world's leading cryptofinance ecosystem, Crypto Valley, as well as Monetas, the Tezos Foundation, the Digital Finance Compliance Association, and the Bitcoin Association.

[9] http://www3.weforum.org/docs/39655_CREATIVE-DISRUPTION.pdf

1.2. Key sub-regional implications

For decades the integration initiatives "from within" in the CA subregion have been failing partly due to the external geopolitical environment. The CA states trade more with China, rest of Asia, Russia, and Europe rather than with each other. Compared to other subregions in Europe, Americas and Asia, intra-Central Asian trade is the lowest.

With a new developments in policy and economic cources in Uzbekistan and Kazakhstan, a new format of interaction - Presidential Consultative Meeting of the five CA States, have gained momentum So, between 2017 and 2018, Uzbekistan's imports from Kazakhstan increased by $569 million, or over 53 percent and a similar trend can be observed in their bilateral trade with other neighbors. The third Meeting was held on 31 March 2021. Yet, political tensions, lack of mutual accommodation of interests among Central Asian countries are still obstacles to integration.

In addition, the COVID-19 pandemic has seat back Central Asian economies for many years and highlighted ongoing governance and structural problems, widespread corruption, and exacerbated social discontent. With an average score of 36, Eastern Europe and Central Asia is the second-lowest performing region on the Corruption Perception Index (CPI): Kazakhstan (38), Kyrgyzstan (31), Uzbekistan (26), Tajikistan (25) and Turkmenistan (19)[10].

The levels of wages, pensions and other social benefits in Central Asian countries are the lowest in the post-Soviet region. The sense of social unfairness, stemming from persistent inequality, also has economic consequences. Some authorities used the crisis to add restrictions to access information and renounce public accountability mechanisms. Consequently, there is an acute problem of trust that citizens put in the public sector and in public administration in general.

According to a recent surveys, countries in the subregion underestimate the importance of building regional institutions and governance. It is something of a paradox that Central Asia, despite being the most remote subregion from the seas, is one of the

most disconnected in terms of inter-country relations.

This region's history of disruptive, political and cultural transformation has shaped the socio-cultural transitions it faces today. Successfully managing these transitions will require cooperation, with digital technology as a focus.

It is only logical that societies will not accept the poor governance and corruption that the hybrid approach brings them. On the other hand, the digital technologies of 'honesty and justice' and creative industries noted in the previous Chapter, can allow the restoration of almost lost heritage. The latter includes the best ancestors traditions, as well as social cohesion. Their fusion, with the help of creative industries, with a new culture can make the identity of Central Asia even more unique.

Meanwhile, new leadership in Kazakhstan, Kyrgyzstan, and Uzbekistan demonstrates political will to engage in the digital and green revolution. In spite of the challenging climate change impact the a water-energy-food-ecosystems nexus-led solution may build a new reality. The same transboundary and cross-border challenges, that have been a source of discord between countries for years can become integration drivers. President of Kazakhstan K.Tokayev on 31 March 2021 addressed to the Cooperation Council of Turkic-speaking States, saying "The water and energy sphere is also an integral part of the relations of Turkic-speaking countries. Efficient and equitable use of transboundary water resources is the key to the stability and prosperity of the region". He also expressed his readiness to implement projects with neighboring States to build hydroelectric facilities, as well as implement joint projects in areas like AI, big data analysis, digitization and Internet trade.

In the Soviet times, "upstream" countries ran water storage facilities. These were originally made to save water for downstream countries' spring farming, but are used to generate hydropower in

[10] *https://www.transparency.org/en/news/cpi-2020-eastern-europe-central-asia*

winter time.

In addition, the general environment is neglected due to water overuse in midstreams and disallowing water to downstreams. The water realease by upstream countries in winter made downstream ones to built additional storage facilities e.g. Sardoba, Shardara or derive water to Altyn Asyr, Arnasay, Sary Kamysh, those made Aral Sea as it exists now[11].

In December 2020, at the UN Summit on Climate Ambitions, the Kazakhstani President announced his country's goal achieving carbon neutrality by 2060. "We are making consistent efforts to increase the share of renewable energy sources in total energy production. So, as of 2020, this figure was was three per cent, but in 2022 we plan to double. By 2030, the share of green energy in the energy sector of Kazakhstan will be increased to 15 per cent." The Green Kazakhstan project plans to achieve the UN Sustainable Development Goals, including affordable and clean energy, sustainable cities and communities, as well as responsible consumption and production. In order to implement this a new Environmental Code has been adopted, which complies with the principles and standards of the OECD countries and will enter into force on July 1, 2021. Public and private investments in green economy development are increasing, including renewable energy, efficient water use and rational use of other natural resources.

The President of Kazakhstan is clear that the main goal of all reforms is to build an economically strong, democratically developed "Listening State," focused on meeting the needs of every citizen. This should lead to a state of free people, whose voices are responded to by the authorities and whose rights will be protected according to the highest world standards.

K. Tokayev, the Kazakhstani President states that: " ...a truly diversified, technological economy... must work to improve the well-being of the people. We must find a positive answer to the growing public demand for a fairer distribution of benefits arising from the growth of national income..."[12]. The draft law "On Public Control" (2021)., the leader of Kazakhstan has instructed the Government: "We need to create a single legitimate institution of *online petitions for citizens* to initiate reforms and proposals. Such a mechanism must be completely protected from any manipulation".[13]

In turn, S.Mirziyoyev, President of Uzbekistan continues making the government more accountable to the electorate. "Virtual Reception Rooms" have become one of the main mechanisms of dialogue between citizens and the president all governmental agencies their own "virtual reception room" portals. In the draft law "On Public Control" (2018) coupled with the President of Uzbekistan Decree aimed at cutting-off red-tape (2021) are aimed at changing fundamentally how the government interacts with citizens.

In Mongolia, the Government launched a platform available both online and through a smartphone app called e-Mongolia, which gives citizens access to the 181 most in-demand government services[14]. The further development of local self-government concepts in these countries is largely based on the advantages of the platform and data revolution.

[11] see Annex 3, SWOT "Leveraging digital technologies for addressing water management and energy challenges for integration in Central Asia

[12] State of the Nation Address, September 1, 2020. Available at:

[13] Note by author: on blockchain technology application

[14] https://advocate.mn/en/news/140/single/157

Box 2: ITU Commitment toward supporting LLDCs'

ITU has mainstreamed the needs of LLDCs (LandLocked Developing Countries – this includes all five Central Asian countries plus Mongolia) in its activities, programmes and projects to achieve its commitments under the Vienna Programme of Action (VPoA), which was agreed by the UN General Assembly during the Second UN Conference on the LLDCs in November 2014. The main objective of this 10 year (2014-2024) action-plan is to fast-forward progress in achieving the sustainable development in the LLDCs. ICTs will play a critical role to achieve this objective.

ITU's mandate is to connect the unconnected and to help the most vulnerable countries take advantage of ICTs for development, including through the provision of concentrated assistance. Find out more about ITU's assistance to the LDCs, LLDCs & SIDS.

In terms of telecommunication infrastructure, LLDCs depend on neighboring and costal countries for access to undersea cables and international Internet bandwidth. Often, costs for ICTs in LLDCs are relatively high.

ITU has maintained a dedicated programme for LLDCs since 2003, and adopted special resolutions for the LLDCs to support their ICT developments, and address their specific challenges.

1.3. Strategy and tools to set up

It is proposed that an **innovative competitive regional advantage: Central Asia-as-a-digital platform Strategy** should be developed to balance influences of a individual country-as-a-platform approaches, FAGAM's or Eurasian Economic Union's strategies. This will require vision and inspiration from state and community leaders, not least for the collective development of new values for the Information Society. Central Asian leaders have a once-in-a-lifetime opportunity to apply global best practice, innovative ecosystems, and a new culture. This will bring about in a radical modernization of the mindset of officials and citizens – a major transformative force. This, empowered by technology, should be at the core of an effective strategy. It would turn existential transboundary challenges such as the water-energy-food supply and climate change into a breakthrough in integration and sustainable development. Development partners and businesses that share environmental, social, and governance (ESG) principles, as well as the goals of the UN Secretary-General's Roadmap for Digital Cooperation, should be interested in supporting this endeavor.

The Digital Solutions Centre for Sustainable Development (DSCSD) is the tool to implement this strategy. More details are given on this essential tool in the last section of this Report.

FIs and other stakeholders are invited to respond to the appeal of the Kazakhstani President, H.E. Kassym-Jomart K.Tokayev, as chair of the LLDC, "We call on international financial institutions, UN systems and other international and regional organizations to prioritize the special need of LLDSc in their recovery efforts…to boost resilient infrastructure, trade facilitation mechanisms, and digital transformation". Urgent action is particularly required due to climate change: Central Asia is warming faster than the global average[15].

15

https://www.sciencedirect.com/science/article/abs/pii/S0048969721041279?via per cent3Dihub

Box 3: Key highlights and recommendations

- Global trends should stimulate CA and Mongolian governments to develop and strengthen digital-green policies.
- CA states could play on the declared "global power centres" model to deal with competing goals in the subregion, such as fostering new growth engines, green energy, AI, e-commerce and digital finance. Examples of this approach include the EU "high-quality building of the Belt and Road" and "connectivity priority", and the Eurasian Economic Union "Digital Agenda of the Eurasian Economic Union". Using this approach, power centres will be pragmatically encouraged to cooperate instead of competing, to mutually ensure a "balance of interests" in the subregion. The experience of Kazakhstan and its neighbours is a good example: they secured a balance concerning pipeline and transit transport policies in Central Asia.
- Radically transforming social norms with frontier "technologies of integrity" can create new economic opportunities and unprecedented social freedom. Given that officials of CA countries priotize solution of immediate daily problems, they may underestimate these opportunities. There is a need to understand **data-driven governance** - the intensive and extensive use of data to allow citzens to organize, define and achieve their common future.
- The same vision is needed to realize that transboundary challenges, a traditional source of discord between countries), can become the drivers of Central Asian integration. This includes leveraging practical digital solutions where a nexus approach can lead to improved outcomes in integrated management of resources. For example, the common water-energy and e-agriculture digital platforms could be established as building blocks of Regional digital integration (see SWOT, Annex 2 and 3).
- However, true integration is based on shared values. "Culture is the fundamental bond of communities, binding us together when pursuing shared objectives".[16] It is therefore surprising that politicians, along with international and national experts, generally discuss only the business and economic aspects of digital transformation such as old and new business models, b2b and b2c marketing strategies, or value creation for old-new products.
- An example is the EU, which remains a community based on values which means it uses digital platforms that use dedicated data, search engines, and algorithms. Central Asia, which gave the world those algorithms, should be able to use them to restore the good cooperative values of the region. Therefore, it is vital to create a common socio-cultural digital platform along with the above proposed water-energy and e-agriculture digital platforms, with a view to developing social integration and creative industries.

- To cope with the challenges of the 21st century, CA governments should make Regional digital integration an explicit national policy priority.

[16] https://cultureactioneurope.org/knowledge/the-value-and-values-of-culture/

2. National and subregional digital readiness: policy, flagship initiatives and strategies

A brief overview of national and subregional digital readiness covers the list of strategic documents and initiatives. The Chapter is summarized with key highlights and recommendations on digital readinness.

2.1. National level

The key programmes and initiatives in the digital connectivity, infrastructure and transformation of the five Central Asian countries and Mongolia have been developed only within the last three years. However, Kazakhstan has advanced in various areas, including second place in the Government AI Readiness Index for South and Central Asia (2021) which includes 16 countries. CA countries will be able to achieve the stated goals and commitments by supporting them with systemic measures, investments and joint actions.

1) The programme "Digital Kazakhstan" was launched in 2018. This country was also at the regional forefront in launching e-government services back in 2008. The e-gov system provides more than 83 per cent of public services [Zerde, 2020]. Kazakhstan is also 29th in the UN E-Government Development Index (EGDI), and also ranks highly in the e-participation and open government data indices [UN, 2020]. However, Digital Kazakhstan does not have risk reduction or natural disaster provision, the environment is only mentioned, healthcare is excluded and digital healthcare is only vaguely described, with no references to the WHO or UN expertise. Instead of Digital Kazakhstan the national project DigitEl is being developed, involving the creation of ten technological platforms: Govtech, the smart city, the Industry 4.0 plan, agritech, blockchain, space-geotech, AI, e-industry, FinTech and GreenTech. These platforms will have a ready-to-go technical infrastructure, host large amounts of open data as well as developmental and analytical systems for local IT companies and startups. DigitEl can also provide a network of virtual museums, converting to e-format all museum resources and objects of material and intangible heritage. The government will develop new concept for **creative industry** growth in 2021.
2) Kyrgyzstan likewise has a "Digital Kyrgyzstan 2019-2023" transformation programme, and 2019 was declared as the Year of Regional Development and Digitalization of Kyrgyzstan. In 2017 the government adopted the digital transformation programme "Taza Koom" to improve the national digital infrastructure. Kyrgyzstan is one of the top three countries in the world with the cheapest Internet access.[17] The electronic government system *e-kyzmat* consistently enlarges its e-services for the population, planning to provide 80 per cent of public services electronically by 2023 [Soltobaev, 2020]. Kyrgyzstan ranks 83rd on the EGDI, and similarly highly on the e-participation index, whilst its open government data index is estimated as average [UN, 2020].
3) The Uzbekistan "E-Government Development Programme 2013–2020" has been completed, and the "Digital Uzbekistan-2030" programme is being developed. President Mirziyoyev declared 2020 as the "Year of Science, Enlightenment and Digital Economy Development" and outlined the transition to the digital economy for the next five years. As of 2020, 30 per cent of public services are connected to e-government, the majority of the rest to be integrated into an electronic system in the near future [Sputnik, 2020]. The country is 87th onn the EGDI [UN, 2020].
4) The Tajikistan "Concept for the Formation of Electronic Government (2012-2020)" was adopted in 2011. It divided implementation into three stages, but it is far behind schedule in

[17] https://www.cable.co.uk/mobiles/worldwide-data-pricing/

providing e-government services. Low access to the internet due to scarcity of equipment and high costs of connection - including a five per cent tax - plus lack of ICT infrastructure, challenges the realization of the programme [Abdujaborov, 2019]. As of 2020, 26 per cent of the population were connected to the internet [Datareportal, 2020]. On the EGDI, Tajikistan is 133rd with average EGDI and e-participation indicesx, and a low open-government data index. On the plus side, on June 8, 2021 the first Central Asian TajRupt artificial intelligence laboratory was set up in Dushanbe.

5) Turkmenistan launched its "Concept of the Development of Digital Economy until 2025" in 2019 and adopted a law on electronic document management and digital services in March 2020. The government aims to implement an electronic document management system in 2021, and to expedite the launch of an e-government system [CentralAsia.news, 2020]. However, due to the unsatisfactory level of infrastructure and gaps in providing connection, internet access remains low. On the EGDI, Turkmenistan is 158th, with low e-participation and open government data indexes.
6) The "E-Mongolia" platform (2020) is based on the Estonian model of digital transformation. The Government of Mongolia has created "Khur" and "Dan" state service systems in the past which will be transferred into "E-Mongolia".
7) The World Bank Digital CASA (Digital Central Asia-South Asia) is a regional programme aimed at improving broadband internet connectivity and developing an integrated regional digital infrastructure. Within the CASA -Kyrgyzstan project 50 million USD was approved in March 2018. The Digital CASA-Uzbekistan project estimated budget is 300 million USD, while Kazakhstan and Tajikistan are currently negotiating the project terms.
8) Digital Data Centres, technology parks, innovations and science centres have been established in CA and Mongolia (see mapping in Annex 4).
9) The Green-Digital agenda in Kazakhstan includes:

- The Green Bridge Partnership Programme 2022-26.
- A New Environmental Code (2021) with focus on eco-friendly technology in manufacturing and more green projects. Kazakhstan is ranked 33rd in the Green Future Index by the Technology Review portal of the Massachusetts Institute of Technology (01.07.21).
- In 2020, the Astana International Exchange, where Nasdaq and the Shanghai Stock Exchange are shareholders, made its first offering of green finance bonds to help small and medium-sized businesses invest in renewable energy projects.

The AIFC Green Finance Centre was created in 2018 to develop and promote green finance in Kazakhstan and the Central Asian region. Note: additional relevant statistics and information on connectivity, broadband, ICT products and services, etc. are available in other papers prepared within the current ESCAP project.

2.2.Subregional level

The list below gives the key relevant programmes and initiatives, including trends for allocating finance and investment, and strategies related to digital connectivity, infrastructure and transformation. It covers five Central Asian countries and Mongolia, as well as case studies of the United Nations Economic Commission for Latin America and the Caribbean (ECLAC).

1) AP-IS Action Plan (2022-2026): This has three pillars:
   - Connectivity for all, focused on infrastructure and connectivity.
   - Digital transformation, focused on digital platform, digital technology and applications.
   - Digital data, focused on development and management of digital big data and population digital capacity.

   The governments of the subregion are not only fully aware of these priorities, but also implement and fund several relevant projects about infrastructure and connectivity. For example, the TransCaspian Fiber Optic Azerbaijan-Kazakhstan project launched in November 2019 and costing 60 million USD has a potential revenue for Kazakhstan of 300 million USD. Its data transfer capacity is estimated up to six terabits per second. Also, a team of British investors suggested the project be extended to two data centres in the cities of Aktau and Baku on either side of the Caspian Sea within a Caspian Digital Hub Kazakh-Azerbaijani project. The links are Frankfurt-Azerbajan-Kazakhstan - China; Frankfurt-Azerbaijan-Turkmenistan-Iran; and Azerbaijan-Turkmenistan-Uzbekistan-Afghanistan-Pakistan-India. The above links also open up additional perspectives for Mongolia.

2) The World Bank Digital CASA: A regional programme intended to increase access to more affordable internet, increase private investment in ICT, and improve capacity to deliver digital government services in Central Asia and parts of South Asia. This will be done through the development of a regionally integrated digital infrastructure and an enabling environment. The world bank investment is 300 million USD.
3) Digital Almaty Forum (2021): This Forum aims to provide a regional and global platform to discuss the digital agenda in the context of COVID-19, new digital transformation strategies, trends in emerging technologies during the pandemic, and prospects for international cooperation.
4) The EU new Central Asia strategy (2019): This is focused on connectivity, and is a response to BRI.
5) The Digital Agenda of the Eurasian Economic Union until 2025: As Kazakhstan and Kyrgyzstan are members of the EAEU, these countries will need to define if there are synergies or contradictions between the EAEU Digital agenda and the priorities of the Central Asian integration and digital transformation.
6) The Central Asia Investment Partnership (2021): The International Financial Centre, the USA, Kazakhstan and Uzbekistan will jointly raise at least 1bln USD to support economic growth in Central Asia, increasing trade, development, and connectivity.
7) Note by the secretariat: ESCAP support for implementation of the Vienna Programme of Action for Landlocked Developing Countries: This is the Asia-Pacific region implementation strategy for the for the six priority areas of action identified in the Vienna Programme of Action for the landlocked developing countries. These are:
   a. Fundamental transit policy issues.
   b. Infrastructure development and maintenance.
   c. Transport, energy and information and communications technology infrastructure.
   d. International trade and trade facilitation.
   e. Regional integration and cooperation.
   f. Structural economic transformation.
   g. Means of implementation.
8) The Plan of Action for the Information Society in Latin America and the Caribbean (eLAC, 2005): This presents a good case study of how to prepare regional "digital homework" and manage relationships with external players. It has consolidated as the standard-setter for ICT policies and as a platform for political dialogue and cooperation between the region's countries, and between the region and Europe.
9) Regional Broadband Dialogue (2010, 11 countries of the region): This is a forum for debate and for pooling experiences, approaches and proposals about the costs of international links.
10) Digital Transformation in Central Asia Conference 2019: Organized by the University of Central Asia (UCA), the State Committee for Information Technology and Communications, and the High Technology Park of the Kyrgyz Republic, this international conference was the first of its kind in the region. A strategic partnership was set up to support innovative ecosystems in the region between High Technology Park and Shenzhen Open Innovation Lab. Selected start-ups will be able to leverage resources from, and connect to,

start-up ecosystems in China. Technology Parks can then be replicated, and further partnerships explored.[18] Also, of particular interest is the presentation of Dr.Hak-Min Kim, professor of Public Administration at Soonchunhyang University of Korea, and Smart City and Science and Technology Park as Regional Innovation Platform.

Box 4: Key highlights and recommendations for digital readiness

Technology is only an instrument of digital transformation, while people and society should be at the heart of this process and emerging ecosystem.

- The AP-IS Action Plan (2022-2026) can provide a bridge role between the CAREC Digital Strategy 2030 and digitally advanced countries in other sub-regions of Asia pacific, because the action plan covers all Asia Pacific member States and sub-regions.
- The AP-IS Action Plan (2022-2026) bridge role can appeal to member States of Central Asia concerning potential benefits such as transfer of digital technology, sharing good policies and governance systems, the balance of digital powers among digitally advanced countries, and expansion of digital markets. Central Asian countries are more likely to accept the CAREC Digital Strategy 2030.
- The Trans-Caspian optic-fiber communication line will secure for CA countries a data transmission infrastructure and access to the leading Europe-Asia trunk routes, as well as a more certain role in world data transit. For example, Kazakhstan expects data transit revenue to reach $300 million.
- The branch-projects of the TransCaspian link, along with the potential involvement of some BigTechs in establishing and operating the Caspian hub, can become gamechanger for the entire subregion, having positive implications for all AP-IS in the context of its three pillars.
- With the support of the World Bank, the Central Asian states aspire to advance their connectivity capacity to promote regional digital connectivity.
- Creating, on the basis of the Digital Almaty Forum, an Information Society for discussing and coordinating ICT policies, as well as managing relationships with external players by providing a platform for political dialogue and cooperation.
- Establishing Regional Broadband Dialogue, a forum for debate and pooling experiences, approaches, specific technical issues, and proposals.
- Enhance, if needed, Digital Transformation Officer (Kazakhstan, Uzbekistan) status, and create the same position in other CA countries to connect officers in a common mechanism to ensure their effective interaction within AP-IS, Information Society and Regional Broadband Dialogue.
- ADB/CAREC initiative Asia Regional Integration Index Report (2021), to expand cooperation into new areas: agriculture, water and ICT are of special interest.
- Prioritizing data research, data management among the ICT skills.
- Recommendations of the 3rd CAREC Think Tanks Development Forum (CTTDF, 2018) "Building Knowledge Corridors along the Silk Road" (European Institute for Asian Studies). This indicates that the future for the region's landlocked countries are in service industries, and FINTECH originally, but then a wide range of multilateral institutions, have shown active interest in the region.
- CA should make "sustainability" a key feature in all its projects. CAREC could be a coordinator to set common "ESG-benchmarks" for the subregion. However, this should not only be about sustainability, but take a step further to foster creativity, entrepreneurship and innovative concepts.
- Enhance the "bankability" of projects, involve multilaterals either as co-financers (lender or guarantor), or as technical advisors and in creating leverage.
- CAREC should look at innovative models and mechanisms of finance. A regional or "CAREC Fintech Infrastructure Fund" could be a model to leverage a regional FINTECH revolution. CAREC should promote the "Central Asian FINTECH Investment Opportunity" through presentations and road-shows across the globe with the full support of the European Institute for Asian Studies.

[18] https://dtca.kg/outcomes

3. Innovative regional competitive advantage: the Central Asia-as-a-platform Strategy and its tool

To meet the global challenges of the Chinese country-as-a-platform, FAGAM or EAEU strategies this document highlights the great potential of the subregion's innovative competitive advantage - the **Central Asia-as-a-platform strategy.** Developing a subregional economic, political, socio-cultural e-integration service based on digital transformation and the integrated national platforms of CA countries might be a once-in-a-lifetime opportunity. Such integration would let the conditions created by the Big Data revolution and the platform economy be harnessed for achieving SDGs and strengthening the competitiveness of states.

Similar to business concepts of value creation for new products or enhancing existing brands, there must be a collective creation of new values for the Information Society of Central Asia, based on best national traditions and modernized common identity nurtured with green-digital culture. The essential condition for such a qualitative transformation will be the existence of confidence and transparency. Unfortunately this is currently problematic at both the global and regional levels.

The hope is that this new opportunity can overcome 30 years of distrust and stagnation in relations between the CA countries. There will need to be a further build up of confidence-building measures: successful implementation of subregional cross-sectoral pilot projects with e-components with international partners (see Annex 5). This must be combined with scaling up and integrating projects on digital platforms in priority areas. First of all water-energy-food nexus and climate change issues will need to be addressed(see SWOT, Annex 3). Breakthrough in these topics will increase investment attractiveness and ensure competitive regional advantage. It may also stimulate external actors to opt for pragmatic cooperation instead of playing another Great Game in Central Asia. Moreover, regional digital integration can make real what these external forces have prevented for centuries, and what local peoples could only dream of - the highest level of interaction, a common economic space, a single political entity, and revival of a unique identity for Central Asia.

Development partners, including IFIs, and businesses that share environmental, social, and good governance principles, should be interested in supporting this endeavor

3.1. SPECA – a subregional platform to support SDGs implementation

In 2015, after adoption of the 2030 Agenda, the SPECA Governing Council decided that the Programme would become a platform for sub-regional cooperation to implement the SDGs. In 2016, the six SPECA working groups mapped the interventions, priorities and needs of SPECA participant countries against the SDGs.

The SPECA Working Group on Knowledge-based Development (former Working Group on Innovation and Technology for Sustainable Development: WG ITSD) serves as a practical instrument to implement the SPECA Innovation Strategy for Sustainable Development (2020). Among other functions, the Working Group will serve as a forum for discussion on issues related to knowledge-based development, including information and communication technologies (ICT) as well as related policy and regulatory issues".[19]

[19] https://unece.org/fileadmin/DAM/SPECA/documents/gc/session12/UNECE_Study_GC_English.pdf

3.2. The role of the DSCSD: grasping digital-green revolution

The proposed Digital Solutions Centre for Sustainable Development (DSCSD) is planned to connect with Asia Pacific Information Superhighway (AP-IS) in the mid-term. It should connect with UN agencies, global/regional organizations such as ADB, and regional platforms/initiatives such as the Asia Pacific Information Superhighway (AP-IS) for digital connectivity and synergy impact. It would integrate the data and analytics of the UN agencies in Almaty and other parts of CA subregion, regional organizations, and member States, through the united digital platform including geospatial information. If DSCSD was designed well, with an innovative approach and political commitment, this could be a strong tool to tackle the "dual challenge-opportunity" of the Digital Green Revolution. It would feed into integrated national and subregional policy formulation and implementation.

The main factors defining the DSCSC special role and areas of application compared with other innovations/technological/data centres are:

- With a high growth rate, 10-12 per cent annually by IFC estimates, the data market is dominated by centres specializing only in mining or purely economic matters. Therefore, certain special interest groups focused on these matters, as well as emerging new grey zones, can be seen in many countries. In addition, governments tend to strictly control data centre development and infrastructure for security reasons.
- The environmental, social and scientific (ESG) spheres tend to be more politically neutral. There is also a significant amount of big data produced in these areas, but they are of less interest to special interest groups. Conversely, stakeholders and the international community as a whole tend to view ESG principles as central to digital transformation
- While AP-IS is aimed at creating an efficient physical and virtual network in the Asia Pacific region, the Centre's applications would cover transboundary and cross-sectoral challenges with a special focus on Central Asia region. It would use the prism of the SDGs to produce solutions for the top policy-makers and stakeholders. One of the key barriers to integration has been trust and verification problems between upstream and downstream countries. There is a great need for modeling of processes and monitoring in the upper watersheds. Governments need guidance to use scientific knowledge and good and best practices accumulated within the UN system. At the same time, several joint programmes and projects in Central Asia supported by IFIs and other stakeholders have been successfully implemented on bilateral and multilateral basis
- Therefore there is some optimism that countries in the subregion will welcome monitoring, collecting, processing, and data analysis. The intention is to create an "honest broker" - a partnership of UN agencies on the DSCSD/SPECA platform equipped with the "technologies of trust": the very asset currently missing in CA.

The idea of the external operating mechanism is, that through a common GIS platform, stakeholders will agree a sharing of data, analytics, forecasting models and solutions options. This will be in two directions: from the UN Regional Offices/Headquarters to high-level government decision-makers and vice versa. Such an exchange can occur both proactively and by order of stakeholders.

The internal operating mechanism, using the Kazakhstan example, can include data sharing, analytics, forecasting models and solutions options. These will be between the main national Data Centre/DSC of the National Statistics Bureau and the digital platforms of relevant ministries. This main DSC will collect information and data from Ministries' platforms. It will then process, store and selectively share it with the GIS platform – DSCSD (see Annex 8).

It is possible that BigTechs will be interested in getting involved in establishing and partnering with the DSCSD. For example, Oracle, IBM, CISCO, Microsoft, Samsung, LG, and others operating in Kazakhstan and neighboring countries. National complanies might also be interested, in particular KaspiBank with its potential expansion plans in Central Asia. The main factor here is a global trend: world companies are increasingly taking into account ESG criteria in their investment strategies.

This would represent an innovative approach to grasping "dual challenge-opportunity" of green and digital revolution to feed into national and subregional integration policy formulation and implementation.

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Box 5: The case to be studied: The Plan of Action for the Information Society and the Regional Broadband Dialogue in Latin America and the Caribbean

The Plan of Action for the Information Society in Latin America and the Caribbean (eLAC) has been recognized as the standard-setter for ICT policies and as a platform for political dialogue and cooperation between the region's countries, and also between the region and Europe. Since its inception in 2005, it has brought together political authorities and leading actors from the telecommunications and ICT industry and academia, representatives of international organizations and civil society, as well as institutions specializing in many digital development initiatives. The process is supported by a technical secretariat operated by ECLAC. Since the creation of eLAC, the region's countries have agreed three action plans, which are adjusted as the targets set are achieved and goals are redefined in the light of technological advances and regional country needs. These goals have been approved at four ministerial conferences on the information society in Latin America and the Caribbean.

The second initiative is the Regional Broadband Dialogue. Created in 2010, this currently brings together 11 countries of the region: Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Mexico, Paraguay, Peru, the Plurinational State of Bolivia, and Uruguay. It is a forum for debate and the pooling of experiences, approaches and proposals about the costs of international links. ECLAC acts as the technical secretariat. At the request of member countries, the Regional Broadband Observatory (ORBA) was set up in May 2011. This is a source of relevant and timely information that helps the region's countries develop and follow up on public policies for the universalization of broadband. The activities of ORBA consist in preparing service indicators, compiling, systematizing and disseminating information on policies for large-scale roll-out, and preparing periodic reports on broadband in the region.

3.3.Proposed actions for the way forward

To continue effectively, member states of ESCAP need to tap into new agreed terms and definitions and strategies and create a shared glossary of a terminology in the region. The ESCAP secretariat has already become more adept at developing support to strategic planning processes and creating entry points at governance level to balance and align with local and decentralized capacities and needs. The digital "e" (electronic) opportunities in trade, commerce, and learning processes increase government dependency on the internet and digital technologies. Expert group meetings would help to crystallize the foundations for further academic, policymaking, and business sharing.

The cross-cutting and interdisciplinary approach would need to rely on a holistic collective visioning exercise to drive and motivate innovation and talent.

At the same time, many assessment tools are outside the current project microclimate. Therefore, the new platform-based economy owned by SPECA countries could become an powerful engine in Central Asia.

SPECA countries in presence of a common digital straregy would become an powerful engine in Central Asia.

It is foreseeable that in the near future, member States of SPECA will create new enabling policies and innovative solutions to reform "business as usual" to a new normal in the remaining nine years of the decade. Their decisions and systems in the digital economy would need to be set up with the support of telecommunications and technologies to create healthy and sustainable patterns of digitalization in industries and all sectors of the economy.

To ensure the success of the digital strategy, the MFA and MDDIAI of Kazakhstan and other countries of Central Asia, should present a proposal for developing the Central Asia-as-a-platform strategy with the special focus on establishing DSCSD as an implementing platform to their respective Presidents. In addition, it is important to suggest to the President of Kazakhstan, Chair of the LLDC, to announce the above initiatives. This would be done after conducting consultations with the United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States (UN-OHRLLS).

Detailed proposed actions:

1) Create a detailed plan for initiating Regional Digital Dialogue for the realization of the proposed digital strategy and for establishing the Digital Solutions Centres towards the Information Society (IS) by using the SPECA framework and the Digital Almaty Forum framework. Both frameworks can be a part of or aligned with the strategy for DSCSD (information to Prime-Minister of Kazakhstan, MFA, July-October 2021).

    a. Consult with the United Nations Group on Digital Transformation for Europe and Central Asia (ITU/WSIS)
    b. Request ESCAP to provide the continued support to the implementation of the digital strategy with the special focus on the digital solutions centres and the proposed IS and Dialogue.
    c. Submit these initiatives at 2021 or 2022 SPECA Governing Council.

2) Organize trainings for the officials of CA countries on **data-driven governance** - the intensive and extensive use of data, and how societies organize. (APCICT Virtual Academy, an online distance learning platform).
3) Enhance, if needed**,** **Digital Transformation Officers** (Kazakhstan, Uzbekistan) status, create the same position in other CA countries to connect Officers in a common mechanism ensuring their effective interaction within AP-IS, Information Society and Regional Broadband Dialogue.

4) Use the **Asia Pacific Information Superhighway (AP-IS) Action Plan (2022-2026)**

a. Explore options and opportunities to seek support for the 3 pillars such as Connectivity for all, Digital technology and applications, and Digital data, as well as support for joint research, data management, and other ICT skills (APCICT Virtual Academy).
b. Link the Digital Solutions Centre as a sub-regional service node of the Asia Pacific Information Superhighway in Central Asia for synergy with other countries.
c. Study the best practices" of the North and South on digital transformation.
d. Tap AP-IS knowledge and technical resources to create common digital platforms in CA

5) Conduct subregional consultations on the issues of mutual interests (regulatory frameworks, Trans-Caspian link, Caspian Hub, data-driven governance - the intensive and extensive use of data, etc.) Share good and best practices on digital green policies.
6) Discuss at the expert level the technical, organizational issues and possibilities of creating **"Central Asia-as-a-platform strategy"** (MFA, MDDIA, Agency of Strategic Planning and Reforms, Ministries of Energy, Environment, Agriculture). Potential prototypes or components: ten Kazakhstan's (govtech, the smart city, the Industry 4.0 plan, agritech, blockchain, space-geotech, AI, e-industry, FinTech, and GreenTec), as well as other countries tech platforms. Develop the following:

- environmental, water-energy and e-agriculture digital platforms,
- socio-cultural digital platform (build upon creative industries phenomenon).

7) Establish cooperation with Nexus Resource Platform, the global knowledge platform, part of which is the Nexus Regional Dialogue Programme on Central Asia, to create common subregional **WEF green-digital nexus platform.** Kazakhstan's GreenTech and AgriTech platforms could also be prototypes/parts of the latter.
8) ADB/CAREC and ESCAP to further cooperate in developing digital transformation Strategy in subregion, including establishing **Digital Solutions Centre for Sustainable Development (DSCSD).**
9) Establish partnership between ADB/CAREC, the Central Asian Environmental Centre (CAREC), relevant UN agencies (ESCAP/ECE, ITU, FAO, UNFCC/WMO/ILO, UNESCO/Hydrology IHP) and world-class companies having ESG criteria in their investment strategies to realize initiatives in pp.1 and 2.
10) Strengthen mutual trust among the countries of subregion, giving an impetus to further intersectoral and multi-level digital collaborations through development and funding of the proposed pilot projects in the priority areas. Reach agreement on these projects within the SPECA Working Group on Knowledge-based Development (Annex 5)

- Alignment of planned DSCSD with the Central Asian Climate Information Platform (the Central Asian Environmental Centre).
- Innovative initiative to develop in upstream countries (Tajikistan, Kyrgyzstan) appropriate renewable (wind) energy capacities managed by advanced digital technologies, including Internet of Energy (IoE) or smart grid, to optimize the efficiency of energy infrastructure, reduce water and energy wastage (the concept of the pilot project integrating RE and IoE is being developed in parallel, together with UNECE experts, see Annex 5).
- Identify appropriate pilot project in organic agriculture, for example, as extension of the wholesale and distribution and agro-logistics centres (under construction by Kazakhstan: the International Centre for Trade and Economic Cooperation 'Central Asia', along the border with Uzbekistan, or similar one in Kyrgyzstan).

11) Conduct consultations on:
- external and internal operating mechanisms of the DSCSD-GIS platform.
- big data vs. small data of traditional national statistics organization as there are both, opportunities and potential risks

of strategic and operational character.20 Potential technical assistance required from ESCAP.

ESCAP (2021): "Close collaboration between the NSOs, Mapping Agencies, Space Agencies and specialized Environment Agencies could help address many of those challenges. International development partners, such as ESCAP and ADB, as well as the specialized funds and programmes of the UN that are custodians of the environment-related SDG indicators (such as FAO) are supporting the national statistical systems in the use of EO data for environment and agriculture statistics through pilots, trainings and technical guidelines."

12) Submit current **Strategy** on Digital Connectivity, Infrastructure and Transformation including proposal on establishing DSCSD to 2021 SPECA Economic Forum and Governing Council (MFA, MDDIA).
13) Implement recommendations of the 3rd CAREC Think Tanks Development Forum (CTTDF) "**Building Knowledge Corridors along the Silk Road"** (European Institute for Asian Studies) Future for the landlocked countries of the region are service industry and FINTECH originally, as follows:

a. CA should make the "sustainability" a key feature in all its projects. CAREC could be a coordinator to set common "ESG-benchmarks" for the subregion. But it should not only be about "sustainability but even a step further to foster creativity, entrepreneurship, innovative concepts going far beyond "sustainability".
b. Enhance the **"bankability"** of projects, involve the multilaterals either as co-financers (lender or guarantor), or as technical advisors and in creating leverage.
c. CAREC should look at innovative models and mechanisms of finance. A "regional" or **"CAREC Fintech Infrastructure Fund**" could be a model to leverage a regional FINTECH revolution. CAREC should promote the "Central Asian FINTECH Investment Opportunity" through presentations and **"road-shows"** across the globe with full support of the "European Institute for Asian Studies"

14) Present the above mentioned initiatives at Ministerial Conference on **Green Digital Forum 2022 (Almaty).**
15) Arrange bilateral and multilateral exper meetings to discuss technical, institutional and the other aspects related to the "Strategy: Central Asia as a Platform"

[20] https://www.researchgate.net/profile/Rob-Kitchin/publication/314576304_Big_Data_and_Official_Statistics_Opportunities_Challenges_and_Risks/links/5d78f6d6a6fdcc9961c0af16/Big-Data-and-Official-Statistics-Opportunities-Challenges-and-Risks.pdf?origin=publication_detail

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List of boxes

ANNEX 1: International, Regional and National organizations related to green-digital transformation (selected)

UN Agencies

• UNFCCC (UN Framework Convention on Climate Change) • WMO (World Meteorological Association) • UN-GGIM • Food and Agriculture Organization (FAO) • UN Astana Civil Service Hub • UNDRR (The Sendai Framework for Disaster Risk Reduction) • UNDP SDGs • UNECE (United Nations Economic Commission for Europe) • UNEP (UN Environment Program) • UNESCAP • UNRCCA (UN Regional Centre for Preventative Diplomacy for CA) • UNESCAP APCICT	• UNFCC's Intergovernmental Panel on Climate Change Reports conducts worldwide climate change research (an authoritative source of reference based on multiple international datasets) • the United Nations Initiative on Global Geospatial Information Management • Combat rural poverty, for sustainable management of natural resource • Inspired by the Agency of Civil Service Affairs of Kazakhstan jointly with UNDP • Disaster Risk Reduction • Cross-cutting agency for development • Govt-level diplomacy for peacekeeping • Supports the ICT4D through govt training modules.
Cross-cutting regional and International agencies	
• ADB • ADB Institute	• Regional cross-cutting agency sponsoring CAREC development strategies
• CAREC (Central Asia Regional Economic Cooperation) its strategic framework CAREC 2030 • CAREC Program CAREC Institute	• Cross-cutting most CAR development issues and regional organisations. • economic and financial stability; trade, tourism, and economic corridors; infrastructure and economic connectivity; agriculture and water
• CESDRR (The Center for Emergency Management and Disaster Risk Reduction)	• Organises emergency responses between Kyrgyzstan Tajikistan Turkmenistan Uzbekistan
• Eurasian Economic Union (EEU) – the Eurasian Economic Commission (EEC) is the executive body. • Digital Initiatives Office, EEC	• An international economic union and free trade zone (Russia, Armenia, Belarus, Kazakhstan, and Kyrgyzstan).
• Economic and Social Council (ECOSOC)	• Cross-cutting development issues especially ESG and SDGs. Kazakhstan has been elected to the ECOSOC of the United Nations for 2022-2024
• Interstate Commission on Sustainable Development (ICSD) supported by UNEP	• Develop the Regional Environmental Action Plan (REAP) and a Framework Convention for the Protection of the Environment for Sustainable Development in Central Asia.

• Islamic Organization for Food Security (IOFS) 36 members states	• Provide expertise and technical know-how on various aspects of sustainable agriculture, rural development, food security, and biotechnology
• The International Thank thank for landlocked developing countries LLDC (based in Mongolia)	• 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
• The Cooperation Council of Turkic-Speaking States (Turkic Council 2009, by the Nakhichevan Agreement)	• Members: Azerbaijan, Kazakhstan, Kyrgyzstan; Turkey, Uzbekistan + Observer status Hungary • Partners: UNDP, UNAOC, OSCE, BSEC & PABEC, WCO, CICA, UNOSSC, UNWTO, ECO, OIC, ICSS & SIGA • To promote regional economic and social cooperation, trade and investment, science, technology, education, health, culture, sports and tourism, and enhancing legal cooperation.
• CAREC (Regional Environmental Center for Central Asia) – country offices in Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan • Central Asia Nexus Dialogue Project implemented by CAREC • GBPP (Green Bridge Partnership Programme)	• CAREC (2001) established by a joint decision of all five Central Asian states, the EU and UNDP. Environmental knowledge hub in the region • 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
• International Fund for Saving the Aral Sea (IFAS)	• Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan.
• Ready4Trade Central Asia (2020-2023) Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan funded by EU	• Create, launch and promote trade facilitation online platforms

Other national and international agencies to collaborate with	
• GEF (The Global Environment Facility) • KOICA (The Korea International Cooperation Agency) • ILO (International Labour Organisation) • ISRIC- World Soil Information • IUCN (Int Union for Conservation of Nature) • UNESCO (UN Educational, Scientific and Cultural Org) • UN Water	• Provides support to civil society and community initiatives. • Korean overseas aid agency for sustainable economic growth • All matters relevant to work processes and labour standards. • Member of the WDS (see below) • https://www.iucn.org/regions/eastern-europe-and-central-asia • Build peace through international cooperation. • Coordinates UN work on water and sanitation • Parent of the treaty of the 1997 Kyoto Protocol

• UN World Institute for Development Economics Research • UN WTO • World Data System (WDS) • WHO (World Health Organisation)	• UN-WIDER Development research focused on the SDGs • WTO initiatives to support trade and tourism, etc. • An Interdisciplinary Body of the International Science Council (ISC; formerly ICSU) to promote trusted data collection for scientific and social science purposes.

ANNEX 2: SWOT - Leveraging digital technologies for transforming agriculture for integration in Central Asia subregion

Strengths	Weaknesses
1. Awareness among CA decision-makers and farmers of potential to transit to digital, green, climate-smart, other agriculture technologies, improve the resilience to floods and droughts, reverse the degradation of soil and of the environment as a whole. 2. CA governments interest to cooperate on a regional level on a new level (*the second meeting on e-agriculture of CA Ministers facilitated by FAO and Kazakhstan, December 2020*). Readiness to develop and implement comprehensive digital agricultural strategies. 3. Adding sustainable agriculture and rural dvpt into national agendas. 4. Huge agricultural/food, especially organic production potential. Undergoing alignment of regulatory frameworks to international standards (Uzbekistan, Kazakhstan). 5. RVC development. Construction of wholesale and distribution and agro-logistics centres (by Kazakhstan: the International Centre for Trade and Economic Cooperation Central Asia, along the border with Uzbekistan). A similar infrastructure is developed with the support of the ADB in Uzbekistan and Kyrgyzstan. 6. Strong commitment and support from the international partners, including businesses and IFIs. Cooperation of FAO and the Islamic Organization for Food Security (Nur-Sultan) (*round-table discussion "Digital agriculture: from precise farming to 'smart farms"*).	1. Pervasive corruption undermining political and social stability. 2. Precarious situation in Ferghana valley, densely populated ethnic enclave with high unemployment and poverty rate, aggravated by environmental and governance problems. 3. Poor soil fertility in various areas of CA. 4. Limited technical expertise. Lack of workforce's skills and knowledge meeting international standards. 5. Lack of internationally recognised certification and standardisation. 6. Weak integration of domestic and practically nonexistent regional food chains, poor access to external markets and low credit resources. 7. Big differences between legislative and regulatory frameworks. 8. Inability of CA countries to coordinate measures to act externally, if not as a single economic community, then from a unified position on key agribusiness issues. 9. Digital divide, as well as rural digital divide, among and between the CA countries. 10. Lack of Geospatial Information System data, mapping, digital analytics, etc. in all CA countries.
Opportunities	**Threats**
1. Digital transformation to spur achievement of the Sustainable Development Goals (SDGs). 2. Applying, if needed the FAO mandate in humanitarian intervention (Ferghana valley?), as well as the Organization's state-of-the-art databases and software to monitor and manage the many variables on water/land inventories, etc. (*e-Agriculture in Action: Big data for agriculture, 2019, FAO/ITU).* 3. WSIS, other partners' digital solutions applications/initiatives like the Ferghana	1. CA countries are landlocked. Having the UN "special needs" status (transport/logistics problems, etc.) they are most vulnerable to external economic and other shocks. 2. An existential threat of the water-energy-food *nexus* (the glaciers in CA can disappear in 40 to 50 years). Sensitivity of agriculture to climate change.

Valley Internet Exchange Point (FVIXP) project, to decrease inter ethnic tension, ease other social problems in rural areas. 4. Implementation of the concept of smart farming centers on the application of cutting-edge technologies, such as big data, to provide optimised cultivating environments for various crops. *Nare Trend Inc., a South Korean agricultural technology company, to complete the pilot project in Kazakhstan in October.* Penetrating, jointly with tech-leaders, deeper into the global market for smart farming facilities to boost export. 5. Capture and expand the niche in organic production, for which global demand is growing. Scaling up the pilot projects for value chain development in selected areas. 6. Building upon the FAO/ITU and FAO/IBM global programs-success stories to engage ESCAP/ADB, forge subregional partnerships in e-agriculture. Realisation of public-private partnerships and academia-industry collaboration potential. 7. Further development and expansion of digital agricultural platform "Coldau" (Kazakhstan). Creating conditions for establishing CA agricultural market, stock exchange. 8. Regional cooperation on the basis of e-agriculture can become a main driver of integration in the CA.	3. Land degradation/desertification is a major challenge for all CA countries and Mongolia *(even mountainous Kyrgyzstan could lose up to half of its land as a result of desertification in the short term).* 4. "Centres of power" attempts to sustain instability in the subregion: exploiting corruption, other weaknesses of Central Asian countries in their political and economic interests. 5. CA's market competetive disadvantages to worsen amid growing "global land grab" trend. Large tech companies take over market shares in the agri-food sector. In turn, multinational agri-food companies take on the business models (digital platforms) of leading digital tech companies. 6. Bureaucratic process of Central Asian countries might delay the decision and implementation of the CAREC Digital Strategy 2030.

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ANNEX 3: SWOT - Leveraging digital technologies for addressing water management and energy challenges for integration in Central Asia

Strengths	**Weaknesses**
7. There is no shortage of water and energy resources in Central Asia. 8. Political will at the top level (Kazakhstan, Kyrgyzstan, Mongolia, Uzbekistan) to develop and implement digital policies. 9. There are several digital programs and initiatives at the national and subregional levels. *10.* Increased scientific attention and number of publications on WEF (water energy food) nexus globally, and particularly on Central Asia. *There were only seven papers on Google Scholar search for "water energy food nexus" in 2011 while the quantity of papers reached 3350 occurrences in 2019.* 11. Potential "cascading effect": CA governments interest in cooperating on *e-agriculture* development would naturally lead to cooperation on water-energy issues, and vice versa. 12. Commitment and support from international partners, including businesses and IFIs. In turn, CA countries often prefer a "third party" /international partner rather than a bilateral one to work out important development issues.	7. All of the WEF-nexus-related challenges are the result of poor market structure, diplomacy and governance, including problem of corruption, in the region. 8. Lack of evidence-based policy-making based on facts that are obtained through data collection, research and analysis. 9. Big differences between the countries in socio-economic development, as well as legislative and regulatory frameworks. Digital divide among and between the CA countries. 10. Reliable information about the water resources is not available in a consolidated and credible platform. 11. Lack of Geospatial Information System data, mapping, digital analytics, etc. The absence of data exchange prevents the initiation of a hydro-meteorological system that could guarantee rational resource allocation in the subregion. 12. Although the systemic nature of water, energy and food security is widely recognised, there is a limited understanding of how to address these relationships. 13. Lack of knowledge and resistance to changes hinder the practical deployment of a cross-sectoral nexus approach in the management of natural resources.
Opportunities	**Threats**
1. Certain conditions for establishing innovative e-partnerships have been created or have emerged. The benefit-sharing theory and concept in transboundary water resources management and development should work for CA countries. 2. The same transboundary challenges (water-energy nexus), a source of discord between countries for many years, can become the drivers of integration. Leveraging the practical digital solutions where the use of a	1. Having the UN status of countries with "special needs" (transport/logistics problems, etc.) CA states are the most vulnerable to external economic and other shocks. 2. The Central Asian region is warming faster than the global average

nexus approach can lead to improved outcomes in the integrated management of water-energy-food-ecosystems resources. 3. Implementing Internet of Things (IoT)/ Internet of Energy (IoE) technology into distributed energy systems to optimise the efficiency of energy infrastructure and reduce water and energy wastage. 4. Advancing an innovative initiative to develop in upstream countries appropriate renewable (wind) energy capacities managed by advanced digital technologies (*pilot project integrating RE and IoE is being developed separately).* Contributing to the better adaptation to climate change and reduction of conflicts rooted in the allocation of resources. 5. It will give a strong impetus to further intersectoral and multi-level digital collaborations. **WEF green-digital nexus platform** can become a **foundation for renewed, real integration** in the CA. 6. Strengthening mutual trust. Forming a technology based yet human-centered mindset and value creation. 7. Playing on the declared "global power centers" noble (?) at the same time competing goals in the subregion – such as fostering new growth engines, green energy, AI, e-commerce and digital finance - to the advantage of CA states. This refers to "the high-quality building of the Belt and Road", "connectivity priority" of the EU, "Digital Agenda of the Eurasian Economic Union", etc. 8. Achieving genuine political and economic independence for the countries of the Central Asian subregion.	3. An existential threat of the water-energy-food *nexus* (the glaciers in CA can disappear in 40 to 50 years). 4. Geopolitical "centres of power" attempts to sustain instability in the subregion: exploiting corruption, other weaknesses of Central Asian countries in their political and economic interests. 5. This includes duplication of subregional initiatives/programs and lack of complementarity of efforts at the national level in Central Asia. Mutual mistrust and rivalry. 6. Consequences of the crisis of confidence between authorities and population at the global and regional levels. 7. Emerging and continuing "land grab" and taking over the strategic sectors, including water and energy, by big powers and tech giants in CA.

ANNEX 4: Digital Data Centers, technology parks, innovations and science centers in CA and Mongolia

Kazakhstan:

- About 40 data centers (Kazaktelecom 65%, TransTeleCom 35%).
- 25 Data Centers of Kazakhtelecom (including Tier III DC in Pavlodar),
- 9 Data Centers of Transtelecom (including Tier III DC in Nur-Sultan) + the five centers to be established shortly.
- Server center of governmental bodies (National Information Technologies)

Main technoparks, centers:

- Science Fund
- Fostering Productive Innovation Project (World Bank)
- "Qazinnovations" National agency for innovation development
- "Zerde" National ITC Holding
- The Center for Digital Transformation as a structural division of JSC "Zerde" National ITC Holding (24 November, 2020).
- The Autonomous Cluster Fund "Park of Innovative Technologies"
- International Technopark of IT startups AstanaHub
- AIFC Fintech Hub
- AIFC Green Finance Center
- Technopark of Innovation Cluster of Nazarbayev University
- Park of Innovative Technologies Alatau
- Huawei Kazakhstan Joint Innovation Center
- The Regional Environmental Centre for Central Asia (CAREC)

Kyrgyzstan :

- Data Centre of National Bank of the Kyrgyz Republic
- The first commercial Data Processing Center (2018, NSP company)
- ElCat Data Center (by IPTP Networks company, Bishkek)
- Data Center construction within the Digital CASA project (from 2019-2024)д
- Ferghana Valley Internet Exchange Point (FVIXP, 2019).
- Innovation, Digital Technology, and Economic Research Center (IDTEAM)

Uzbekistan:

- Five data centers (Tashkent), run by three organizations. Independent Telecom Innovations Metrotelecom, Independent Telecom Innovations ITI-IX and IPlus.
- Huawei Uzbekistan Data Center (for irrigation engineers, agriculture)
- International Innovation Center for the Aral Sea Basin under the President of the Republic of Uzbekistan
- Technology park in Tashkent (2019, former Mirzo Ulugbek Innovation Center); Technology park in Andizhan (2020). *Similar parks will be established in Nukus, Bukhara, Namangan, Samarkand, Gulistan and Urgench.*

Mongolia:

- The Mongolia National Data Center (NDC, has the capacity to store and share all databases of all the government departments).
- 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)
- Mongolian Innovation and Technology Center at Mongolian National University
- National Information Technology Park.
- Atal Bihari Vajpayee Centre for Excellence in Information & Communication Technology (Ulaanbaatar).
- National IT Park incubator, CLUB Co-working, the Women's Business Center, and the Startup Council of the Mongolian National Chamber of Commerce and Industry

Turkmenistan:

- Technology Center (within the Technopark in Turkmenistan)

ANNEX 5: Shared regional challenges and opportunities: Priority areas for the DSCSD and SPECA (for developing transboundary pilot projects)

Climate change and SDGs in Central Asia. Global warming and climate change have effects on the high mountains of Central Asia. Rapid melting of the glaciers will have consequences not only for the water balance in the Aral Sea basin. There is an **existential threat** of the water-energy-food *nexus* - by some estimates, the glaciers in CA will disappear within 40-50 years. It leads among others to natural disasters like droughts, land slides, glacial lake out- burst and it affects the socio-economic development of the region. *Avoidable environmental risks cause about one quarter of all deaths and diseases worldwide, amounting to 13 million deaths each year. Among them seven million preventable deaths annually are caused by air pollution – one of the largest risks to health.* Cancer and chronic disease rates due to toxic dust clouds in the Aral Sea region are among the worst in the world. "Still, not enough research has been conducted [on the *nexus*, including the glaciers], and not enough reliable knowledge and information is available. Additional efforts are urgently needed to fill these gaps in order to provide better policy advice."

7.1 Water and land. The UNESCO Cluster Office in Almaty and the UNESCO International Hydrological Programme (IHP).

- The water management programme of Kazakhstan for 2020 - 2030: international cooperation, updating of the legal framework, institutional reform, modernization and reconstruction of water infrastructure, study of international best practices in creating a water market, digitization of water management, introduction of the project 'Smart Water', environmentally optimal use of water resources, training of specialists. What are the similar programs in the neighboring countries? The Regional Environmental Centre for Central Asia (CAREC), International Union for Conservation of Nature (IUCN), International Fund for Saving the Aral Sea (IFAS). Country-example (Turkmenistan-Uzbekistan): "The demo project aims to find technical solutions and investment opportunities to address the issue of intensive siltation of the Ruslovoe Reservoir at THC". Thematic area: Water, Energy and Food Security Nexus Dialogue (2016-2019, 1,3 mln. €).
- **Land degradation/desertificatio**n is a major challenge for all CA countries and Mongolia. *(Specialists estimate that even mountainous Kyrgyzstan could lose up to half of its land as a result of desertification in the short term).* Land Degradation Neutrality Target Setting Programme (LDN TSP), a partnership initiative implemented by the Secretariat and the Global Mechanism of the UN Convention to Combat Desertification. Realized in Kazakhstan (2018, other countries joined earlier?). "Results from the analysis of the default data show that the official statistics on degraded land in Kazakhstan is disputable due to the fact that monitoring of land quality as well as mapping of degraded land have not been carried out in the last 30 years." The UNCCD default data has been compared with the data of the Center of Space Research of the Republic of Kazakhstan, the work is going on. There is great need for Geospatial Information System data, mapping, analysis, etc. in all CA countries. On the other hand, there are JSC National Center of Space Research and Technology of Kazakhstan, Agricultural Industry Space Monitoring Laboratory.

Green economy and digital transformation issues, policies to be interconnected in "National Action Plan to Promote the Green Bridge Partnership Program for 2021-2024". Case study: collaboration of Uzbekistan, Green Growth Institute (GGI) and KOICA, as well as other countries examples.

- Projects/Programs. UNESCO project proposals, approved for funding by the Adaptation fund and GEF-UNDP (2019): "Reducing vulnerabilities of populations in the Central Asia region from glacial lake outburst floods (GLOFs) in a changing climate (Adaptation Fund); "Strengthening the resilience of Central Asian countries by enabling regional cooperation to assess high-altitude glacio-nival systems to develop integrated methods for sustainable development and adaptation to climate change" (GEF-UNDP). The project "Satellite Assessment of the Seasonal Condition and Degree of Pasture Vegetation" (2018).
- Main (potential) stakeholders/partners: UNFCCC (its Intergovernmental Panel on Climate Change Reports conducts worldwide climate change research), Green Climate Fund/ADB, WMO *(an authoritative source of reference based on multiple international datasets maintained independently by global climate analysis centre and information submitted by WMO Members' National Meteorological and Hydrological Services and Research Institutes. WMO partnered with other UN agencies in 2016 to include information on the social and economic impacts of climate change).* The UN-Water, UNECE, EU, the International Fund for Saving the Aral Sea (EC IFAS), UNESCO, the UN Regional Centre for Preventive Diplomacy for Central Asia (UNRCCA); European Space Agency, Center of Space Research of Kazakhstan, Food and Agriculture Organization of the United Nations, Global Environment Facility, ISRIC – World Soil Information.
- Projects/Programs.
  The GEF-UNDP-UNESCO project proposal "Strengthening the resilience of Central Asian countries by enabling regional cooperation to assess high altitude glacio-nival systems to develop integrated methods for sustainable development and adaptation to climate change" (November 2019, Almaty, Tashkent).

  Regional project proposal "Reducing vulnerabilities of populations in the Central Asia region from glacier lake outburst floods in a changing climate" aims to strengthen adaptation to climate change in Central Asia by reducing societal risks and vulnerabilities associated with GLOFs" (2020).

7.2 Water and Energy. Internet of Energy (IoE) and Renewable energy. Decreasing carbon footprint is crucial for the CA sustainable development, notably in agriculture, energy and industry. IoE can play a key role in this regard. Implementing Internet of Things (IoT)/ Internet of Energy (IoE) technology into distributed energy systems to optimise the efficiency of energy infrastructure and reduce water and energy wastage.

Conjunctive Wind and Hydro Energy for Water Management in Tajikistan

Objective of the project:

Energy and water resources management is a key element in Central Asia to ensure sustainable development. Wind energy production could reinforce the hydro-electric systems so that more water is available and that there is a significant potential for a conjunctive wind and hydro energy program when the water saved by wind power is much more valuable than the simple cost of

production.

The preliminary assessment has been conducted and a conjunctive wind and hydro energy program/project has been proposed. Further empowered by application of digital technologies (including, but not limited to modern remote data gathering and monitoring systems and advanced analytics and forecasting capabilities, i.a. based on computer-aided digital twins simulations) for evidence-based decision-making and optimized performance. This programme can contribute to realizing the national energy security benefits and effective water management. as combat drought in Central Asian countries.

The proposed project aimed at development of wind energy feasibility study so that to the extent possible it leads directly to the tendering and investment stage. It has all sustainable development components: economic development through creation of local renewable energy industry, social development through employment and poverty alleviation, environmental protection through clean energy and water resources management. A potential success of the project will give impetus to broader establishment and integration of variable renewable energy sources, facilitate regional cooperation and transboundary electricity trade, and will help to develop a coordinated regional energy/water policy.

7.3 Digital agriculture/food security. On average, about 50% of the population of Central Asia and Mongolia are engaged in agriculture. The CA countries and Mongolia to transit to digital, green, climate-smart and other modern agriculture technologies to increase production, improve the resilience of farmers to climatic shocks such as floods and droughts, and contribute to reversing the degradation of soil and of the environment as a whole.

"With the growth of technology including the impending introduction of 5G networks, which will support a huge sensor network infrastructure, data driven agriculture and the challenges of extracting meaningful insights from various data streams to influence policy decision and/or provide actionable advisories for agriculture stakeholders are gaining prominence" (FAO and ITU. E-agriculture in Action: Big Data for Agriculture. Bangkok FAO, 2019). More than 70% of global producers of agricultural and fish products do not have the knowledge - how to display and sell their own vegetables, fruits and harvested seafood on the online market (e-commerce). This is especially acute problem for the Central Asian farmers and producers: since the collapse of the Soviet Union, the supply chains between the Central Asian Republics have been destroyed and generally have not yet been restored (the same is true for the industrial enterprises). To be explored in the context of the ESCAP paper/ report on value chain as well as "Digital technologies and 'value' capture in global value chains (the UNU-WIDER project, The United Nations University World Institute for Development Economics Research (UNU, 2019). Kyrgyzstan: 'FAO is extending $50 million grant, including $22 million earmarked for the agriculture, some part will be for the energy sector, said MP Nurbek Alimbekov'. (Aki Press)

"IBM Agriculture helps overcome obstacles to digital transformation by combining the power of Artificial Intelligence (AI), data analytics and predictive insights with unique agricultural Internet of Things (IoT) data, the expertise of veteran food and agribusiness industry leaders and decades of IBM research".

Projects/Programs. Explore FAO and the Islamic Organization for Food Security (Nur-Sultan) intention to cooperate (*round-table discussion*

"Digital agriculture: from precise farming to smart farms"). Construction by Kazakhstan of the International Centre for Trade and Economic Cooperation Central Asia (transport and logistics along the border with Uzbekistan). A similar infrastructure of wholesale and distribution and agro-logistics centres is being developed with the support of the ADB in Uzbekistan and Kyrgyzstan.

Main stakeholders or partners:FAO/ the UN World Food Program, ADB, Islamic Organization for Food Security, IBM Agriculture (meet with IBM rep., office in Nur-Sultan)

7.4 Disaster reduction and ICT. Disaster risks are becoming more frequent, complex and systemic. There is an urgent need to shift the balance from investing in response, to investing in prevention and in risk reduction. Outcomes of the meeting with the Regional Center for Emergency Situations and Disaster Risk Reduction (CESDRR, Kazakhstan, Kyrgyzstan, Afghanistan) reps 17 April, 2021.

The journal Geoscientific Instrumentation, Methods and Data Systems (GI, 2012): A new permanent multi-parameter monitoring network in Central Asian high mountains – from measurements to data bases: "The newly developed and installed Remotely Operated Multi-Parameter Stations (ROMPS) do not only monitor standard meteorological and hydrological parameters, but also deliver GPS data for atmospheric sounding as well as tectonic studies. The 15 observational data from the ROMPS is transmitted at least once a day to a centralized geo-database infrastructure for long-term storage and data redistribution. Users can access the data manually using a web-interface or automatically using SOS requests; in addition, data is distributed to the NHMS through standard communication and data exchange channels."

Main (potential) stakeholders/partners: GFZ German Research Centre for Geosciences, Potsdam, Germany. Central-Asian Institute of Applied Geosciences (CAIAG), Bishkek, Kyrgyzstan

7.5 e-Healthcare/ telemedicine. WHO: "Because of the close relation between air pollution and climate change, failure to tackle air pollution and to mitigate climate change together result in a lost opportunity to gain the health, economic and environmental multiple benefits that would derive from more efficient transport and energy systems, a low-carbon economy, and healthier food systems with less impact on the environment. New approaches are needed that consider the consequences of actions in their entirety".

Case study: "e-Health in Latin America and the Caribbean: progress and challenges" (ECLAC, 2010). *"Digital Kazakhstan": "in 2004-2016 the national telemedicine network had combined 204 health facilities and district-level health workers (144 district and city hospitals) are consulted by colleagues from regional and republican hospitals and centre").* Preliminary interviews and contacts with Kazakhstan physicians produced mixed, at best, perception of this Program's provision, there are some discrepancies. On the other hand, there are unresolved issues preventing the developed and developing countries from full realization of the telemedicine potential (legal, technical, etc. see: Telemedicine: opportunities and developments in Member States: report on the second global survey on eHealth 2009).

Main stakeholders or partners: WHO, ITU, ECLAC

7.6 Digital co-production of public services, Transparency and Trust.

As the world becomes more inter-connected and closer together the power is shifted out of the hands of traditional governments and institutions to non-state actors, first of all, to civil society. Co-governance is a new relation between partners - government institutions, decision-makers and citizens/NGOs. Decentralized society, decentralized economy underpinned by blockchain, will not only impact how we trade but will also radically change how we make, design and produce physical and digital goods.

President Kassym-Jomart Tokayev emphasizes that the main goal of all reforms is to build an economically strong, democratically developed "Listening State," focused on meeting the needs of every citizen. A state of free people, whose voices the authorities hear and react to, and whose rights will be protected according to the highest world standards.
Digital platforms: co-creation of new values.

President of Kazakhstan K.Tokayev State of the Nation Address, September 1, 2020): " ...a truly diversified, technological economy... must work to improve the well-being of the people. We must find a positive answer to the growing public demand for a fairer distribution of benefits arising from the growth of national income...". Kazakhstan: Draft law "On Public Control" (2021). Uzbekistan: law "On Public Control" (2018) and the Decree aimed at cutting-off red-tape (2021). Concepts for the development of local self-government. President K.Tokayev: "We need to create a single legitimate institution of *online petitions for citizens* to initiate reforms and proposals. Such a mechanism must be completely protected from any manipulation" (blockchain technology's application perspective. Role of the UN Astana Civil Service Hub and it's partners).

Main (including potential) stakeholders/partners: Governments of Kazakhstan and Uzbekistan (Kyrgyzstan and Mongolia?) UN Astana Civil Service Hub.

Science and Research. There is a well-established fact: 75% of commercialization of sciences come from research on basic science, including astrophysics/ space and Earth Observation. Astrophysics is a concentration of Big Data, AI, digital technologies. Technology transfer and spin-offs from astronomy have important applications, among others, in medicine, industry, environmental monitoring, and consumer products. At the same time, it is comparably a neutral area (free of "special interest groups" pressure) providing unusually promising opportunities for international cooperation. Fesenkov Astrophysical Institute (Almaty, under the Ministry of Digital Development, Innovations and Aerospace Industry, Kazakhstan), partner - Nazarbayev University. International Solar Energy Institute (Uzbekistan) can a partner. Also under the MDDIAI: is the Laboratory of Mathematical Modeling of Radiation Transfer Processes. Research areas: Mathematical modeling of atmospheric processes over the territory of Kazakhstan based on satellite data. Development of a space monitoring system for greenhouse gases in the atmosphere over the territory of Kazakhstan. Laboratory of Space Environmental Monitoring, Research areas: Developing methods and technologies for space monitoring and forecasting of natural and technological disasters, environmental pollution processes. Drought Condition Monitoring Center, Research areas: Activities related to space monitoring of climate change and drought. Developing the geoportal of space monitoring of drought, electronic atlas of pasture resources and climate. Space Data Reception Center (Almaty), Research areas: Periodic receiving and archiving

of data of the Earth's remote sensing from the following space vehicles: Aqua, Terra (USA) and Suomi NPP (USA). Providing satellite information to all structural divisions of the Earth's Remote Sensing Department to carry out research work. Perform different application tasks as part of contract-based works at the request of the Ministries of Agriculture, the Emergency Situations Committee of the Ministry of Internal Affairs of Kazakhstan, regional akimats, etc. Space Monitoring Center (Astana) Periodic receiving and archiving of data of the Earth's remote sensing from Aqua, Terra space vehicles (USA). Providing satellite information to all relevant ministries and departments to solve industry problems using satellite data.

Potential partner: parties concerned in Central Asian countries, International Think Tank for Landlocked developing countries (LLDCs, Mongolia)

Digital Tourism industry. Several Kazakhstan and Uzbekistan joint project and programs, including common visa, etc. are being implemented. Electronic Silk Road Visa project. The Regulations if the multiple-entry tourist Visa and a, single list of countries whose nationals will be able to apply for this visa were agreed upon by Kazakhstan and Uzbekistan parties concerned. The CAREC Tourism Strategy 2030 endorsed by the 19th CAREC Ministerial Conference (December 2020; Afghanistan, Azerbaijan, China, Georgia, Kazakhstan, the Kyrgyzstan, Mongolia, Pakistan, Tajikistan, Turkmenistan, and Uzbekistan). One of the Strategy's pillars: "Market intelligence. This includes development and implementation of common methodologies for data gathering and production of tourism statistics following international best practices, and promotion of partnerships between public and private tourism stakeholders in the region for conducting joint market research to better understand customers' preferences, desired experiences, and needs." Digitization and digitalization of the tourism sector is a priority for all CA countries.

Digital platform Creative Industry of the Turkic World.

Main (including potential) stakeholders/partners: governments of Kazakhstan, Uzbekistan, Kyrgyzstan, UNWTO, ADB/CAREC, The Turkic Council, UNESCO, ISESCO.

ANNEX 6: Digital Solutions Center for Sustainable Development and SPECA