DIGITAL LANDSCAPE AND ITS IMPEDIMENTS IN THE CAREC REGION

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Objectives

- **This presentation has two sections:**
  - To understand the digital economy and digital divide
    - Digital Economy pillar including e-commerce and digital economy impediments
    - Digital divide across various pillars
  - To explore digital investment eco-system
    - What motivates digital investment and what are the core factors of eco-system?
    - How digital investment eco-system linked with digital application (e-commerce etc.)?

Digital Economy: global overview

White Paper on Global Digital Economy (2024)

- Five giant digital economies: US, China, Germany, Japan, and South Korea ($33 trillion, over 8% yoy)
- Equivalent to 60% of GDP, 8 percentage points higher than in 2019
- In 2019-2023, digital economy developed rapidly in the US and China; Germany, Japan, and South Korea continued to develop.

Digital Economy: global overview

White Paper on Global Digital Economy (2023)

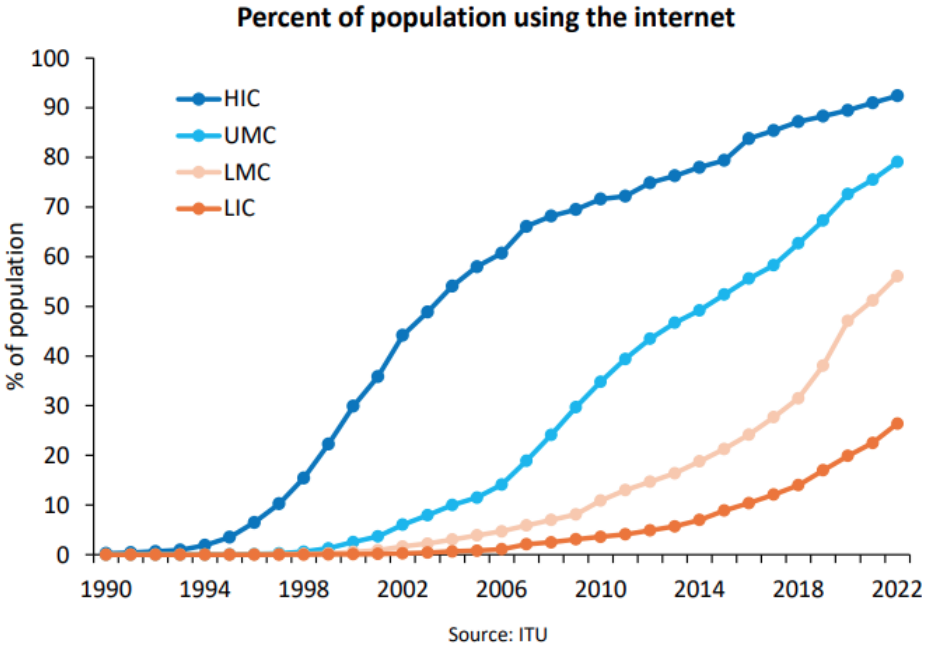
- **Scale of digital economy:** US(1st), China(2nd), Germany(3rd), Japan, UK, France
- **Share of digital economy in GDP:** UK, Germany, US >65%; South Korea, Japan, Ireland, France >avg.; China 41.5% (43.6% in 2023)
- **Growth rate of digital economy:** Saudi Arabia (1st), Norway (2nd), Russia (3rd) >20%; Brazil, Mexico, Singapore >10%
- **Penetration of digital economy:** UK(primary industry>30%); German, South Korea(secondary industry>40%); UK, Germany (tertiary industry>70%)

Digital Economy: global overview

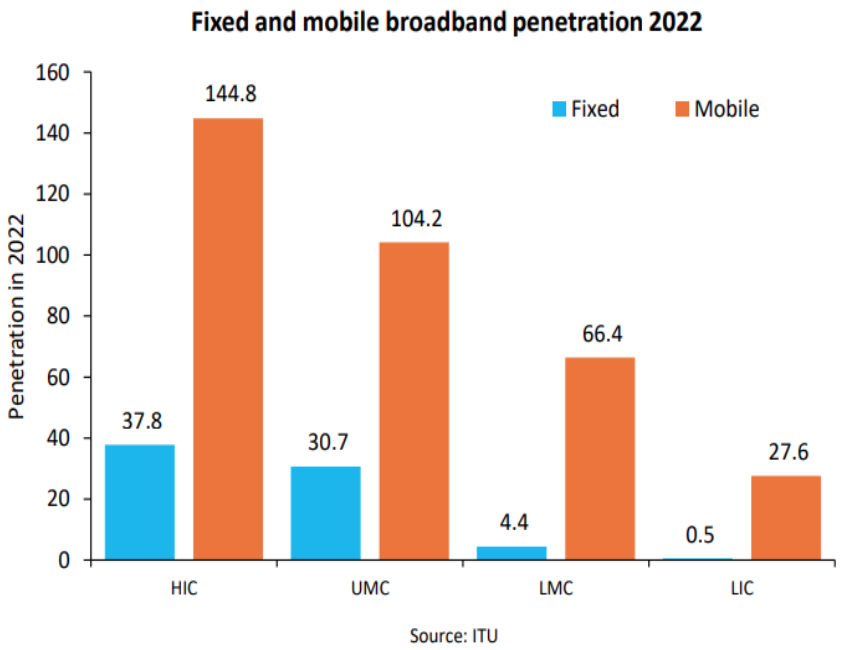
- In low-income countries, only 1 in 4 people use the internet.
- The divide in fixed broadband penetration between rich and poor countries has widened.
- Median fixed broadband prices in low-income countries accounts for 1/3 of monthly GNI per capita.
- The cheapest smartphone accounts for 30-60% of monthly GNI in LMCs and LICs.
- In 2023, median mobile and fixed broadband speeds in HICs are 5 and 10 times of those in LICs, respectively.
- Median mobile broadband traffic per capita in HICs is more than 20 times higher than that in LICs, and median fixed broadband traffic per capita more than 1700 times higher.

Digital Economy: global overview

Only 1 out of 4 individuals use the Internet in LICs.



Divide in fixed broadband penetration between rich and poor countries has widened.



Source: The World Bank, Digital Progress and Trends Report (2023)

Digital Economy: global overview

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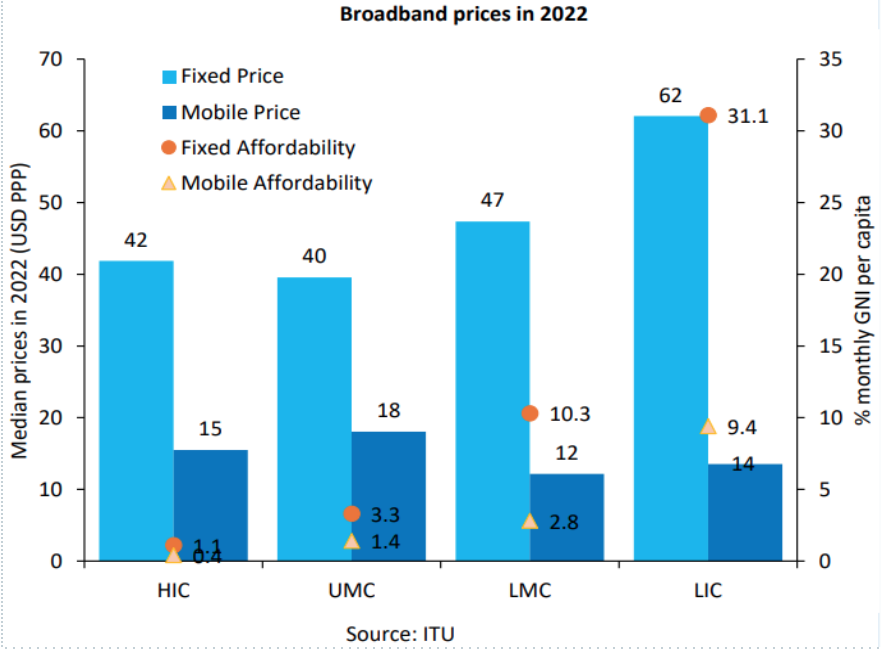

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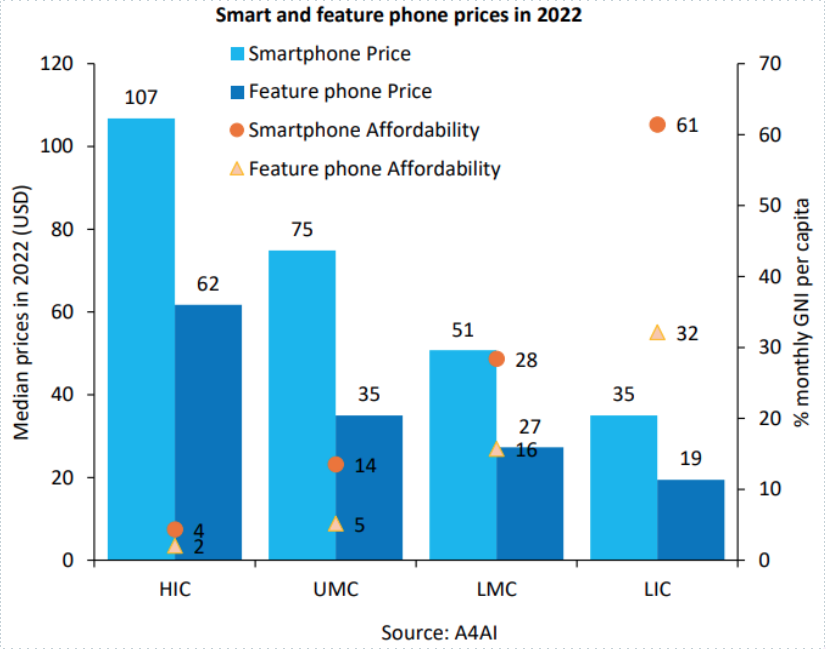
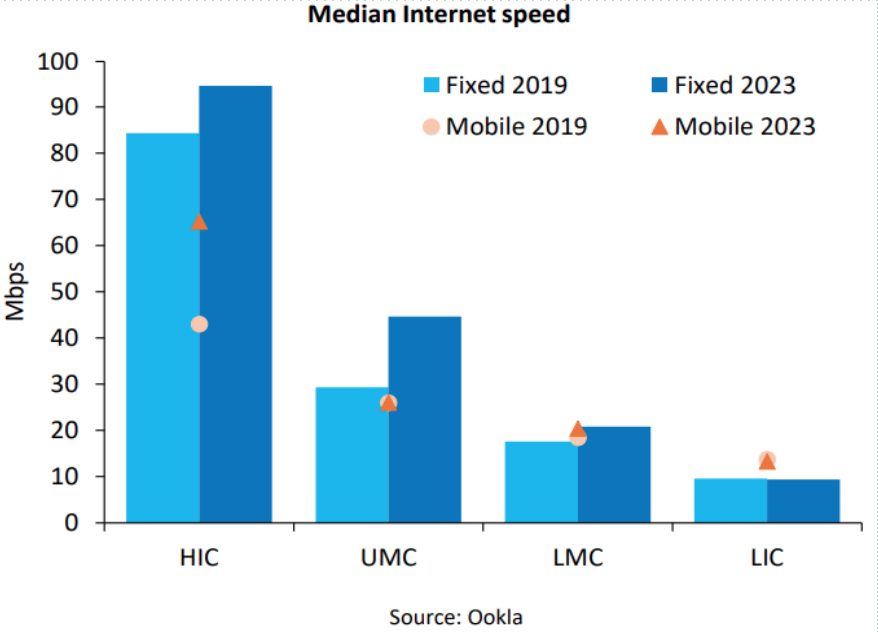


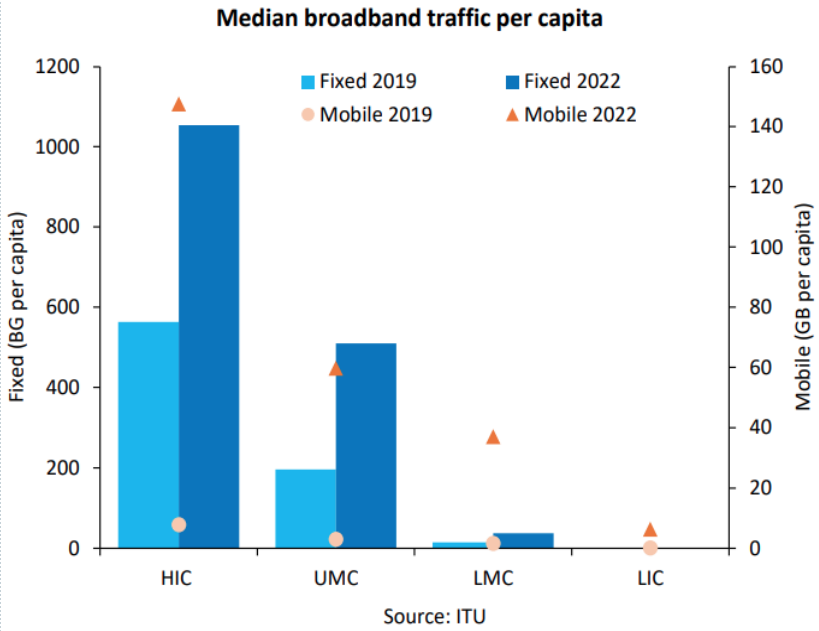
Source: The World Bank, Digital Progress and Trends Report (2023)

Digital Economy: global overview

Median mobile speeds in HICs are 5 times faster than those in LICs, with fixed broadband speeds 10 times.



Median mobile broadband traffic per capita in HICs was over 20 times higher than that in LICs, median fixed broadband traffic per capita over 1700 times higher.



Source: The World Bank, Digital Progress and Trends Report (2023)

Central Asia Regional Economic Cooperation Institute

CAREC Institute is an intergovernmental organization headquartered in Urumqi, Xinjiang, China. The Institute provides evidence-based research, capacity-building services, and knowledge dissemination in the CAREC region. Our mission is to support sustainable development in the region and beyond. The Institute is jointly shared by eleven member countries and serves as the knowledge arm of the CAREC Program - an ADB-led initiative and supported by multiple development partners, guided by the overarching vision of “Good Neighbors, Good Partners, and Good Prospects”.

The Institute focuses on promoting regional economic cooperation and integration in five key areas: economic and financial stability, trade and economic corridors, infrastructure and connectivity, agriculture and water, and human development.

https://www.carecinstitute.org/

CAREC Institute's researches on digitalization

Vision: create a common CAREC Digital Space, which will lead to inclusive economic growth and social well-being, new jobs, better services, and higher regional competitiveness.

Part 1

https://www.carecinstitute.org/publications/digital-carec-analysis-of-the-regional-digital-gap/

Digital CAREC: Analysis of the Regional Digital Gap

The report employs two methods to examine the digital gap/divide of the CAREC countries.

- Questionnaire (including 6 member countries)
- Principal Component Analysis (PCA) (including 8 member countries)

The study (through questionnaire) evaluates the level of the digital economy focusing on four priority digital economy areas:

- Digital infrastructure
- Digital payment
- Internet access
- E-commerce

Digital Economy: global ranking of the CAREC countries

Indicator	Year	Organization	Total	AFG	AZE	PRC	GEO	KAZ	KGZ	MON	PAK	TJK	TKM	UZB
B2C e-commerce Index	2020	UNCTAD	152	143	65	55	47	60	97	61	116	121		107
ICT Development Index (IDI)	2017	ITU	176	159	65	80	74	52	109	91	148			95
E-Gov. Development Index	2024	UNDESA	193	188	74	35	69	24	78	46	136	123	145	63
Inclusive Internet Index (3i)	2022	EIU	100			22		51		62	79			61
Network Readiness Index (NRI)	2023	Univ. of Oxford	134		75	20	78	58	94	83	90	113		82

Source: UNCTAD(2020), ITU(2017), UNDESA(2024), EIU(2022), University of Oxford(2023)

B2C E-commerce Index: it measures an economy's preparedness to support online shopping.
ICT Development Index(IDI): it accesses the development of ICT through 11 indicators grouped by three sub-indices: access, usage and skills.
E-Gov. Development Index: it is a useful tool for policy planners to analyze the principles, approaches, progress, and commitment of countries in the realm of digital government.
Inclusive Internet Index(3i): it examines the state of internet inclusion based on four categories, that is, accessibility, affordability, relevance and readiness.
Network Readiness Index(NRI): it evaluates the readiness to harness the benefits of the digital revolution based on a wide range of factors.

Objectives (Part-1)

- **The specific objectives of the study are:**
  - To provide a comparative analysis of the current situation of the digital economy with the potential in selected CAREC countries and to identify gaps for development and action.
  - To analyze the "digital divide" among the selected CAREC countries and to provide a comparison with the rest of CAREC member countries and other regions.
  - To identify major gap areas and opportunities for bridging the digital gap in the region.

Methodology

- This study primarily contains two sections that used both primary (questionnaire-based) and secondary data analysis.

  - The first segment includes a questionnaire, which explores detailed attributes of digital divide in terms of ***Digital Infrastructure, Digital Payments, eCommerce, Internet Access, and Digital Economy*** using questionnaire-based data collected from six CAREC countries, i.e., ***Afghanistan, Azerbaijan, Kyrgyzstan, Pakistan, Tajikistan, and Uzbekistan.***

  - The second section proposes the construction of a composite/cumulative digital divide index (CDDI) through Principal Component Analysis using secondary data from 2016 to 2020. CDDI integrates multidimensional aspects of the digital gap considering ***Cost and Affordability, Access and Infrastructure, Internet Quality, Digital Security, Regulations, Digital FDI, and ICT output***. For CDDI, this study includes eight countries; ***Azerbaijan, Georgia, Kazakhstan, Kyrgyz Republic, Mongolia, Pakistan, Tajikistan, and Uzbekistan***, while Afghanistan, Turkmenistan, and China were dropped due to missing data

Methodology for Primary analysis

- Primary data collection for quantitative measurement of the current situation in the digital economy within a given country:
  - questionnaire for examining the digital gap of selected CAREC countries
  - Analysis of the questionnaires and description of the results on the digital divide in the selected countries
  - Visualization of results through graphs, radars and charts describing each indicator by countries
- Identification of gaps based on the results of analysis
- Preparation of policy recommendations

Questionnaire for the analysis of the regional digital gap (1)

Two types of questionnaires were designed – a comprehensive and a short version with the most important indicators to cover 4 main sections and subsections:

1. Digital infrastructure
    - Digital Public Services
    - Integration of Digital Technology
    - Access to Digital Financial Services
2. Digital payments
3. eCommerce
    - eCommerce ecosystem
    - Trust, Security and Privacy
4. Internet access
    - Use of Internet

Questionnaire for the analysis of the regional digital gap (1)

1	2	3	4	5
#	**Indicator/Questions**	**Choose appropriate option(s) and add explanation wherever asked for it**	**Source of data (name the publication and URL)**	**Comments (can also be described separately in additional Annex)**
1. Digital Infrastructure				
		1. Digital Public Services		
1.	Are there any specific national strategy for digital infrastructure development?	Yes (pl. Provide details): No (pl. Explain why not:		
2. Digital payments				
1.	Amount of DFDI (in million USD) in the last 5 years in digital infrastructure (including digital payments).	_____ ___		
3. eCommerce				
1.	Can SMEs as companies directly register on global marketplaces (such as Amazon, Alibaba, eBay, WISH etc., available in your country) to sell cross-border?	a) Yes available (pl. provide name of all those that are available. b) Not available (pl. provide reasons of unavailability:		
4. Internet Access				
1.	List recent major projects introduced or underway in the mentioned sector	a) _____ b) _____ c) _____ d) _____		

Questionnaire for the analysis of the regional digital gap (1)

***Interviewees*:**

- Ministry of Information Technologies (MIT)
- Statistical authority
- National postal operator
- Customs authority (agency)
- Tax/Fiscal Ministry or corresponding divisions of the Ministry of Finance
- Ministry of Economy (Trade)
- National (Central) Bank
- Cyber Security Authorities
- Local parcel delivery services
- Marketplaces available in selected countries selling cross-border

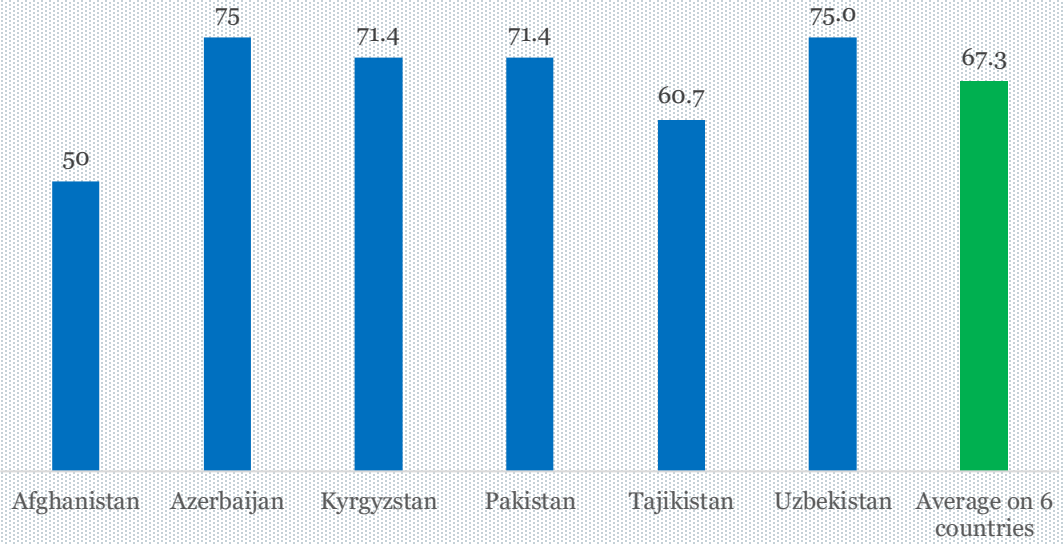
Analysis of questionnaires & description of results

- The most important indicators in each area of study selected or grouped into one general sub-indicator for assessment
- All the indicators are given in a single unit of measurement, i.e., percentage, between 0, 25, 50, 75 and 100.

0	25	50	75	100
The weakest indicator	Weak indicator	Medium indicator	Good indicator	The best indicator

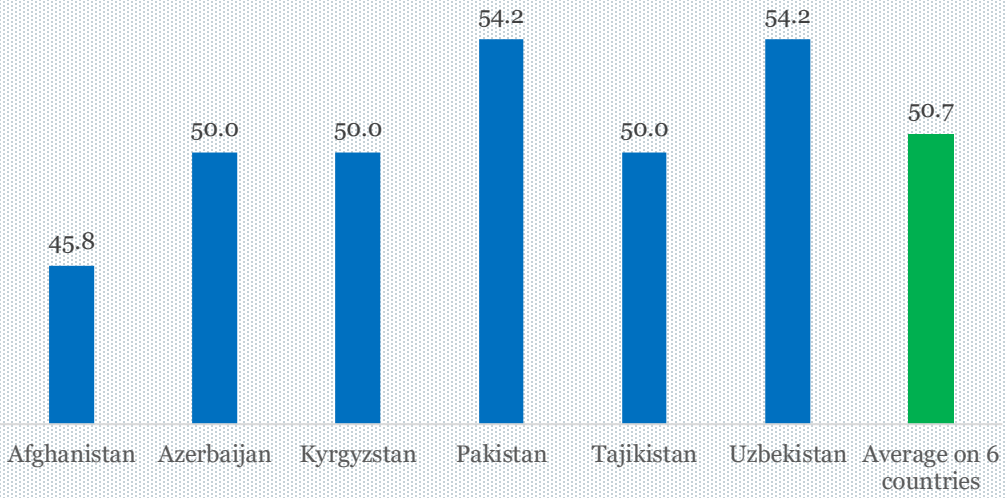
Key findings: Digital infrastructure

Indicators	Afghanistan	Azerbaijan	Kyrgyzstan	Pakistan	Tajikistan	Uzbekistan	Countries Average
1.1. National framework / availability of any specific national strategies for digital infrastructure development	100	100	100	100	100	100	100.0
1.2. Citizens using online public services	25	25	25	25	25	25	25.0
1.3. Amount of FDI in digital infrastructure	25	75	75	75	50	75	62.5
1.4. Country coverage with 4G network	50	100	100	75	100	75	83.3
1.5. Usage of new technologies in digital infrastructure	50	75	50	75	50	50	58.3
1.6. Availability of micro small and medium enterprise (MSMEs) innovation and digitalization hubs (techno parks, SEZs)	50	75	75	75	25	75	62.5
1.7. Availability of any eHealth methods	50	75	75	75	75	75	70.8
Average indicators	50	75	71.4	71.4	60.7	67.9	66.1



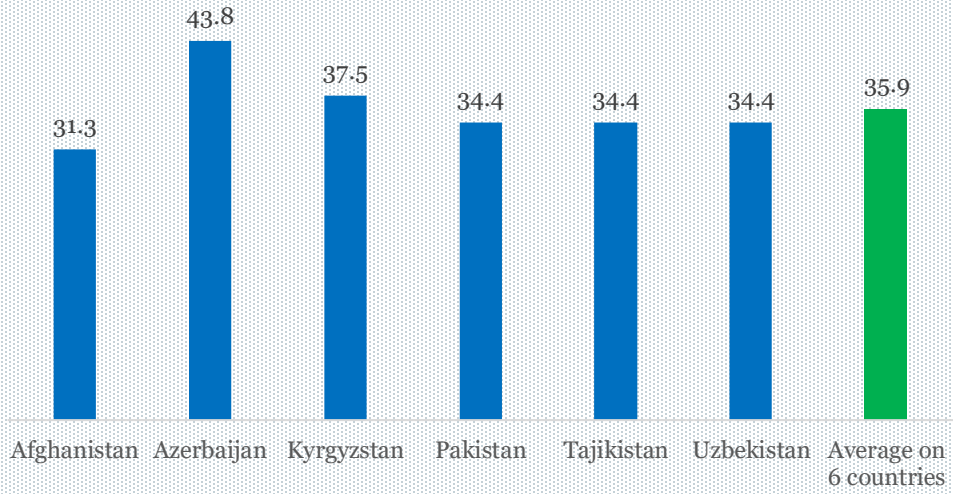
Key findings: Digital payments

Indicators	Afghanistan	Azerbaijan	Kyrgyzstan	Pakistan	Tajikistan	Uzbekistan	Average on 6 countries
2.1. Volume of cashless payments	25	25	25	50	25	50	33.3
2.2.Digital financial products offered by financial service providers	50	50	50	50	50	50	50
2.3. Programs for increasing the volume of cashless payments	50	50	50	50	50	50	50
2.4. Availability of major payment methods used worldwide to sell and pay for goods on the major marketplaces	50	50	50	50	50	50	50
2.5. Digital banking services that help to process financial transactions and activities	50	75	75	75	75	75	70.8
2.6. Availability of specific programs or policies aimed at increasing the cashless payment volume	50	50	50	50	50	50	50
Average indicators	45.8	50	50	54.2	50	54.2	50.7



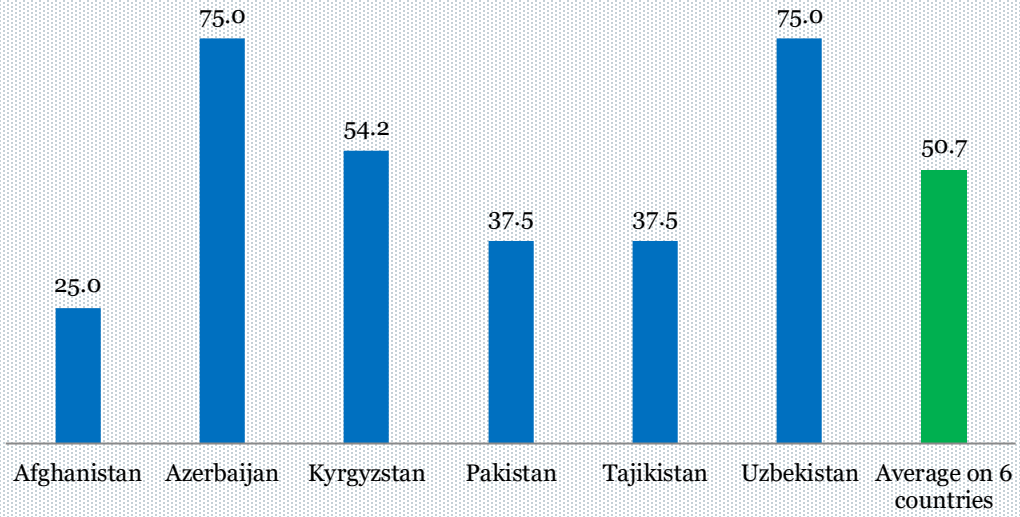
Key findings: E-commerce

Indicators	Afghanistan	Azerbaijan	Kyrgyzstan	Pakistan	Tajikistan	Uzbekistan	Average on 6 countries
3.1. Enterprises having a website with eCommerce functions	25	50	25	25	25	50	33,3
3.2. Can SMEs directly register on International marketplaces to sell cross-border	0	0	0	0	0	0	0
3.3. Key marketplaces in the country that allow to buy and sell cross-border	25	50	50	25	25	25	33,3
3.4. Individuals purchasing goods, services, or content over the Internet	25	25	25	25	25	25	25
3.5. Usage of advanced technologies in online sales	50	75	75	75	75	50	66,7
3.6. Legal framework for cross-border electronic data exchange between customs	50	50	50	50	50	50	50
3.7. What are the most common parcel delivery services used for cross-border & local parcels	75	75	75	75	75	75	75
3.8. Usage of E-Signature for cross-border operations	0	25	0	0	0	0	25
Average indicators	31,3	43,8	37,5	34,4	34,4	34,4	35,9



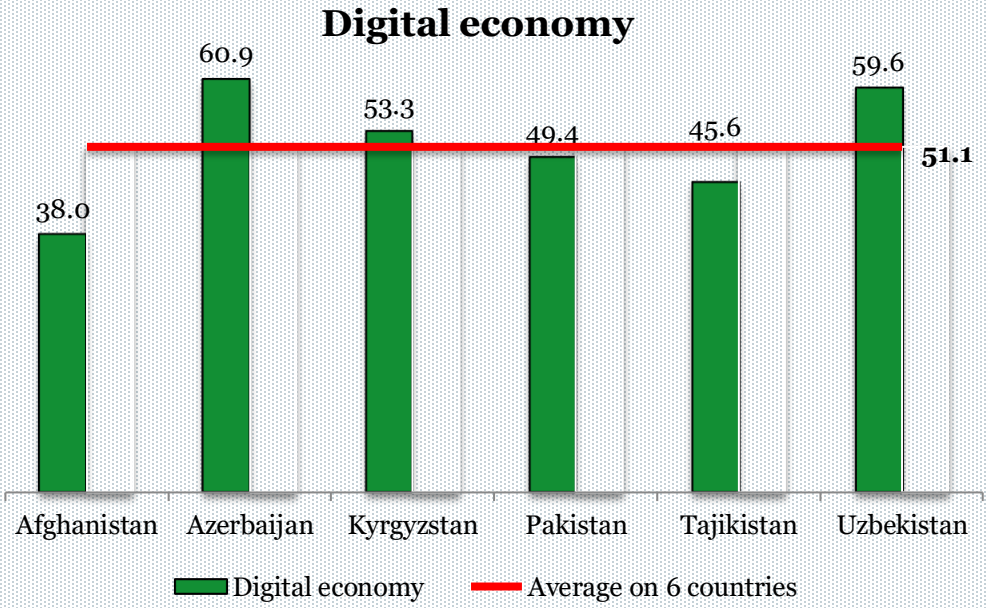
Key findings: Internet Access

Indicators	Afghanistan	Azerbaijan	Kyrgyzstan	Pakistan	Tajikistan	Uzbekistan	Average on 6 countries
4.1. Households using a fixed broadband Internet connection at home	0	100	75	25	25	100	54,2
4.2. Individuals using mobile devices to access the Internet away from home or work	25	100	50	50	50	75	58,3
4.3. Schools with internet Access (e-skills)	25	100	75	25	25	100	58,3
4.4. Share of enterprises with Internet access in total number of all enterprises	50	100	75	75	75	100	79,2
4.5. Individuals using the Internet for Internet Banking	25	25	25	25	25	50	29,2
4.6. Individuals using the Internet for selling of goods or services	25	25	25	25	25	25	25
Internet Access	25	75	54,2	37,5	37,5	75	50,7

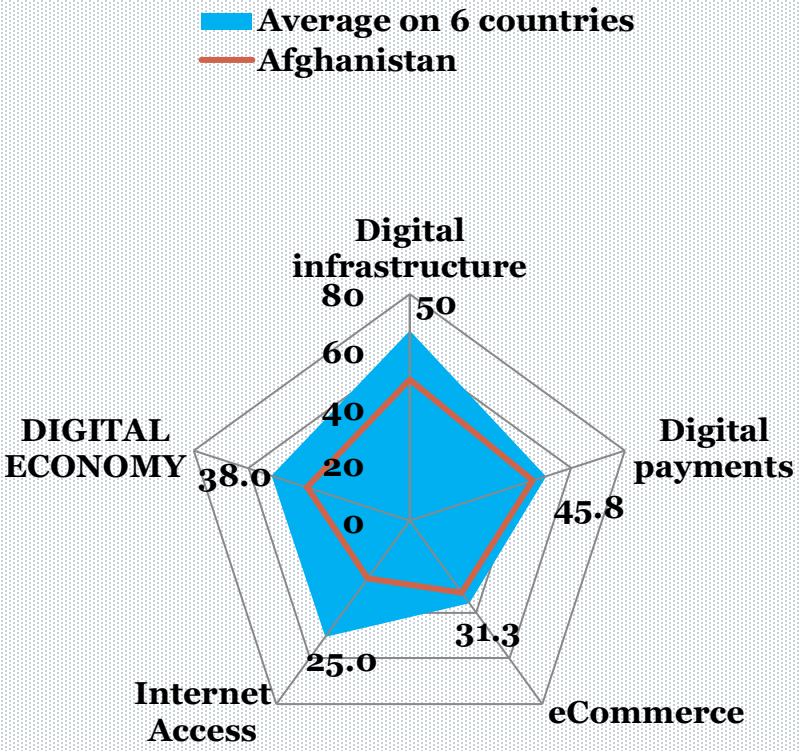


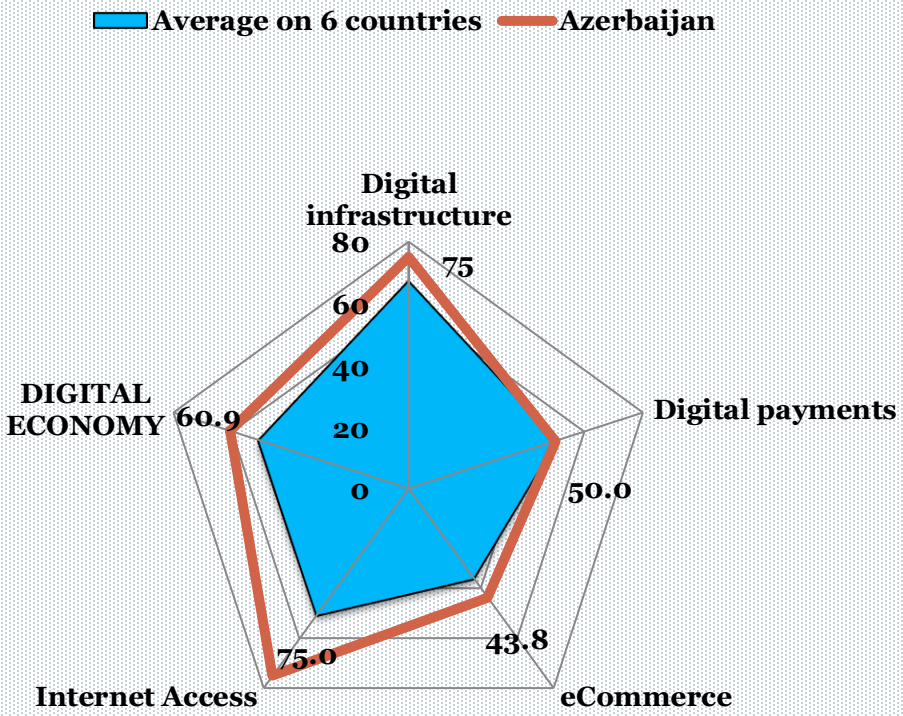
Key findings and summary of results: Digital Economy

Area/indicator	Afghanistan	Azerbaijan	Kyrgyzstan	Pakistan	Tajikistan	Uzbekistan	Average for 6 countries
Digital infrastructure	50	75	71,4	71,4	60,7	75	**67,3**
Digital payments	45,8	50	50	54,2	50	54,2	**50,7**
E-commerce	31,3	43,8	37,5	34,4	34,4	34,4	**35,9**
Internet Access	25	75	54,2	37,5	37,5	75	**50,7**
Digital Economy	**38**	**60,9**	**53,3**	**49,4**	**45,6**	**59,6**	**51,1**



Graphical Representation of Key findings by countries





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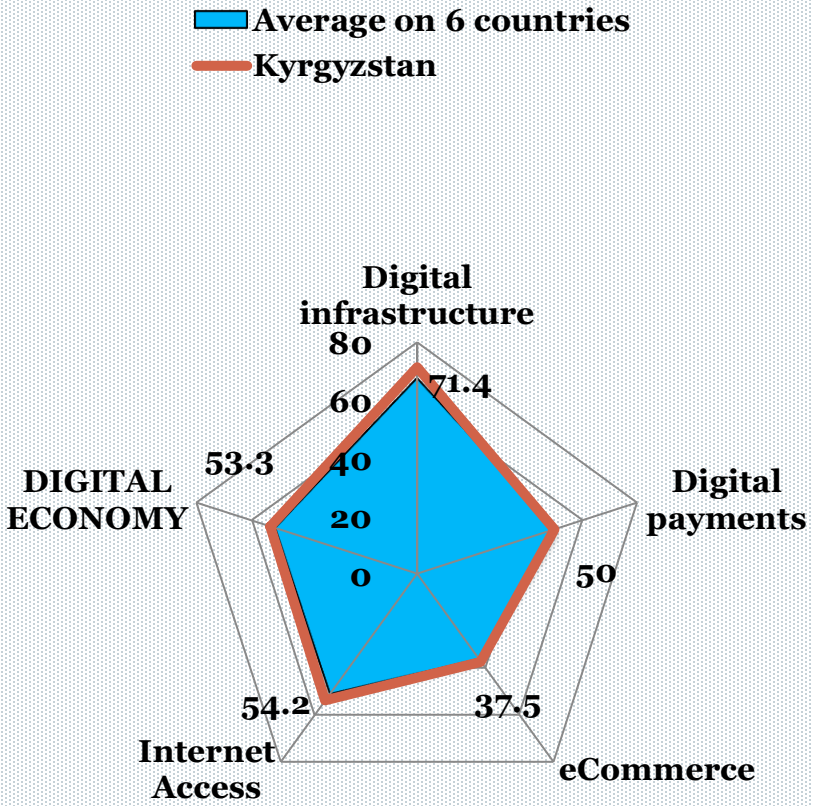

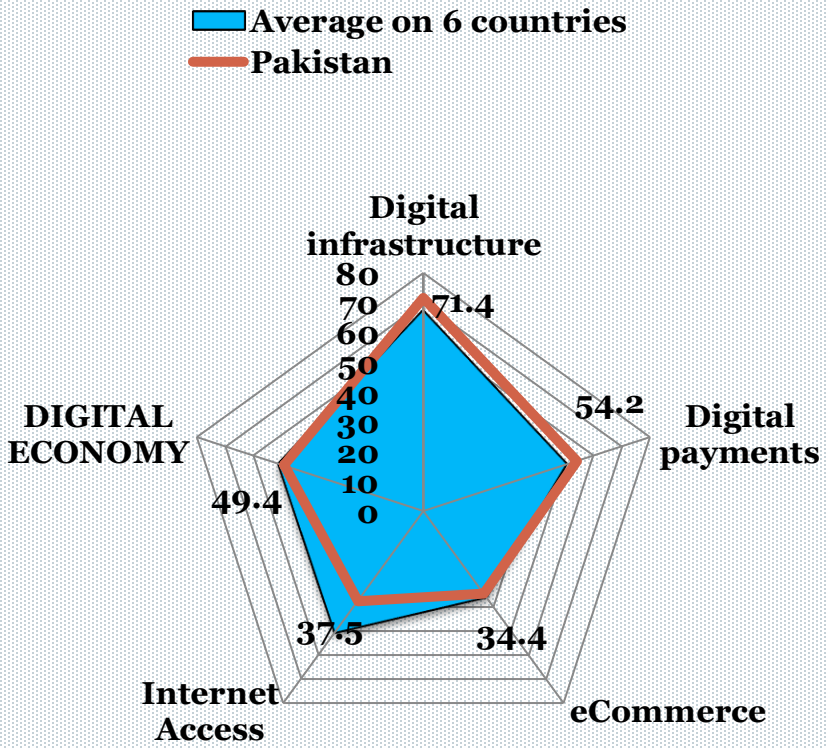

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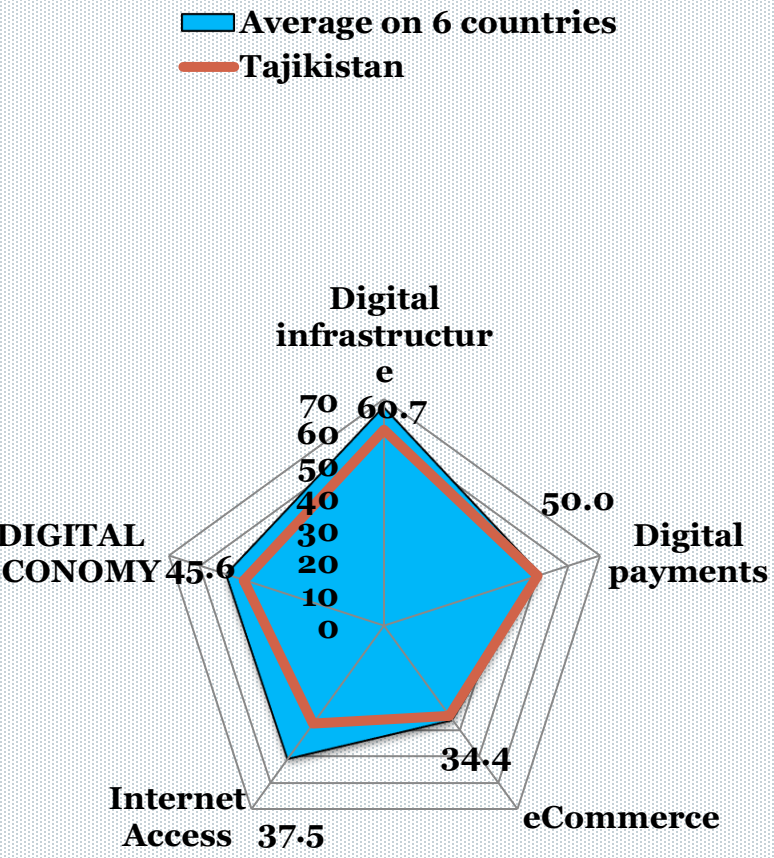
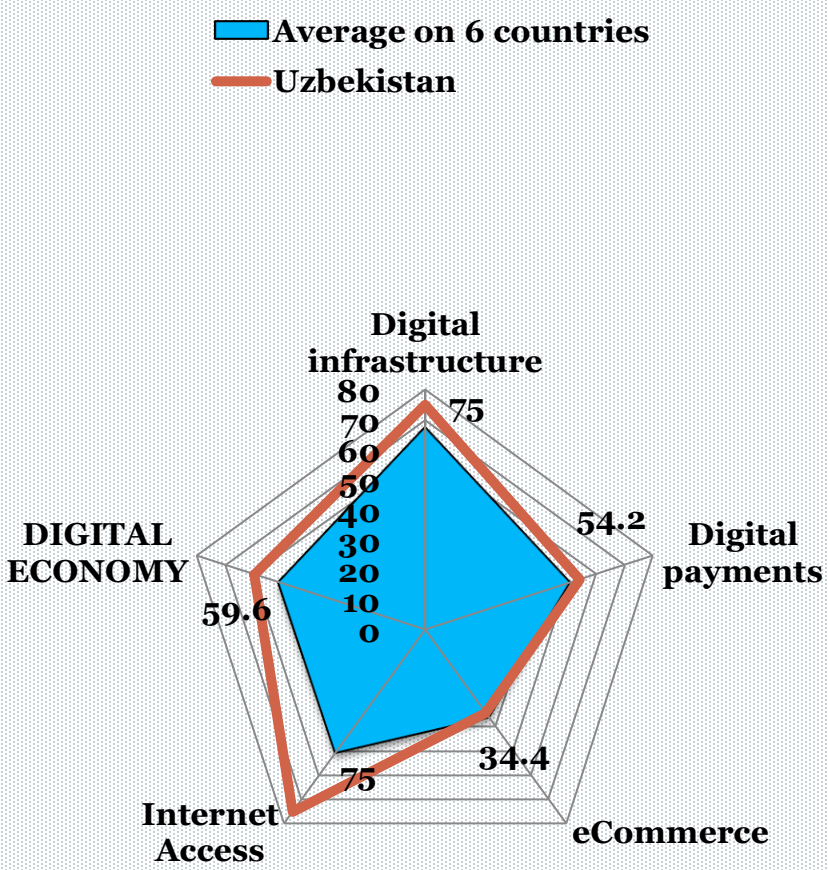




Digital Economy gaps

Digital Infrastructure	Internet access
• Lack of e-skills and cultural issues for use of online services • Low-level of public confidence in digital documents and services • Security concerns and Internet shutdowns • Most of remote areas do not have access to digital infrastructure • No precise data on the amount of FDI on different sectors/areas • Low-level use of digital technologies in the social sphere	• Lack of e-skills for using the Internet • No access to digital infrastructure due to poor connectivity or instability of electricity supply • High Internet costs • Problems with Internet accessibility in remote areas
E-commerce	**Digital Payments**
• Absence of e-commerce platforms to carry out cross-border trade • Inability to directly register on international marketplaces to sell cross-border. • Lack of institutional mechanisms for regulating e-commerce • Imperfect and insecure systems of online payments and lack of systems for delivery of goods and services • Slow or poor adaptation of the mobile or online payments. • Poor after-sales service & Consumer protection issues • Cases of counterfeit product sales. Unauthentic websites. • Poor marketing among the population • Lack of confidence in buying online, cyber security concerns • Lack of e-skills and trust in government structures. • In 2 out of 6 countries, the “green transport corridor” has not been introduced (this hinders the increase in cross-border trade) • Absence of a legal framework for cross-border electronic data exchange • Absence of e-signature use for cross-border transaction	• Lack of awareness on the use of cashless payment methods. • Lack of trust in online payments • Low level of cashless transactions • Limited digital banking services • Rapidly growing services require investment in infrastructure and legislative support • High restrictions on the transfer of money abroad, high threshold of the minimum service fee • Impossibility to register on international payment systems for receiving payments

Methodology for CDDI

- This study uses PCA to construct a cumulative digital divide index using several socio-economic factors for six CAREC countries (Azerbaijan, Kazakhstan, Kyrgyz Republic, Pakistan, Tajikistan, and Uzbekistan). These countries are selected based on the data availability of relevant indicators.
- Principal components (PC) approach reduces a large number of variables of interest into more meaningful (fewer) components or constructs, known as PCs, and picks only the first PC that explains the maximum proportion of variation in data relative to other component.
- This first PC is generally used as an index after being scaled by taking a deviation from the minimum value of this first PC and dividing this difference with the range (maximum minus the minimum value) of this selected PC to get the index in the range of 0 to 1 (see Razzaq et al. 2021; An et al. 2021 for details).

Methodology for CDDI

Dimension	Abbr.	Explanation	Indicators
Cost and Affordability	COST&AFFORD	This covers cost and affordability of internet devices. The variables such as per capita GNI are measured considering the purchasing power parity.	Fixed broadband basket as % of GNI Per Capita Mobile-cellular basket % of GNI Per Capita Mobile broadband basket as a % of GNI Per Capita
Access and Infrastructure	ACC&INFR	This covers the two main aspects of digital divide, such as digital access and infrastructure.	Fixed broadband Subscriptions Fixed-telephone subscriptions Mobile Subscriptions Households with a computer at home (%) Households with Internet access at home (%) Individuals owning a mobile phone (%) Individuals using the Internet, total (%) Population covered by at least a 3G/4G mobile network (%)
Internet Quality	QUALITY	Quality of internet includes internet speed using different devices.	International bandwidth per Internet user (kbit/s) Monthly fixed broadband Internet traffic per fixed broadband subscription (MB) Monthly mobile broadband Internet traffic per mobile broadband subscription (MB)
Digital security	DIGSEC	Level of digital security and implementation and efficacy of regulations.	e-Commerce safety Trust in government websites and apps Trust in information from social media Trust in non-government websites and apps Trust in online privacy
Regulations	REGULATIONS	It covers the social, political, environmental and economic conditions in a country.	Institutional Quality index Ease of doing business index
ICT output	ICTOUTPUT	It indicates the trade associated with ICT and high-tech goods.	High-tech & ICT exports % of manufacturing exports
Digital Foreign Direct Investment	DFDI	Foreign direct investment from China in ICT sector.	FDI in the ICT sector of CAREC countries

Key Results

- A lower CDDI score specifies a higher digital divide and vice versa.
- The average CDDI score exhibit that Kazakhstan and Georgia are the least digitally divided countries in the selected CAREC region with a cumulative average score of 0.868 and 0.798
- Azerbaijan and Mongolia are moderately divided in the digital spectrum with an average score of 0.562 and 0.480, respectively.
- Uzbekistan (0.306), Kyrgyz Republic (0.276), Pakistan (0.196), and Tajikistan (0.078) are the least performing countries in CDDI, confirming a higher digital divide.
- The sub-indicators results substantially varied across countries.
- Although Kazakhstan and Georgia secured the highest score in selected CAREC countries, however, demonstrate a substantial digital divide compared with other developed regions i.e., European Union, or China.

Key Results

- Highest rank/Green highlighted cells show lower digital divide while lowest rank/Red highlighted cells indicate higher digital divide

Indicators	Azerbaijan	Georgia	Kazakhstan	Kyrgyz Republic	Mongolia	Pakistan	Tajikistan	Uzbekistan
Cost and Affordability	5	7	8	2	6	3	1	4
Access and Infrastructure	7	6	8	3	4	1	2	5
Internet Quality	3	8	6	7	2	5	4	1
Regulations	4	8	6	5	7	2	1	3
Digital Security	7	6	8	3	2	4	1	5
ICT Output	6	3	8	5	7	4	2	1
Digital FDI	1	2	8	3	6	7	4	5
`CDDI	6	7	8	3	5	2	1	4

Summary of Results

Country	Indices	Mean	SD	Median	IQR	Min	Max
Azerbaijan	Cost and Affordability	0.859	0.016	0.858	0.007	0.840	0.885
	Access and Infrastructure	0.902	0.013	0.903	0.019	0.887	0.919
	Internet Quality	0.236	0.039	0.236	0.022	0.175	0.279
	Digital security	0.276	0.039	0.265	0.043	0.231	0.331
	Regulations	0.663	0.278	0.660	0.381	0.279	0.951
	ICT output	0.112	0.041	0.109	0.058	0.067	0.168
	Digital FDI	0.001	0.002	0.000	0.003	0.000	0.003
	CDDI	0.562	0.043	0.550	0.050	0.510	0.620
Georgia	Cost and Affordability	0.811	0.077	0.856	0.133	0.724	0.882
	Access and Infrastructure	0.826	0.038	0.820	0.056	0.790	0.879
	Internet Quality	0.900	0.101	0.939	0.139	0.761	1.000
	Digital security	0.984	0.012	0.983	0.017	0.970	1.000
	Regulations	0.850	0.038	0.845	0.011	0.797	0.905
	ICT output	0.069	0.021	0.078	0.022	0.037	0.089
	Digital FDI	0.082	0.009	0.084	0.014	0.072	0.092
	CDDI	0.798	0.059	0.820	0.100	0.730	0.860
Kazakhstan	Cost and Affordability	0.975	0.032	0.990	0.022	0.920	1.000
	Access and Infrastructure	0.942	0.039	0.928	0.049	0.904	1.000
	Internet Quality	0.624	0.158	0.644	0.179	0.400	0.805
	Digital security	0.530	0.038	0.532	0.043	0.478	0.575
	Regulations	0.592	0.437	0.803	0.637	0.000	1.000
	ICT output	0.805	0.150	0.823	0.222	0.646	1.000
	Digital FDI	0.919	0.114	0.959	0.023	0.718	1.000
	CDDI	0.868	0.102	0.870	0.140	0.750	1.000

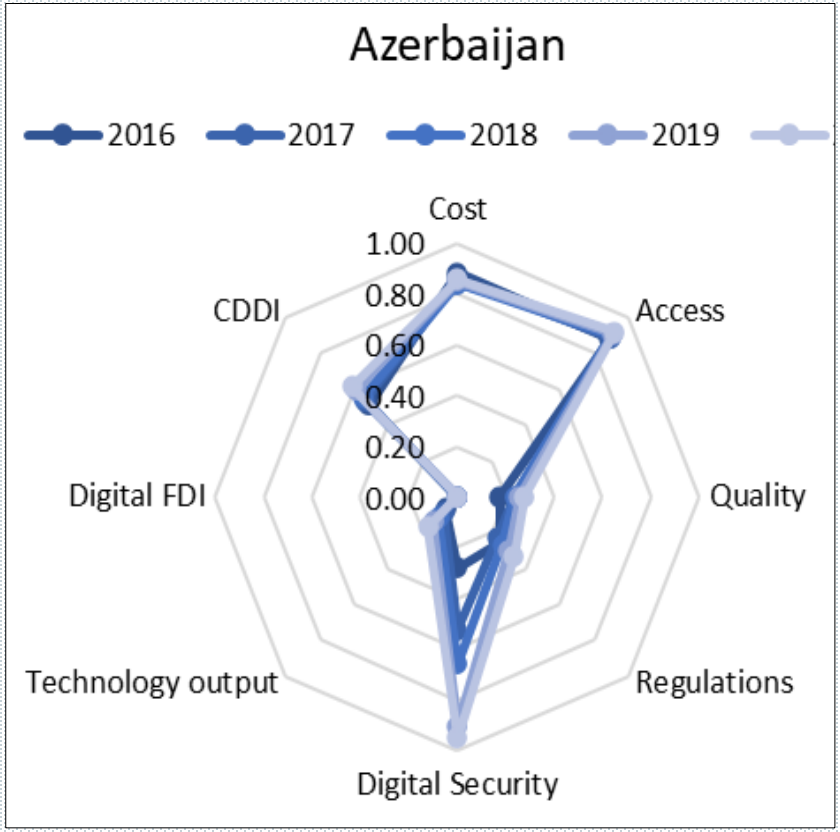
Summary of Results

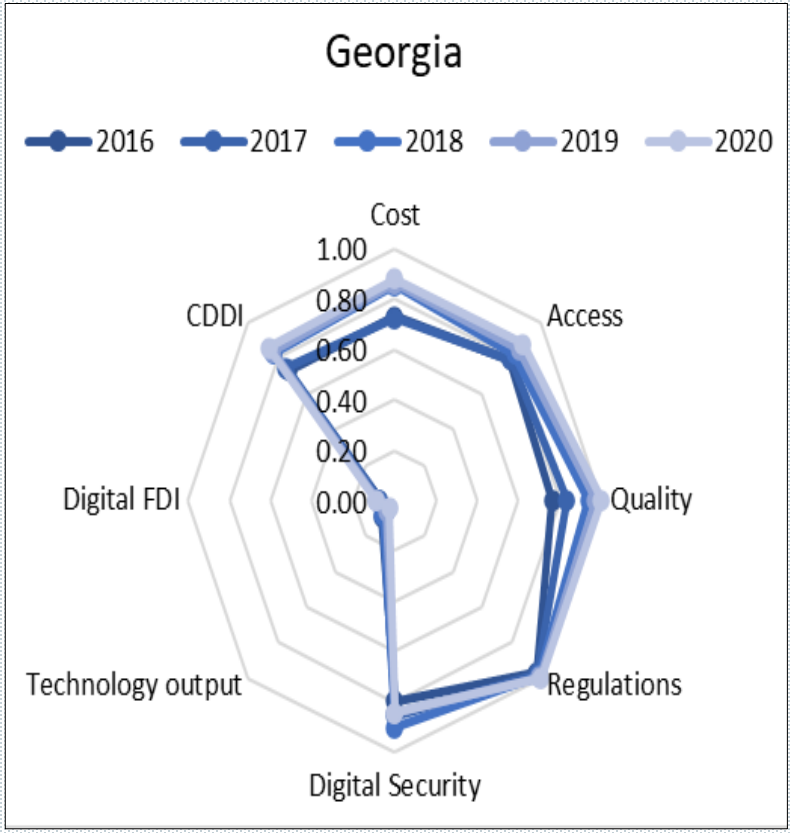
Country	Indices	Mean	SD	Median	IQR	Min	Max
Kyrgyz Republic	Cost and Affordability	0.202	0.161	0.262	0.277	0.000	0.345
	Access and Infrastructure	0.401	0.087	0.425	0.103	0.274	0.492
	Internet Quality	0.533	0.218	0.522	0.309	0.290	0.820
	Digital security	0.408	0.009	0.407	0.013	0.398	0.421
	Regulations	0.230	0.128	0.166	0.103	0.133	0.443
	ICT output	0.312	0.188	0.213	0.305	0.141	0.547
	Digital FDI	0.189	0.025	0.184	0.033	0.163	0.225
	CDDI	0.276	0.112	0.280	0.180	0.150	0.410
Mongolia	Cost and Affordability	0.847	0.017	0.849	0.004	0.820	0.868
	Access and Infrastructure	0.447	0.160	0.476	0.262	0.273	0.636
	Internet Quality	0.138	0.086	0.119	0.101	0.038	0.258
	Digital security	0.683	0.028	0.691	0.015	0.636	0.707
	Regulations	0.180	0.155	0.143	0.156	0.000	0.403
	ICT output	0.418	0.336	0.450	0.392	0.084	0.911
	Digital FDI	0.540	0.126	0.462	0.158	0.445	0.730
	CDDI	0.480	0.102	0.470	0.150	0.380	0.620
Pakistan	Cost and Affordability	0.476	0.078	0.498	0.084	0.379	0.578
	Access and Infrastructure	0.058	0.044	0.063	0.042	0.000	0.118
	Internet Quality	0.419	0.232	0.428	0.378	0.189	0.715
	Digital security	0.122	0.056	0.116	0.080	0.063	0.197
	Regulations	0.408	0.145	0.380	0.106	0.256	0.638
	ICT output	0.049	0.005	0.048	0.004	0.042	0.055
	Digital FDI	0.657	0.076	0.634	0.078	0.561	0.756
	CDDI	0.196	0.098	0.140	0.140	0.110	0.330

Summary of Results

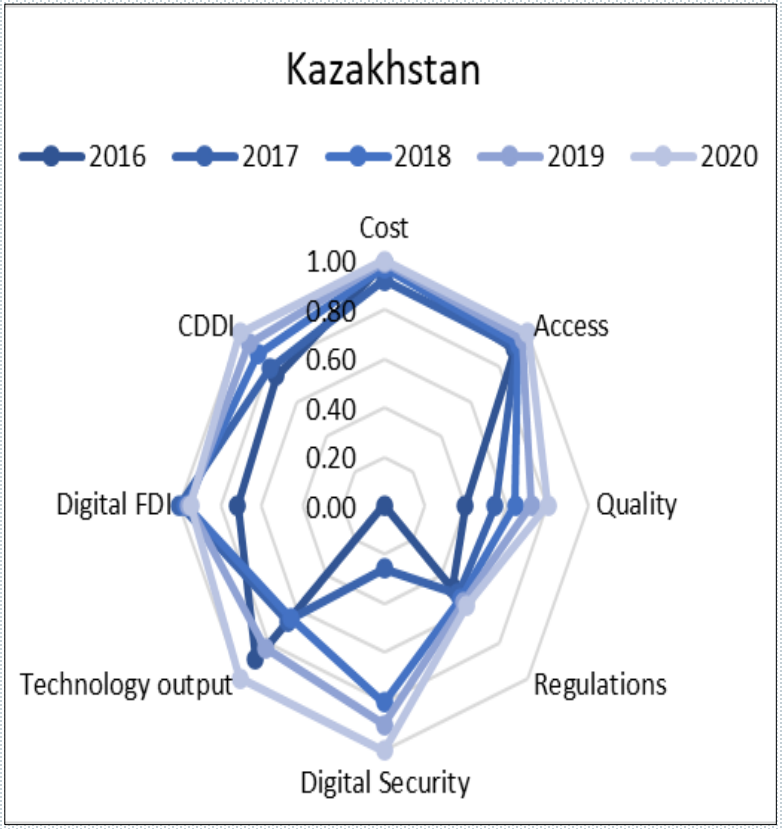
Country	Indices	Mean	SD	Median	IQR	Min	Max
Tajikistan	Cost and Affordability	0.197	0.200	0.082	0.332	0.004	0.423
	Access and Infrastructure	0.185	0.021	0.185	0.026	0.159	0.211
	Internet Quality	0.406	0.178	0.395	0.257	0.214	0.642
	Digital security	0.060	0.046	0.053	0.041	0.000	0.123
	Regulations	0.135	0.079	0.145	0.092	0.027	0.230
	ICT output	0.024	0.026	0.015	0.025	0.000	0.064
	Digital FDI	0.228	0.045	0.257	0.044	0.154	0.257
	CDDI	0.078	0.079	0.080	0.130	0.000	0.180
Uzbekistan	Cost and Affordability	0.638	0.229	0.759	0.299	0.302	0.831
	Access and Infrastructure	0.558	0.120	0.565	0.115	0.381	0.698
	Internet Quality	0.088	0.082	0.074	0.112	0.000	0.201
	Digital security	0.132	0.079	0.118	0.115	0.056	0.242
	Regulations	0.464	0.310	0.660	0.515	0.090	0.729
	ICT output	0.024	0.026	0.015	0.025	0.000	0.064
	Digital FDI	0.310	0.168	0.370	0.290	0.124	0.488
	CDDI	0.306	0.153	0.400	0.200	0.090	0.440
Overall CAREC Region	Cost and Affordability	0.626	0.310	0.779	0.468	0.000	1.000
	Access and Infrastructure	0.540	0.321	0.536	0.641	0.000	1.000
	Internet Quality	0.418	0.290	0.326	0.467	0.000	1.000
	Digital security	0.399	0.306	0.365	0.485	0.000	1.000
	Regulations	0.440	0.319	0.355	0.605	0.000	1.000
	ICT output	0.227	0.293	0.081	0.287	0.000	1.000
	Digital FDI	0.366	0.308	0.257	0.512	0.000	1.000
	CDDI	0.446	0.283	0.405	0.495	0.000	1.000

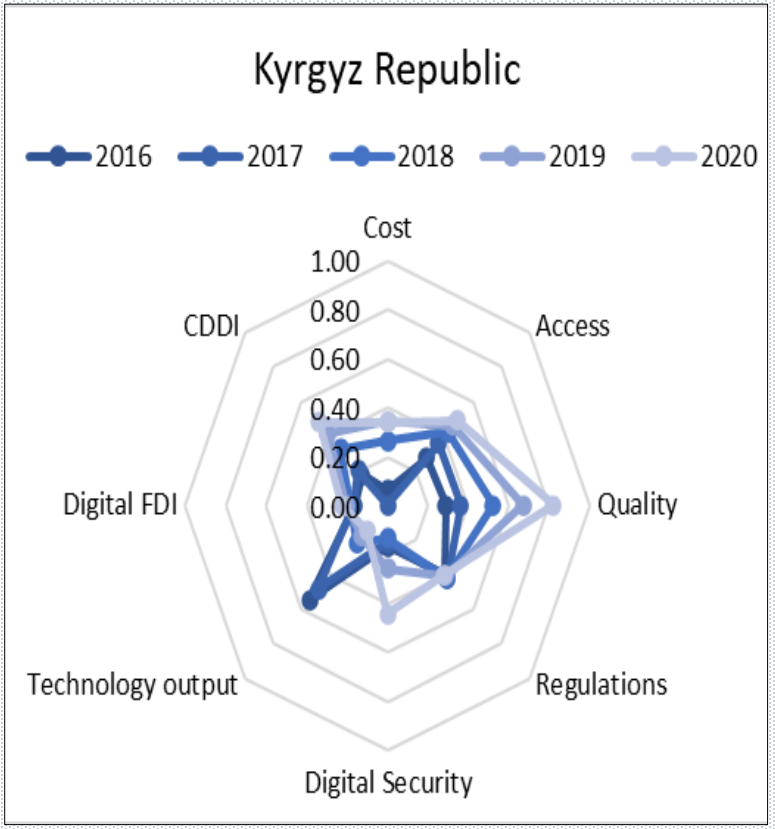
Graphical Representation of Key Indicators



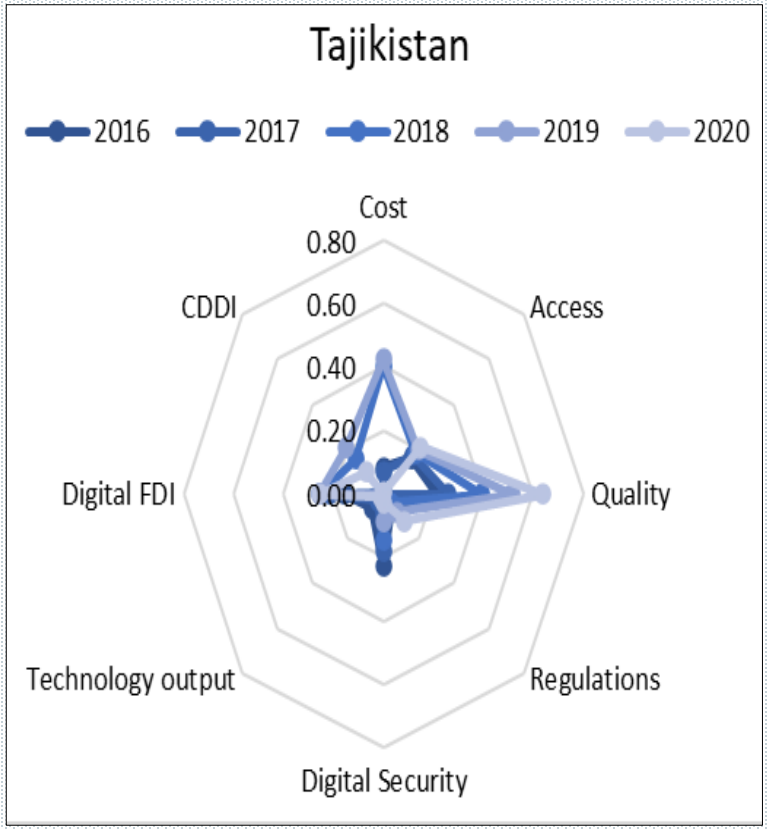


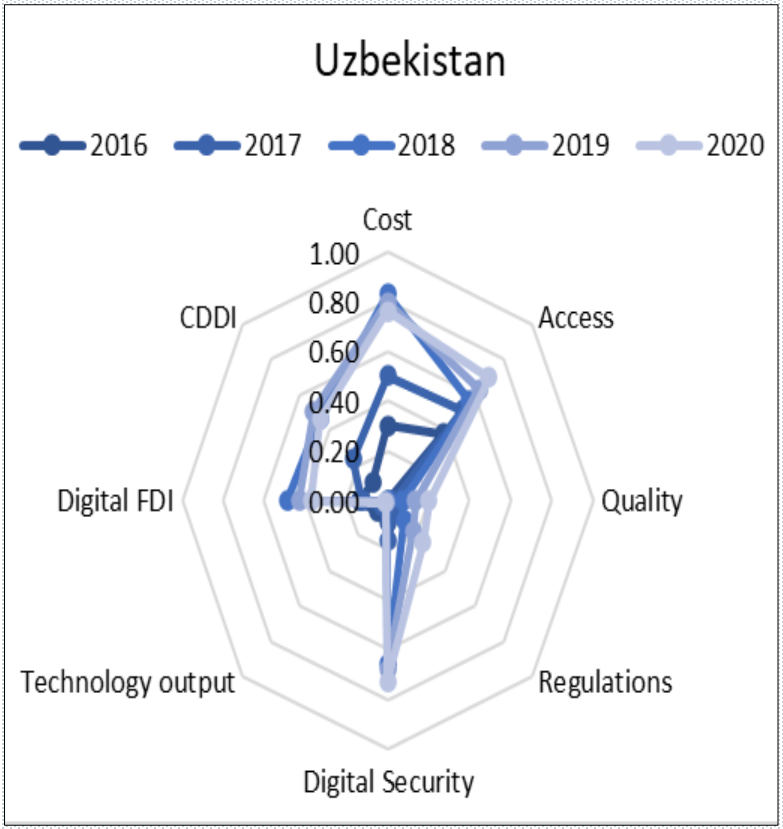
Graphical Representation of Key Indicators



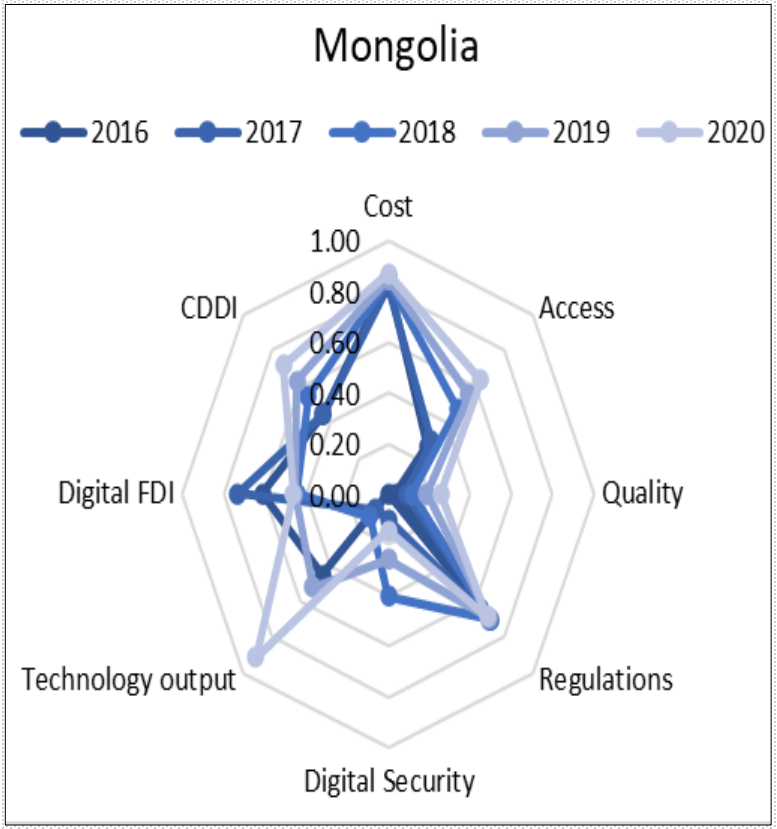


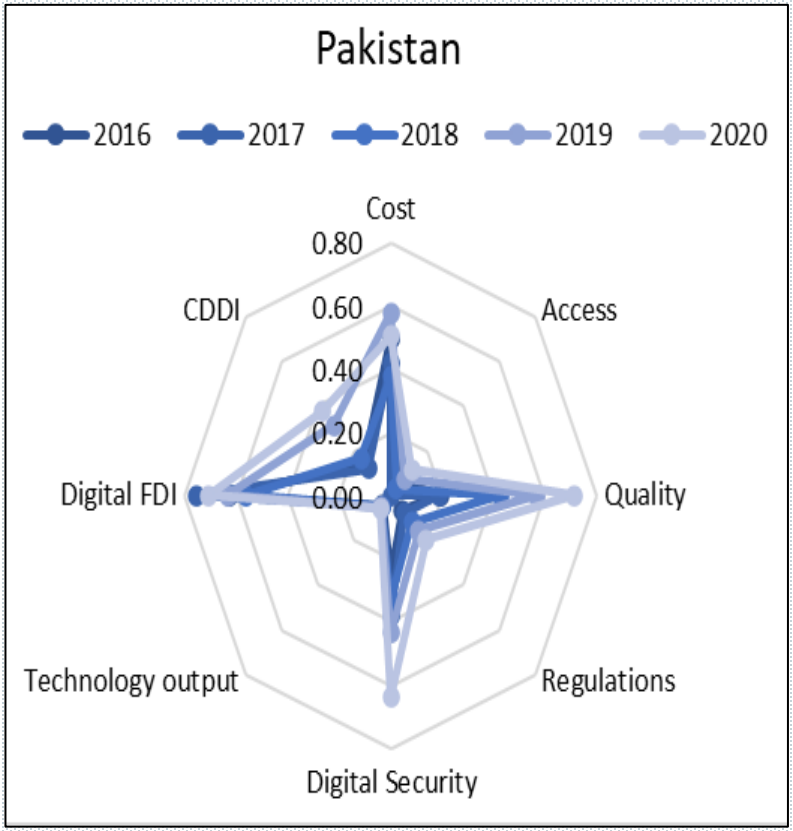
Graphical Representation of Key Indicators



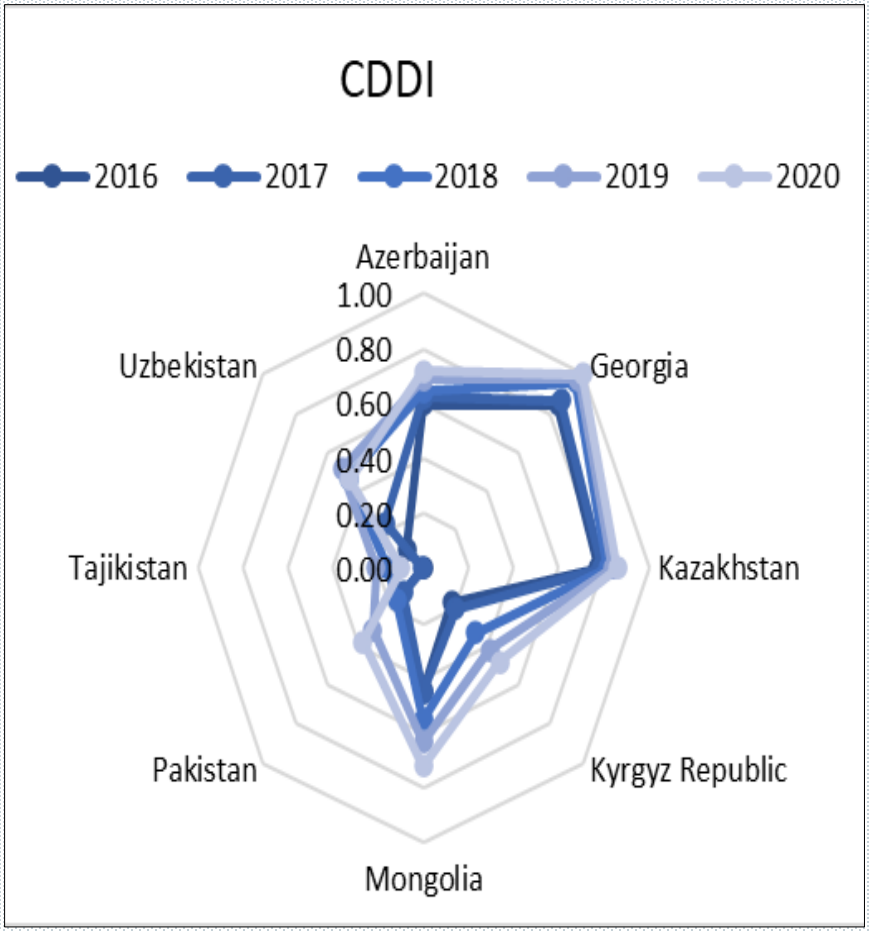


Graphical Representation of Key Indicators





Graphical Representation of CDDI across Countries



Identified Digital Gaps

Tajikistan, Pakistan, and Kyrgyz Republic

- Higher cost of internet limits a large segment of society to remain digitally disconnected. Affordability is one of the imperious factors that reduce internet penetration. It has the lowest score in "cost of internet" compared to other CAREC countries.
- Weak access and infrastructure are the most vulnerable segment of digital divide, which requires a substantial amount of fixed asset investment from domestic and foreign sources.
- Weak institutional quality and business regulations failed to create a conducive environment for individuals and businesses to adopt and disseminate digital technologies at a national scale.
- Digital security is another lagging area, particularly in Tajikistan, which caused eCommerce failure, bad reputation, consumer mistrust, reputational damages, cyber-attacks, financial burglaries, and so on.
- No export diversification and almost zero ICT related output, which indicates lack of basic education, industrial structure and absorption capacity to adopt, imitate and produce digital technologies.

Identified Digital Gaps

Uzbekistan, Mongolia, and Azerbaijan

- Lower internet quality leads to poor service deliveries in eCommerce, inefficient logistics, and disruption in daily business operations. Failed to effectively integrate with virtual education, learning, and reverse technology spillovers.
- Digital security is another gray area in Mongolia, while Azerbaijan and Uzbekistan possess a moderate level of digital security.
- Weak institutional framework of these countries is one of the key socio-economic challenges, which create bottlenecks for business operations, encourage rent-seeking behavior and corruption, discourage innovation and adoption of digital technologies.
- Uzbekistan and Mongolia are lagging in Access and infrastructure and failed to embrace reasonable digital FDI inflows and consequently higher ICT infrastructure gaps.
- ICT-related industrial output is imperious to transform an industry from primary exports (natural resources) to technology exports. Many CAREC countries are rich in natural resources and less diversified in exports, translating into lower demand for ICT skills and the job market.

Identified Digital Gaps

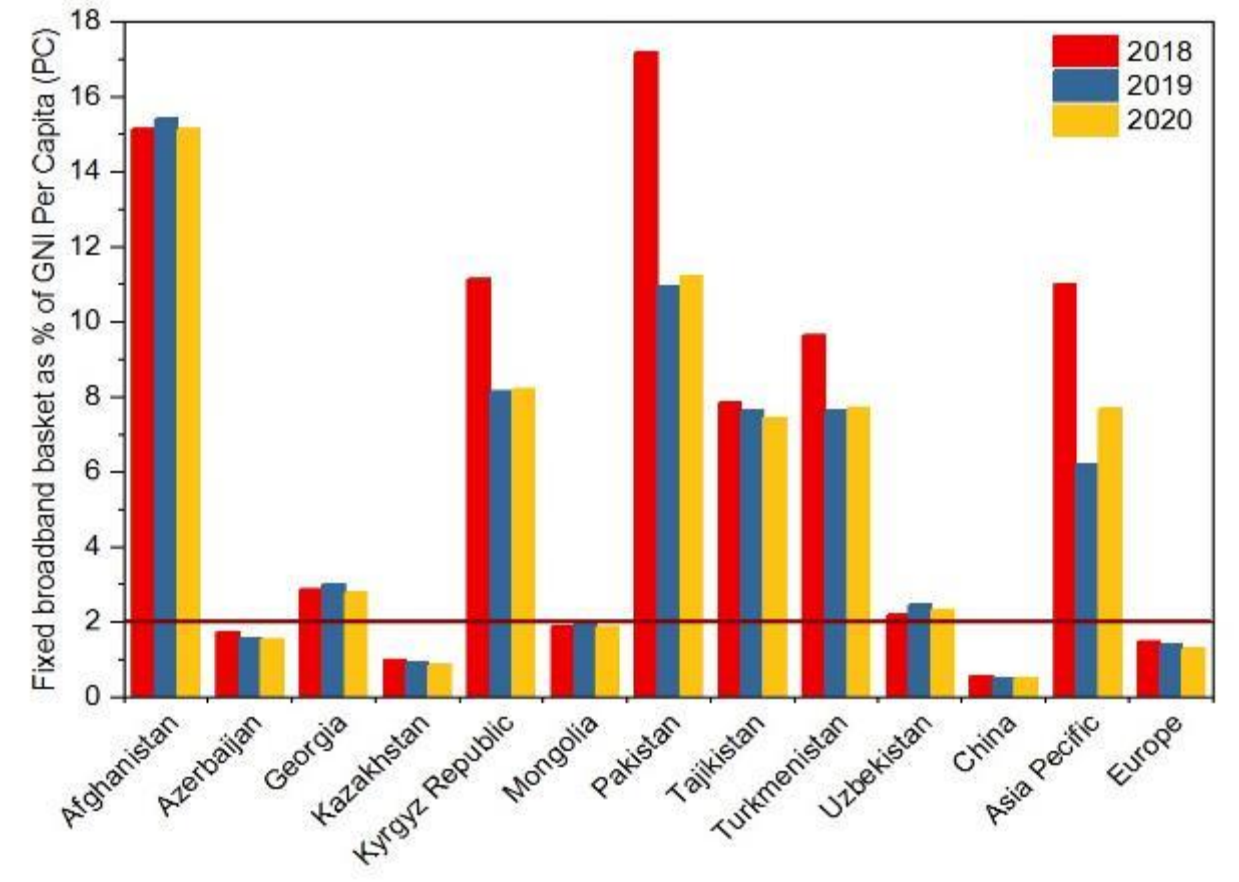
Kazakhstan and Georgia

- Although these countries are the best performing countries in the CAREC region and report a lower digital divide than their counterparts. However, if we compare with other emerging countries such as China or the EU, there is significant potential for digital improvement in digital access, infrastructure, quality, and security.

- Also, Kazakhstan is lagging in institutional quality score, while Georgia is the only exception and best performing county in institutional governance in the CAREC region. However, it has the lowest score in technology-related output.

- Thus, best-performing countries in the CAREC region are also lagging in certain dimensions compared to other developed regions.

Comparison of Digital Gaps



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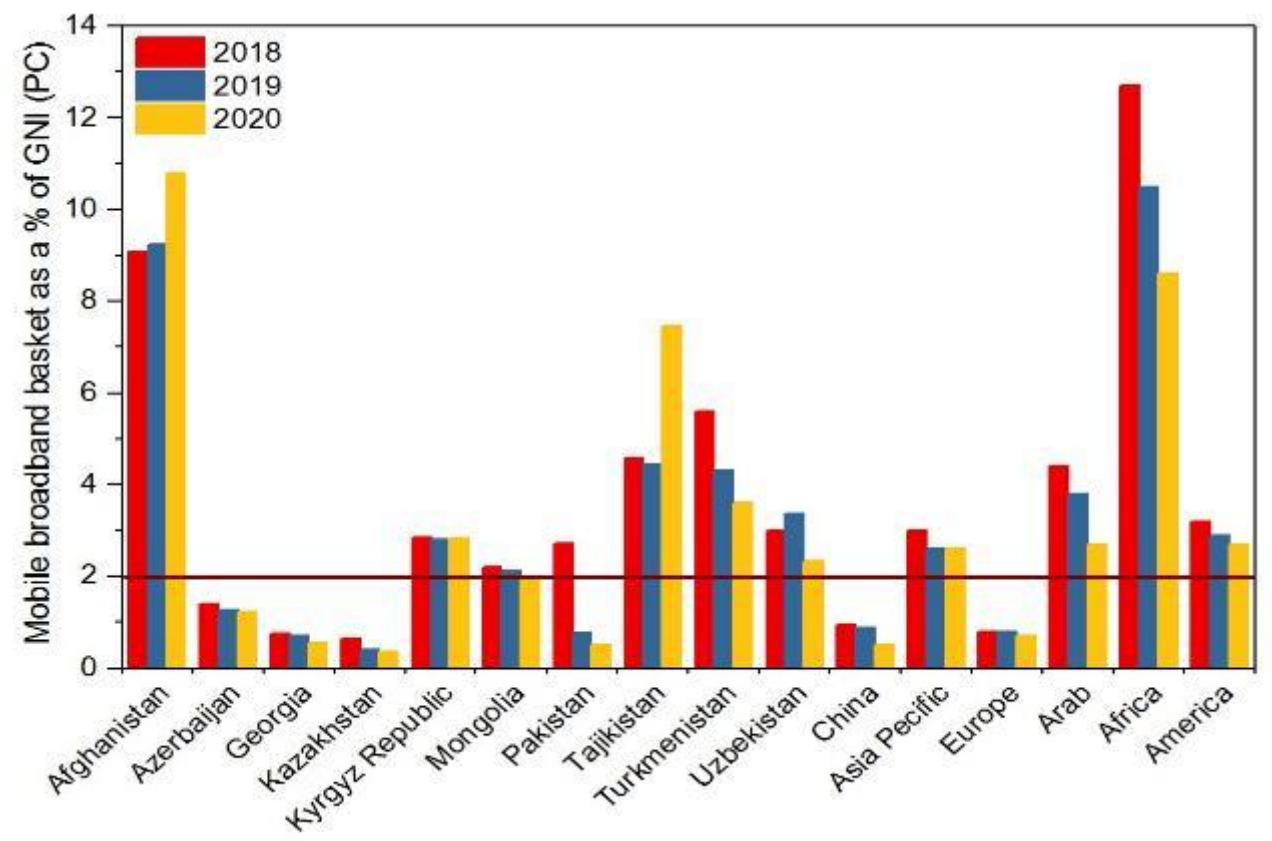

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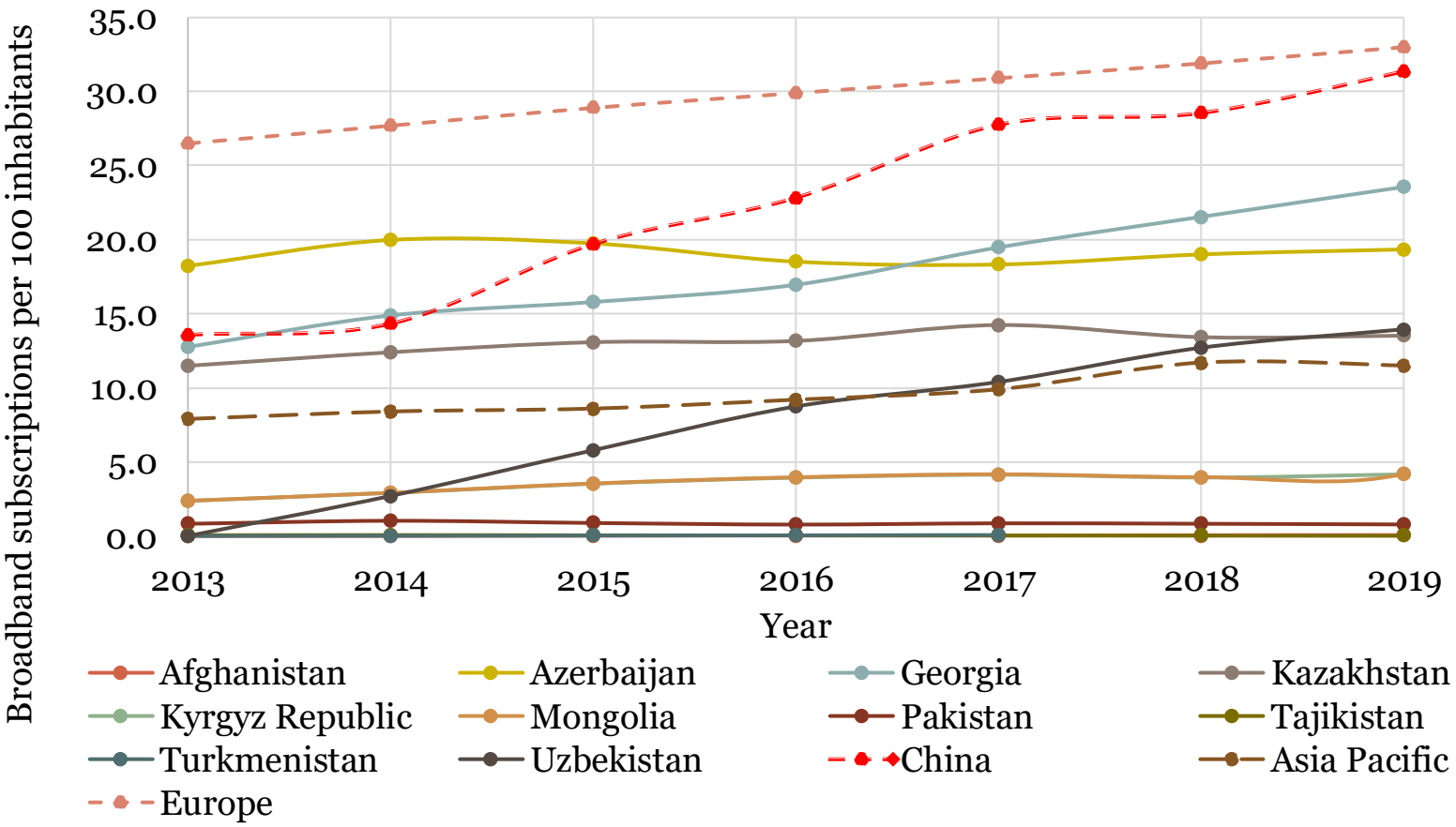

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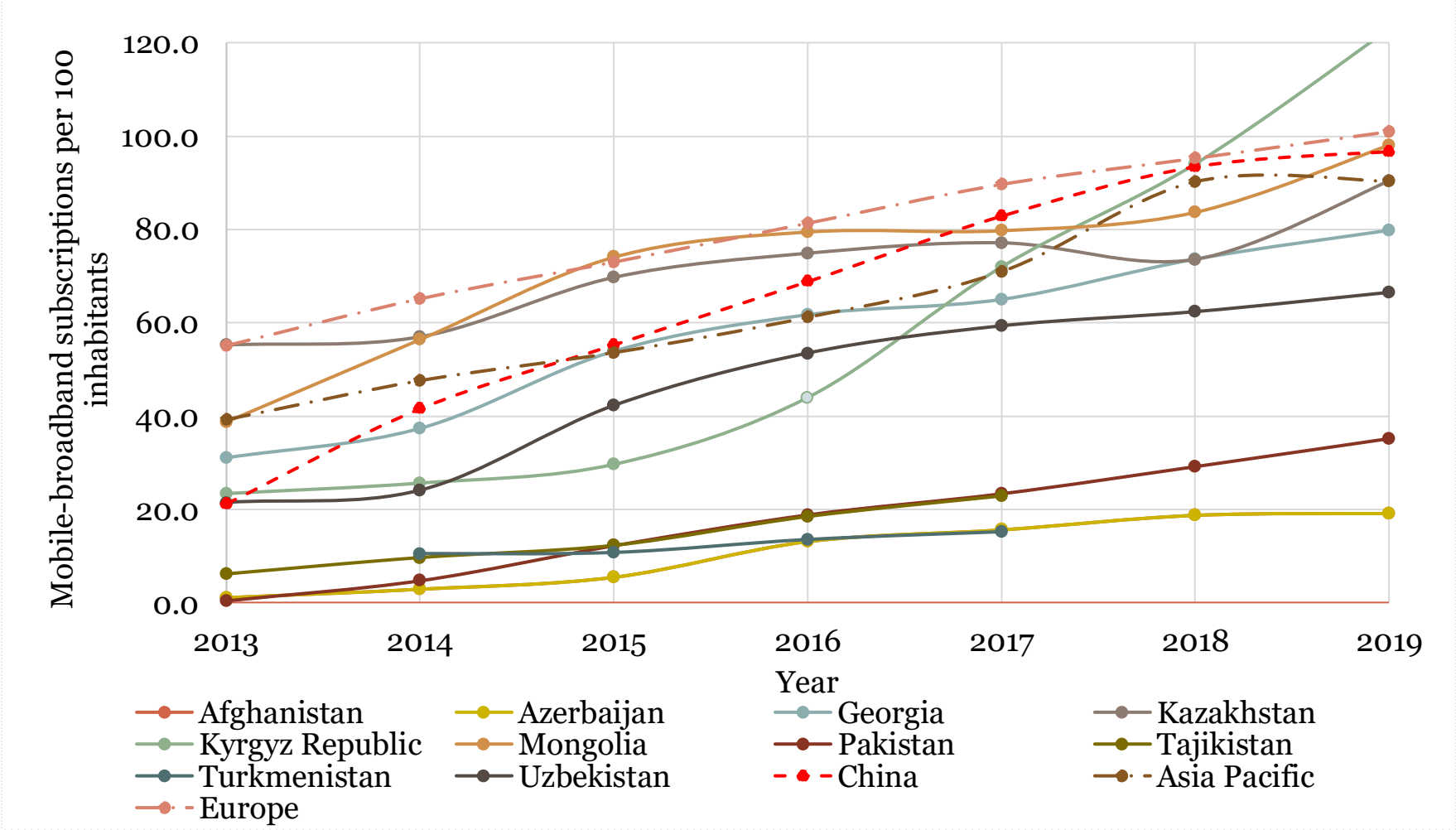

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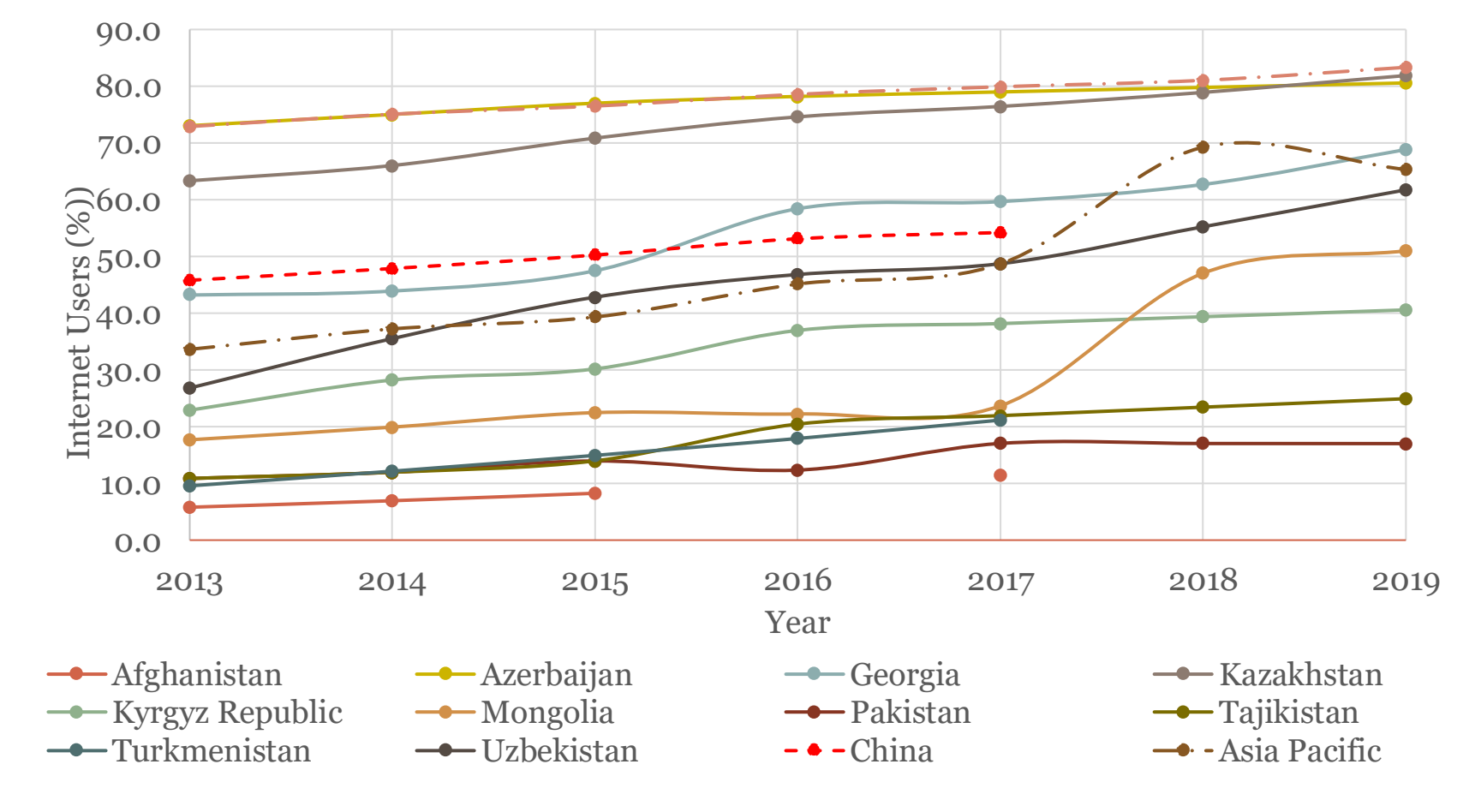

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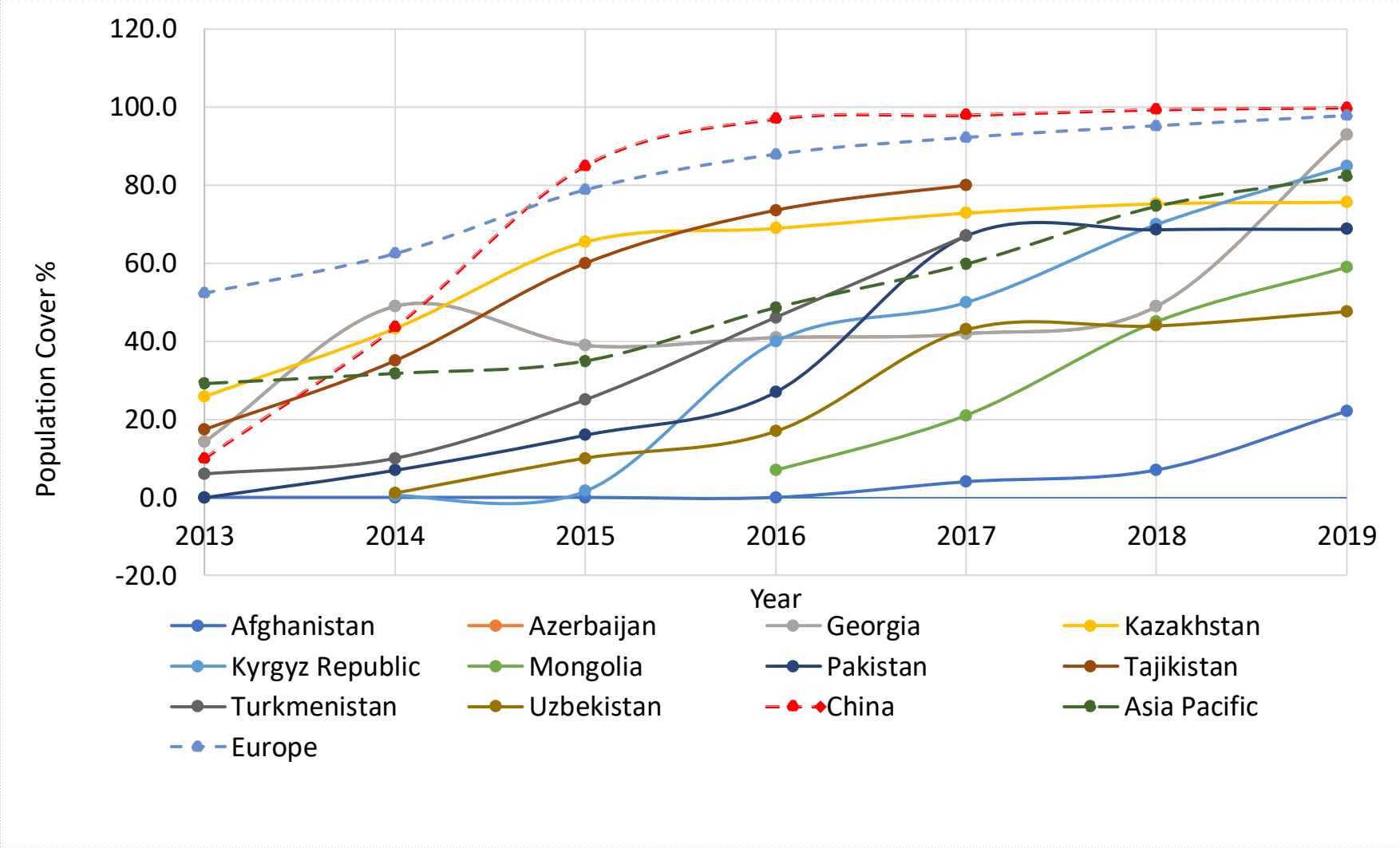
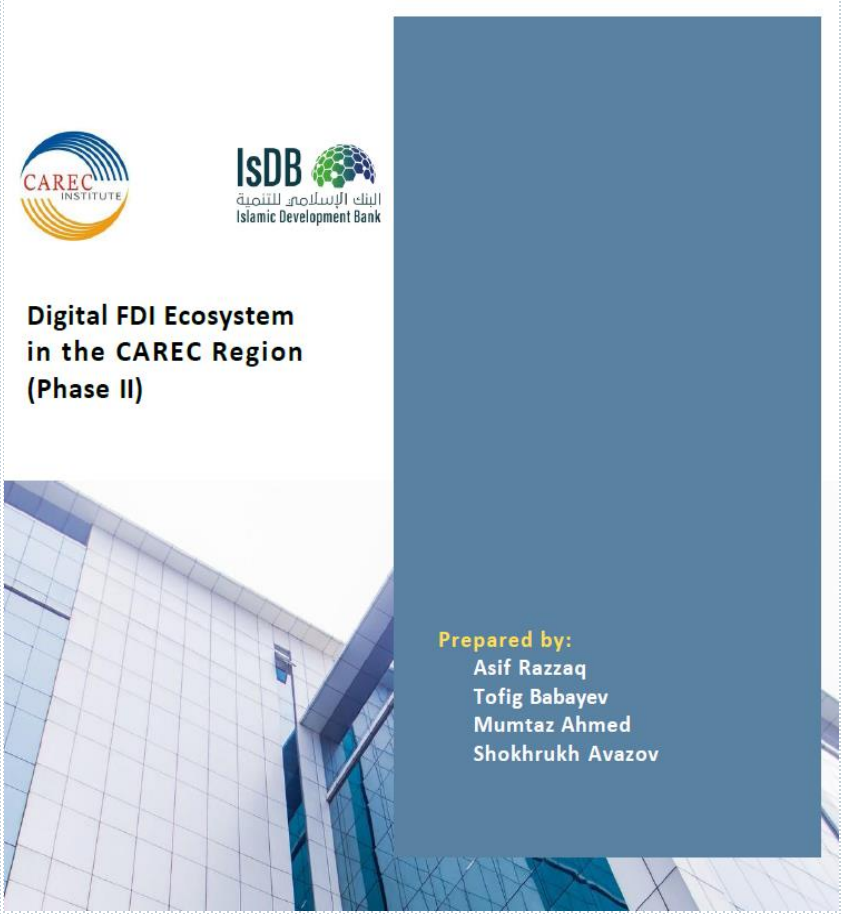


Part 2

Digital FDI Ecosystem in the CAREC Region

It analyses five critical dimensions of digital FDI:
(i) new digital activities
(ii) digital adoption
(iii) digital infrastructure
(iv) digital FDI restrictions
(v) digital promotion tools

The questionnaire was designed following the conceptual framework of the World Investment Report (2017) by UNCTAD, World Economic Forum Trade, and Investment in the Digital Age Report (2020), and OECD's FDI Restrictiveness Index.



https://www.carecinstitute.org/publications/report-on-carec-digital-fdi-ecosystem-in-the-carec-region/

Objectives (Part-2)

- Identification for implementation the most important policies, measures, and regulations such as tax administration (tax incentives/exemptions, and deferral) or FDI restrictiveness (foreign equity restrictions; screening or approval mechanisms; operational restrictions) that governments of CAREC countries can adopt to attract digital investment

- Designed digital investment policy framework (eco-system) considering demand-side factors (for digital investment opportunities), supply-side factors (regulatory requirements and measures that governments can adopt to create digital-friendly investment climates),

- Propose investment policy for the digital economy addresses all three aspects of the digital economy; Digital infrastructure (network operators, internet service providers), Digital firms (local and foreign), Wider digital adoption (Local businesses, public institutions, and governments).

Background and Motivation

- Attracting "digital FDI," or FDI into the digitalization is one of the optimal solution to address digital divide and ensure long term productivity
- Digital economy may require specific policies, regulations, and measures because digital firms have business models that vary from traditional brick-and-mortar businesses
- Digital FDI is more vulnerable to policies, regulations, investment climate, and coordination failures.
- A joint research project of CI and IsDB on Digital CAREC (Phase 1) indicates higher digital divide in Digital FDI, Digital Security, Regulations, Internet Cost, Digital infrastructure, and Internet Quality.

Background and Motivation

- Digital FDI is relatively new and one of the strongest pillars that derive other indicators of digital development. These factors are highly associated, which will derive and be driven by Digital FDI.
- The relevance of digital transformation has increased manifold during COVID-19 due to shifting from physical business operations to a virtual world.
- Microsoft CEO Satya Nadella's sentiment that, as a result of COVID-19, "We've seen two years' worth of digital transformation in two months."
- Integration, maintenance, and support issues in digital transformation.
- Capacity building requires huge capital investment from transmission lines to operating devices or other digital infrastructure along with investment in software's etc. to support business operations.

Conceptual Framework of Digital FDI

- We extend the framework set up in World Investment Report (2017) by UNCTAD, World Economic Forum Trade and Investment in the Digital Age Report (2020), and OECD's FDI Restrictiveness Index (Kaalinova et al. 2010), putting policies, regulations and measures to attract digital FDI into five pillars:

    1. New Digital Activities
    2. Digital Adoption
    3. Digital Infrastructure
    4. Digital FDI Restrictions
    5. Digital Promotion Tools

- Two approaches were adopted to collect the information. First, existing secondary sources, published reports, local/global evaluation indices, regulations, and policy documents.
- Second, interviewed different departments of respective ministries and experts to collect subjective information.
- Each country comprises one comprehensive questionnaire collected from expert interviews, prevailing laws/regulations documents, and other available resources.

Conceptual Framework of Digital FDI

Policies, regulations and measures to attract digital FDI can be divided into 5 categories:

- ***New digital activities, Digital adoption, Digital infrastructure, FDI Restrictions and Digital Promotion Tools***

New Digital Activities
Social / Print Media, Cloud Computing, data centers, etc. and Investors

Digital Adoption
Non-digital businesses into digital technology; telemedicine, mobile banking, e-commerce and Investors

Digital Infrastructure
Robust and reliable physical infrastructure, physical / regulatory aspects and Investors

Digital FDI restrictions
Sectoral restrictions, Restrictions on key foreign personnel, Foreign Equity Limits, Screening and approval of FDI

Digital promotion tools
IT Agreements, incentives, Promotion by government / Private Sector, venture capital

Source: Stephenson (2020), elaborated from UNCTAD (2017)

Methodology: Digital FDI Framework

Dimension	Sub-Indicator	Sub-Indicator
I. New Digital Activities	1.1 Data Privacy and Security	1) Data privacy regulations
		2) Data security regulations
		3) Copyright laws to protect intellectual property
		4) Free flow of cross-border data
		5) Requirements to monitor third-party content
		6) Burdensome data localization requirements
	1.2 Consumers laws	1) Contract law to protect agreements
		2) Consumer protection laws
		3) Laws making e-agreements legal
		4) Ease of registering the company
		5) Ease of receiving a license for digital activities
		6) Ease of registering a property
		7) Consumer law that permits new business models
	1.3 Investors' rights	1) Protecting investors' rights
		2) Access to international arbitration
		3) Intellectual property and copyrights protection
		4) Availability of Bilateral and multilateral investment agreements on the mutual protection of investments
		5) Availability of Double taxation treaties
	1.4 Firm-specific regulations	1) Competition policy and regulations
		2) Burdensome ICT regulations
		3) Requirement for source code disclosure
		4) Regulatory stability and predictability
		5) Regulatory framework (national and local)
II. Digital Adoption	2.1. Support for digital adoption	1) Availability of e-payment services
		2) Level of digital skills in the economy
		3) Support for starting digital businesses
		4) Support for local digital skills development
		5) Support for partnerships with research centers
	2.2 Tariffs and taxes	1) Tariffs on digital inputs
		2) Taxes on digital goods and services
		3) Prevalence of government services
		4) Tax deductions on ICT-related expenditures
	2.3 Independence of ICT regulations	1) Use of international standards
		2) Openness to foreign investment
		3) Strong competition policy and regulations
		4) Independent ICT regulator

Methodology: Digital FDI Framework

Dimension	Sub-Indicator	Sub-Indicator
III. Digital Infrastructure	3.1 Connectivity	1) Level of international connectivity
		2) Level of national connectivity (backbone)
		3) Level of connectivity of urban centers
		4) Level of connectivity of rural areas
	3.2 Availability of Networks	1) 4G mobile network
		2) 5G mobile network
		3) Domestic internet exchange points (IXP)
		4) Domestic data centers
	3.3 Access to infrastructure, finance and manpower	1) Use of international standards
		2) Regional coordination for infrastructure investment*
		3) Availability of skilled local engineers and other workers*
		4) Access to infrastructure, including the ability to share infrastructure
		5) Spectrum rules (e.g., availability, cost)
		6) Access to local finance
		7) Acquisition of land for business purposes
		8) Land ownership is not permitted, but leases possible
	3.4 Ease of receiving visas and licenses	1) Ease of receiving a license for digital infrastructure*
		2) Ease of receiving visas and employing foreign personnel
	3.5 Privatization and taxation	1) Taxes on technology devices and services
		2) Privatization of telecom incumbent
IV. Digital FDI restrictions	4.1 Sectoral restrictions	1) Restriction on print media
		2) Restriction on telecom media
		3) Restriction on social media
		4) Access to webpages
		5) Freedom of expression
	4.2 Restrictions on key foreign personnel / directors	1) Foreign key personnel not permitted
		2) Economic needs test for employment of foreign key personnel
		3) Time-bound limit on employment of foreign key personnel
		4) Nationality/residence requirements for board of directors
	4.3 Other restrictions	1) Restrictions on establishment of branches/local incorporation required
		2) Burdensome restrictions on online content
		3) Prohibition on access to foreign websites
	4.4 Foreign Equity Limits	1) No foreign equity allowed
		2) Foreign equity < 50% of total equity
		3) Foreign equity > 50% but < 100% of total equity
		4) No foreign equity restrictions
	4.5 Screening and approval of FDI	1) Approval required for new FDI
		2) Notification with a discretionary element
		3) No approval required for new FDI
V. Digital promotion tools	5.1 Incentives and promotions	1) Information Technology Agreement
		2) Financial or fiscal incentives
		3) Investment Promotion Agencies/Promotion by government/Private Sector (other than incentives)
		4) Availability of venture capital

Methodology: Digital FDI Framework

The data collection and analysis was undertaken on the various aspects of digital FDI, regulations, policies and investments in digital economy in the CAREC countries. The list of interviewees included:

1. Tax/Fiscal Ministry or corresponding divisions of the Ministry of Finance;
2. Ministry of Economy (Trade);
3. National (Central) Bank;
4. Ministry of Information Technologies and (Tele) Communications;
5. State Frequency Authority / Media Regulatory Authority;
6. State Statistical Authority
7. ICT Regulator;
8. Chambers of Trade and Commerce;
9. Business associations and organisations;
10. Law/consulting firms.

The data was collected from Government officials, financial bodies and relevant ministries including taxation, investment and chambers of commerce.

Methodology: Digital FDI Framework

- A six point scale is used to evaluate the collected data (0-5 lower to highest), each of which is further divided into quarters (i.e., 2, 2.25, 2.50, 2.75) to get the precise score.
- The scores for each indicator and total scores are then transformed to a 0-100 (lowest to highest) scale and the results are visualized in graphs, radars, and charts.
- A comparison between all CAREC countries, within and across each element considered in each of the five key dimensions mentioned above.

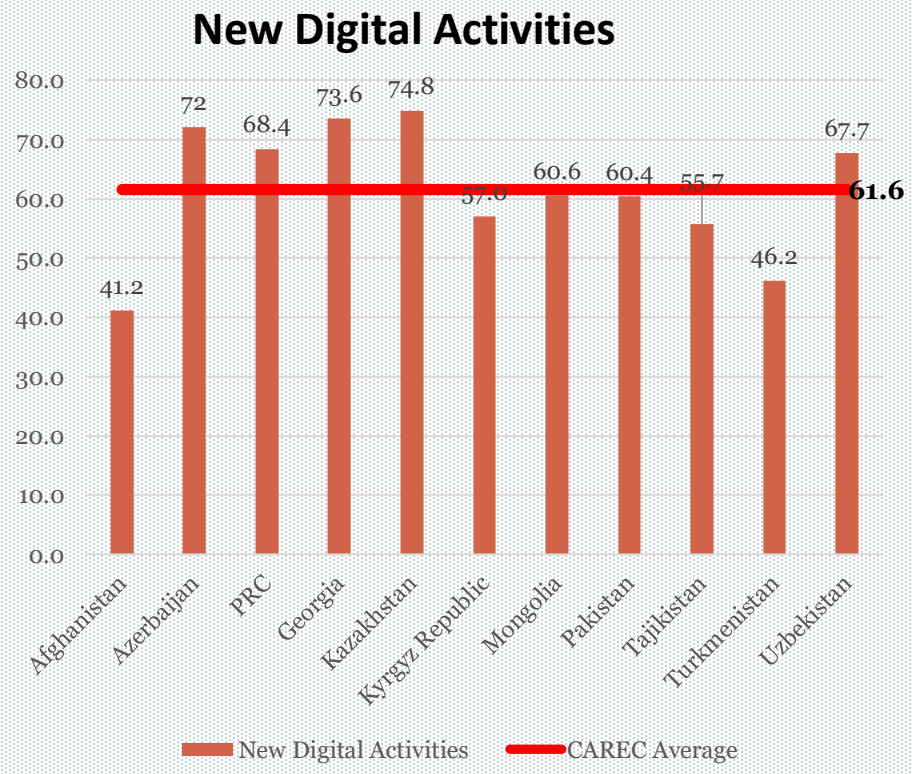
Scores	0	1	2	3	4	5
	0	1-20	21-40	41-60	61-80	81-100
Indicators	Fully Restricted	Certain Restrictions	Major Restrictions	Moderate restrictions	Minor limitations/ restrictions	No Restrictions

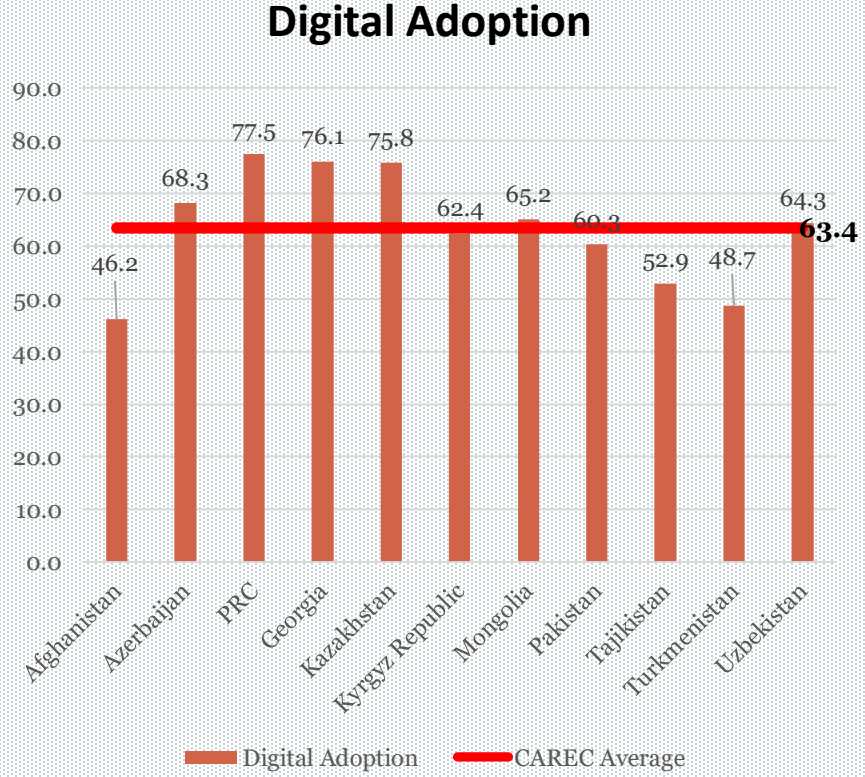
Key Findings

The most important sub-indicators in each of the 5 segments were selected, and results were scaled between 0 to 100 (lowest to highest) for a comparable outcome. The overall score of the Digital FDI Framework is estimated using the average score of these 5 pillars.

Average Indicators	New Digital Activities	Digital Adoption	Digital Infrastructure	Digital FDI Restrictions	Digital Promotion Tools	Digital FDI Framework
Afghanistan	41.2	46.2	44.0	44.7	51.0	45.4
Azerbaijan	72.1	68.3	64.8	76.3	55.0	67.3
PRC	68.4	77.5	73.5	60.6	85.0	73.0
Georgia	73.6	76.1	63.0	79.2	82.5	74.9
Kazakhstan	74.8	75.8	67.5	68.5	85.0	74.3
Kyrgyz Republic	57.0	62.4	53.8	67.1	72.5	62.6
Mongolia	60.6	65.2	62.9	68.9	66.0	64.7
Pakistan	60.4	60.3	61.5	67.7	50.0	60.0
Tajikistan	55.7	52.9	54.7	58.8	70.0	58.4
Turkmenistan	46.2	48.7	44.3	47.4	41.0	45.5
Uzbekistan	67.7	64.3	66.0	68.3	55.0	64.3
CAREC Average	**61.6**	**63.4**	**59.6**	**64.3**	**64.8**	**62.8**

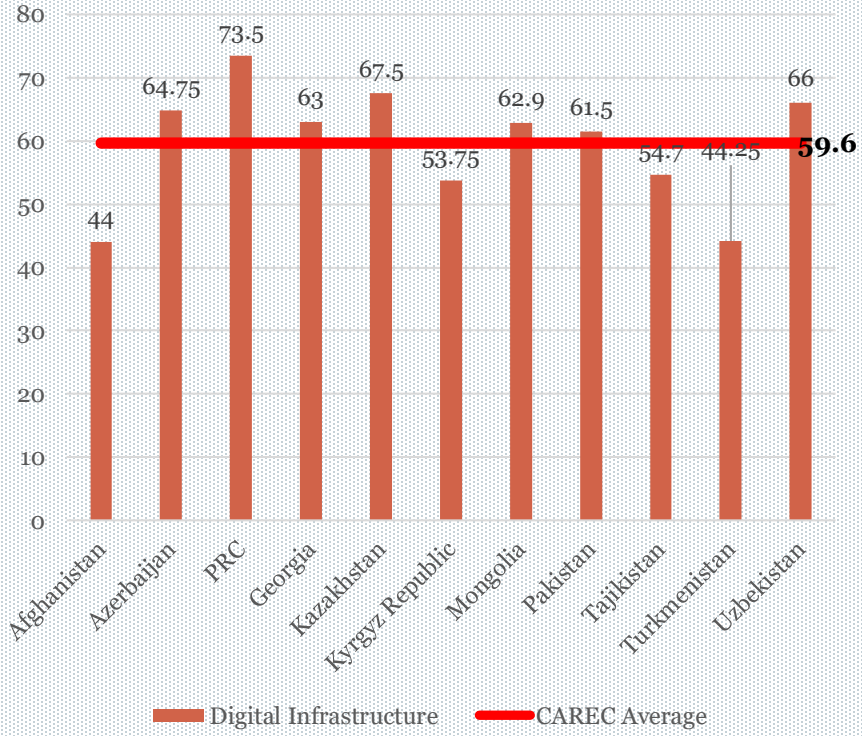
Key Findings



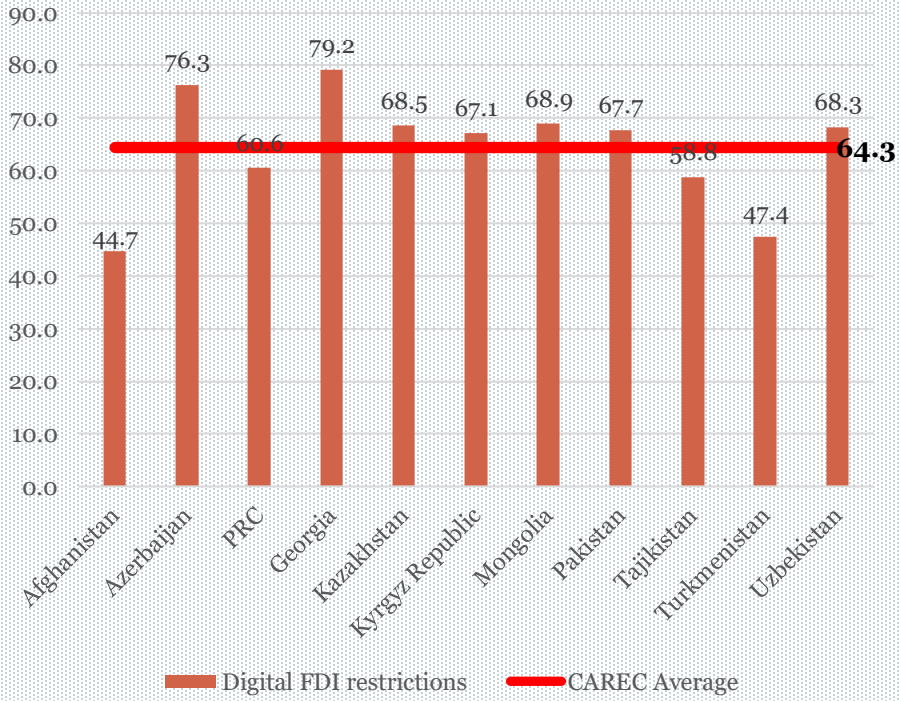


Key Findings

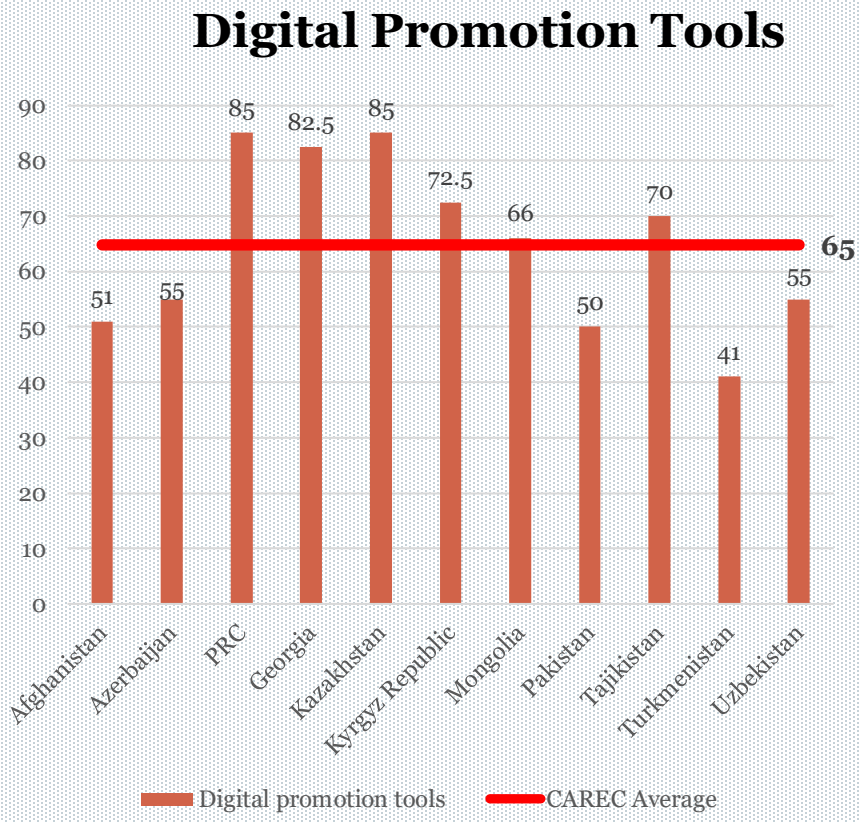
Digital Infrastructure

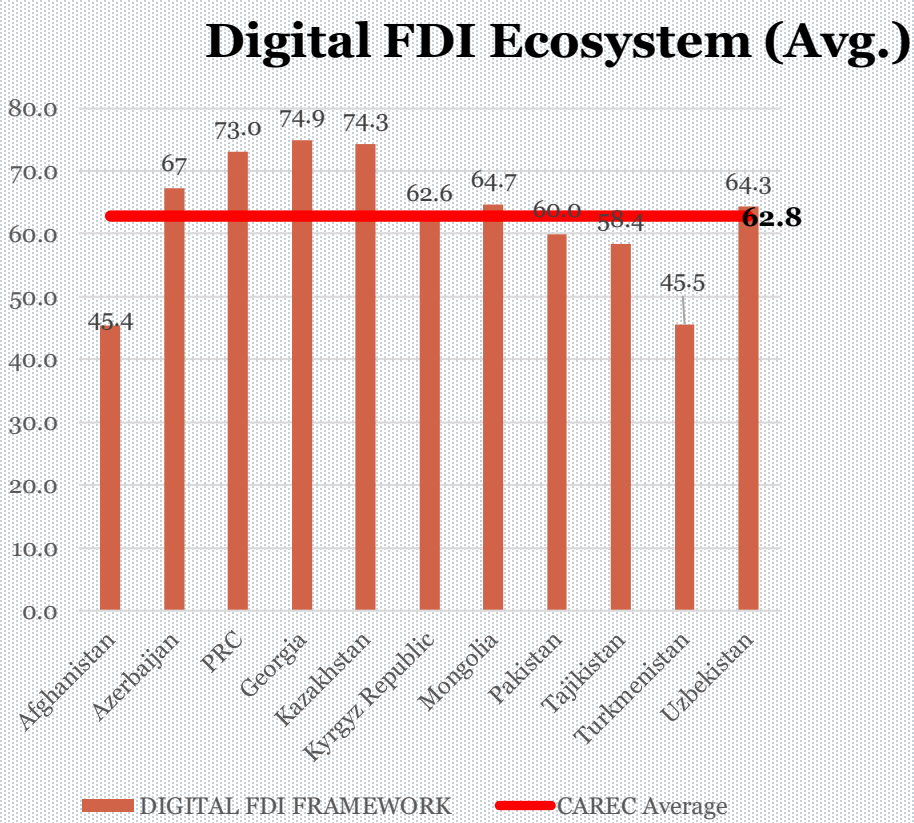


FDI Restrictions



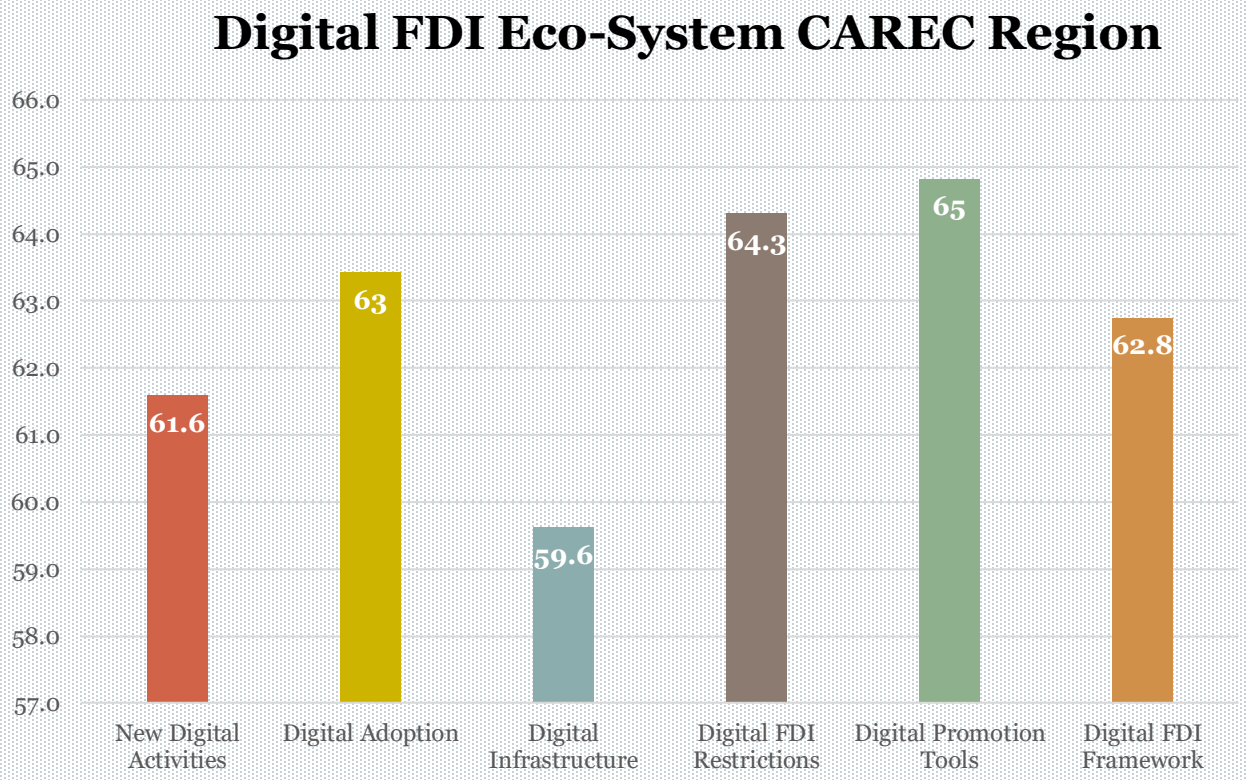
Key Findings





- Georgia (74.9), Kazakhstan (74.3), and PRC are leading CAREC counties in terms of a conducive Digital FDI environment.
- Azerbaijan (67), Mongolia (64.7), Uzbekistan (64.3), Kyrgyz Republic (62.6), and Pakistan (60) report moderate scores in Digital FDI Eco-system.
- Tajikistan (58.4), Turkmenistan (45.5), and Afghanistan (45.4) display the lowest scores than CAREC regional average (62.8).

Key Findings



- **Digital infrastructure** has the lowest score due to lower rural connectivity, lack of 5G networks, domestic data centers, and exchange points, Access to infrastructure, finance and manpower, and privatization policies
- **Digital Adoption** is lower due to issues in data privacy and security, firm-specific regulations, and consumer laws

Policy Recommendations

Digital Infrastructure

- Digital infrastructure is a basic foundation of the digital divide on which subsequent gaps formed. Thus, expansion of internet (4G) coverage across the whole territory and test the launch of 5G networks. For this, Public-Private Partnership is an optimal solution to fund and manage infrastructure expansion projects. Afghanistan, Turkmenistan, Mongolia, Uzbekistan, and Pakistan are falling behind their peer countries in 4G network coverage. Although the gap is squeezing, however, needs substantial investment to speed up the process.
- Government needs to allocate dedicated funds or subsidize ICT industries to develop business-oriented infrastructure for e-commerce development. i.e., transmissions lines, network stations, and compatibility with the existing digital network (All countries).
- Establish backbone networks, Internet exchange points, data centers, and the cloud (All countries).
- Replace conventional cable-based transmissions with fiber optic to increase internet (upload/download) speed (Mbps) (Afghanistan, Pakistan, Tajikistan).
- Encourage Multinational firms to invest in the (digital FDI) ICT sector by offering lucrative tax rebates and swift approvals for new ventures from respective ministries through one-window operations (All countries).

Policy Recommendations

Internet access

- Weak access and infrastructure are the most vulnerable segment of the digital divide, which requires a substantial amount of fixed asset investment from domestic and foreign sources. It also relies upon consumer buying capacity, basic education, and skills to learn, adapt and utilize IOTs. Afghanistan, Pakistan, Tajikistan, Kyrgyz Republic, Uzbekistan, and Mongolia have a higher divide in internet access and infrastructure, which entails effective government intervention to tackle.
- Increase the access to computers at the household level. For this, financial institutions may offer consumer loans and provide computers, laptops, smart phones, printers in easy installments. Besides laptops and computers, ICT equipment can be zero-taxed to decrease retail prices or promote local assembling.
- Introduced lucrative household internet packages. Particularly in those areas, where exiting digital infrastructure is underutilized as a major cost of internet service providers has pertained to fixed capital investment.
- Conduct wide awareness-raising campaigns to:
  - Educate people (consumer and businesses) on the use of the Internet, online services, payment procedures, make online transactions, and enable trust in virtual trading.
  - Increase the level of public confidence in digital transactions
- Review and reduce Internet tariffs to increase Internet usage and number of active Internet users.

Policy Recommendations

Internet Cost and Affordability

- Regularization of internet cost (less than 2 % threshold of Gross National Income) as per target of UN Broadband Commission. Notably, the cost of the internet is too high in Afghanistan, Kyrgyz Republic, Pakistan, Tajikistan, Turkmenistan, and Uzbekistan. In CAREC regions, only China, Georgia, and Azerbaijan are exceptional countries where internet costs are within the accepted threshold.
- Sales tax waiver for consumers on recharge of mobile and broadband internet packages can help to reduce internet cost.
- A national blanket policy for affordable internet is required to achieve low-cost internet targets.

Policy Recommendations

Digital Payments

- Ensure the wide range of major payment methods used worldwide to sell and pay for goods on the major marketplaces (All countries).
- Strengthen the legal framework for cashless payments, implement programs and marketing campaigns to increase the volume of cashless payments (All countries).
- Increase the use of digital technologies in social spheres (All countries).
- Introduced the drive of virtual economy across the whole supply chain (manufacturing, wholesaling, retailing), where each transaction pair will be connected through a digital framework.
- Government may follow the famous quote “charity begins with home” to expand digital penetration by restricting all public offices to make virtual payments, documents submissions, clearance of contracts, salaries disbursements, financial appraisals, claims, etc.

Policy Recommendations

eCommerce

- Develop a dedicated eCommerce framework (development strategy, programs) aligned with SDG 9c (All countries).
- Support funding for startups and small businesses especially engaged in e-trade activities (All countries).
- Developing a digital e-commerce platform meeting the international standards for cross-border trade (All countries).
  - Return of goods purchased online
  - Introduce e-court system in charge of e-trade disputes
- er protection issues (All countries):
- Further development of e-commerce infrastructure:
  - Implementation of the pilot project EU4Digital Virtual warehouse in CAREC countries to develop cross-border trade between CAREC and European countries.
  - Make appropriate measures in legislation to ensure the use of international payment methods and cards (All countries).
- Introduce cross-border electronic data exchange between customs agencies (Kyrgyzstan, Tajikistan, Uzbekistan)
- Introduce “green transport corridor” system/approach (Afghanistan, Uzbekistan).
- Ensure the use of digital services, especially e-signature for cross-border transactions All countries except for Azerbaijan)

Policy Recommendations

Digital Security

- On legal grounds, cyber security regulations need to be implemented and updated regularly. Most of the CAREC countries secured the lowest score in digital security. Particularly, Afghanistan, Kyrgyz Republic, Mongolia, Tajikistan, Turkmenistan are the most vulnerable countries in e-Commerce safety, trust in government websites and apps, trust in information from social media, trust in non-government websites and apps, and trust in online privacy. Therefore, it is recommended an inclusive digital security policy that adheres to all of these concerns.
- On technical grounds, Increase the number of secured internet servers.
- At the organizational level, implementation of the company's cyber security framework.
- Established dedicated hierarchy of cyber security under IT ministry for evaluations.
- Increase awareness of cyber security to control scams, hacking, and digital frauds.
- Public-Private Partnership is imperious in designing and implementing national cyber security framework and their implementations.

Policy Recommendations

Regulations and governance

- The CAREC region is more susceptible to overall regulations and governance. None of the country secured a positive score in the institutional regulation index (-2.5 + 2.5 worse to best) except Gregoria. Afghanistan, Turkmenistan, Tajikistan, Pakistan, Uzbekistan, Kyrgyz Republic, and Azerbaijan have the poorest institutional quality and business regulations, thus failing to create a conducive environment for individuals and businesses to adopt and disseminate digital technologies.
- Encourage conducive environment for individuals and businesses through:
  - Efficient legal system and property rights protection.
  - Consistent policies and inclusive digital regulations for the continuation of long-term digital development.
  - Legal provision for continuation and implementation of digital development projects.
  - A certain percentage of the annual public budget may allocate to digital infrastructure and access across underdeveloped (rural) and digital backward areas and industries.

Policy Recommendations

Regional Integration

- Regional integration is one of the imperious factors that help countries overcome divisions that impede the flow of people, technology, ideas, goods, and services. Disintegration leads to a higher digital divide, particularly in developing economies. Thus, sequester measures are required to integrate CAREC countries with other technology leading countries. For this, harmonization of regulatory policies is a stepping stone to promote and establish an inclusive connectivity network for virtual and physical technology transfer.
- Regional integration helps to increase export diversification through technology spillovers from source to host countries. Most CAREC countries are less diversified, embodied with lower technological levels, operating at lower-end economic models, a heavy reliance on natural resources, and exports of primary products. Therefore, regional integration in trade, investment, connectivity, institutional, and social aspects help to remove these bottlenecks, leading to higher technology spillovers from technology leaders and resultantly lower digital backwardness.

Policy Recommendations

•Drivers of Digital FDI:
Firm location, competitiveness, and investment motives, alongside digital regulation, data privacy, security, and adoption.

•Policy Alignment:
Standardizing digital regulations to attract foreign tech firms.

•Venture Capital Growth:
Build a favorable investment climate, legislative framework, and support entrepreneurship.

•Regional Cooperation:
Strengthen North-South & South-South partnerships for digital FDI.

•FAANG & Digital Economy:
Align ICT regulations on data privacy, security, and IP rights

Policy Recommendations

•Political & Technological Integration:
Facilitates investment dispute resolution, reduces FDI restrictions, and aligns ICT trade agreements.

•Social & Cultural Integration:
Reduces restrictions on FAANG and enhances digital economy opportunities.

•Regional Investment Promotion:
Establishes a one-window platform for business expansion in CAREC countries.

•Governance & Regulation:
Strong governance is essential for policy implementation and investment climate.

•Investment Approvals:
Bureaucratic delays and corruption hinder digital FDI projects. Streamlined approval processes are needed.

FDI Restrictiveness Index (OECD)

FDI Regulatory Restrictiveness Index 2019 for selected CAREC countries

Sector/Industry	Azerbaijan	PRC	Kazakhstan	Kyrgyz Republic	Mongolia	Russia	Tajikistan	Uzbekistan
FDI Regulatory Restrictiveness Index	**0.077**	**0.214**	**0.113**	**0.137**	**0.072**	**0.262**	**0.12**	**0.068**
Primary	0.043	0.342	0.215	0.215	0.093	0.212	0.228	0.04
Agriculture & Forestry	0.05	0.113	0.29	0.35	0.1	0.18	0.425	0.06
Agriculture	0.05	0.176	0.29	0.525	0.1	0.255	0.8	0.06
Forestry	0.05	0.05	0.29	0.175	0.1	0.105	0.05	0.06
Fisheries	0.06	1	0.04	0.055	0.06	0.155	0.03	0.02
Mining & Quarrying (incl. Oil extr.)	0.01	0.14	0.24	0.105	0.11	0.332	0.03	0.02
Secondary	0.017	0.077	0.04	0.059	0.064	0.15	0.03	0.029
Manufacturing	0.01	0.071	0.04	0.06	0.06	0.163	0.03	0.023
Food and other	0.01	0.064	0.04	0.08	0.06	0.155	0.03	0.033
Oil ref. & Chemicals	0.01	0.06	0.04	0.055	0.06	0.072	0.03	0.02
Metals, machinery and other minerals	0.01	0.05	0.04	0.055	0.06	0.155	0.03	0.02
Electric, Electronics and other instruments	0.01	0.06	0.04	0.055	0.06	0.168	0.03	0.02
Transport equipment	0.01	0.12	0.04	0.055	0.06	0.263	0.03	0.02
Electricity	0.01	0.085	0.04	0.055	0.06	0.085	0.03	0.07
Electricity generation	0.01	0.12	0.04	0.055	0.06	0.065	0.03	0.12
Electricity distribution	0.01	0.05	0.04	0.055	0.06	0.105	0.03	0.02
Construction	0.06	0.1	0.04	0.055	0.085	0.155	0.03	0.02
Tertiary	0.128	0.254	0.122	0.158	0.07	0.351	0.139	0.104
Distribution	0.01	0.075	0.04	0.08	0.06	0.155	0.03	0.024
Wholesale	0.01	0.075	0.04	0.08	0.06	0.155	0.03	0.02
Retail	0.01	0.075	0.04	0.08	0.06	0.155	0.03	0.028
Transport	0.079	0.395	0.09	0.188	0.171	0.455	0.18	0.041
Surface	0.035	0.05	0.04	0.08	0.06	0.455	0.03	0.02
Maritime	0.148	0.385	0.09	0.055	0.06	0.155	0.03	0.045
Air	0.054	0.75	0.14	0.43	0.393	0.755	0.48	0.058
Hotels & restaurants	0.01	0.05	0.04	0.055	0.06	0.205	0.055	0.028
Media	0.46	0.985	0.553	0.33	0.06	0.538	0.53	0.395
Radio & TV broadcasting	0.61	1	0.565	0.555	0.06	0.655	0.53	0.52
Other media	0.31	0.97	0.54	0.105	0.06	0.422	0.53	0.27
Communications	0.01	0.733	0.14	0.055	0.06	0.155	0.03	0.02
Fixed telecoms	0.01	0.75	0.24	0.055	0.06	0.155	0.03	0.02
Mobile telecoms	0.01	0.715	0.04	0.055	0.06	0.155	0.03	0.02
Financial services	0.207	0.05	0.118	0.087	0.06	0.495	0.127	0.095
Banking	0.285	0.05	0.14	0.1	0.06	0.48	0.163	0.195
Insurance	0.31	0.05	0.14	0.105	0.06	0.8	0.155	0.07
Other finance	0.027	0.05	0.075	0.055	0.06	0.205	0.063	0.02
Business services	0.16	0.225	0.04	0.298	0.06	0.28	0.273	0.265
Legal	0.51	0.75	0.04	1	0.06	0.655	1	1
Accounting & audit	0.01	0.05	0.04	0.08	0.06	0.155	0.03	0.02
Architectural	0.06	0.05	0.04	0.055	0.06	0.155	0.03	0.02
Engineering	0.06	0.05	0.04	0.055	0.06	0.155	0.03	0.02

Source: CAREC Institute, Digital FDI Ecosystem in the CAREC Region(2023) retrieved from OECD Statistics (zero implies no restrictions, while one indicates entirely restricted)

Tariff Rates in CAREC

Tariff rate, applied, weighted mean, all products (%)

Country	2016	2017	2018	2019	2020
Pakistan	10.09	-	9.45	8.69	8.67
Azerbaijan	-	-	-	11.98	5.93
Mongolia	-	5.52	5.26	5.31	5.3
Tajikistan	5.7	4.98	-	-	3.93
Uzbekistan	-	-	-	-	2.63
China	3.54	3.83	3.39	2.53	2.47
Kyrgyz Republic	3.16	2.93	2.92	3.09	2.33
Kazakhstan	2.55	2.39	2.37	2.32	1.96
Georgia	0.67	-	-	-	0.21
Afghanistan	-	-	5.63	-	-
Turkmenistan	-	-	-	-	-
CAREC Average	**4.29**	**3.93**	**4.84**	**5.65**	**3.71**

E-Governance

E-Government Development Index (EGDI) 2020

Rank	Country	EGDI Level	EGDI 2020	Online Service Index	Telecomm. Infrastructure Index	Human Capital Index
29	Kazakhstan	Very High EGDI	0.84	0.92	0.70	0.89
45	China	Very High EGDI	0.79	0.91	0.74	0.74
65	Georgia	High EGDI	0.72	0.59	0.69	0.87
70	Azerbaijan	High EGDI	0.71	0.71	0.65	0.77
83	Kyrgyz Rep.	High EGDI	0.67	0.65	0.59	0.79
87	Uzbekistan	High EGDI	0.67	0.78	0.47	0.74
92	Mongolia	High EGDI	0.65	0.53	0.61	0.81
133	Tajikistan	Middle EGDI	0.46	0.32	0.35	0.73
153	Pakistan	Middle EGDI	0.42	0.63	0.24	0.38
158	Turkmenistan	Middle EGDI	0.40	0.18	0.36	0.68
169	Afghanistan	Middle EGDI	0.32	0.41	0.18	0.37
CAREC Average			**0.60**	**0.57**	**0.55**	**0.69**
Region / Grouping		**EGDI Level**	**EGDI**	**Online Service Index**	**Telecomm. Infrastructure Index**	**Human Capital Index**
Africa		Low EGDI	0.39	0.37	0.32	0.49
Americas		High EGDI	0.63	0.58	0.58	0.75
Asia		High EGDI	0.64	0.62	0.59	0.70
Europe		Very High EGDI	0.82	0.77	0.82	0.87
Oceania		Middle EGDI	0.51	0.42	0.39	0.73
World			**0.60**	**0.56**	**0.55**	**0.69**

Limitations and Future Directions

Although this study attempts to estimate possible dimensions of digital divide in selected countries, however there are following limitations that can be considered for future projects/studies:

- The study was conducted within a limited time and due to higher stringency measures and limited data availability, only selected CAREC countries are evaluated. Future projects may expand to all CAREC countries and a comparative analysis would be performed with digitally advanced countries.
- Although the questionnaire included over 80 questions in multiple domains, however, only 37 of them were collected for digital gap assessment. Future studies may consider those remaining uncollected indictors or introducing new indicators (replacing some indicators) to fully reflect the digital gap situation in CAREC region.
- Digital divide is a multidimensional phenomenon and includes various dimensions and socio-economic indicators that are not evaluated in this study, such as poverty, income inequality, gender inequality, household income, human capital development, budgetary allocations in ICT sector, R&D allocations, global FDI in ICT industry, education and skills level of inhabitants, and taxation policies of ICT sector etc. Therefore, future projects may expand the cumulative digital divide index considering new dimensions of digital divide.

Limitations and Future Directions

- This study is estimated digital divide using national level aggregate indicators and do not incorporate digital gap within a country considering income inequality, gender inequality, and rural urban inequality. Future projects may study sub-national or regional digital differences within a country based on suggested indicators.
- It would be advisable to provide an instrument (program) implementing the proposed method (for questionnaire data processing and cumulative digital divide index) so that this would not be a single-use study but could be used when new data is acquired (for example, next year), and so that the list of sub-indicators could be altered and new indicators could be taken into account if necessary. Moreover, the proposed digital divide index can be estimated yearly to evaluate the increase or decrease in digital development.

Thank You!