

China-Pakistan Economic Corridor, ICTs, and Digital Economy: A Cross-District Analysis of Baseline Data for Gilgit-Baltistan

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Abstract

In the fast digitizing world, the Information and Communication Technology (ICT) is pivotal for providing greater, efficient, and easier access to many basic services in the everyday life. In the era of globalization, ICT also provides opportunities for self-employment and income generation. It has the potential to pull many isolated regions out of poverty and it provides opportunities. In regard, the purpose of the research is to highlight the current status of ICT usage and infrastructure across various districts in Gilgit-Baltistan. It is anticipated that the installation of fiber optic cable from China to Pakistan along the CPEC route will connect Gilgit-Baltistan to the rest of the world by high speed internet. Using the baseline information, we explore the current ICT related challenges and opportunities, which will help developing an ICT framework for Gilgit-Baltistan in order to take advantage of the opportunities that CPEC promises.

Key Words: Access to Computer, Access to Internet, ICT Usage, Mountain Regions

Introduction

Information and Communication Technology (ICT) is defined as “tools and as well as means used for collection, capture, process, storage, transmission and dissemination of information”. In the most cases, computers are used for data processing and storage, while telecommunications technology offers information exchange tools that allow users to access and connect databases with other computer networks at different locations. In the fast digitizing world, ICT plays a pivotal role in connecting nations as well as impacting the lives of millions of poor people around the world. Many nations including Pakistan are now focusing on digital innovation as a tool of enhancing productivity and growth. Its major role for developed nations as a catalyst for enhancing industries efficiency and productivity, is well recognized (Cecchini & Scott, 2003; Dzidonu, 2010; Richard, 2010; Sife, Kiondo, & Lyimo-Macha, 2010; Souter & Kelly, 2013; Toluyemi & Mejabi, 2011).

In addition to its central role, it makes it possible for all the segments of society to have better access to the basic services and enhances the manner in which these basic services (e.g., schooling, health care and finance) are provided to people (Goswami, 2014).

According to the ‘World Development Report’ overcoming poverty depends crucially on increasing opportunity, enhancing empowerment, and improving security. Opportunity helps markets work for poor people and increases their assets. In addition, empowerment strengthens the role of state institutions for poor people and eliminates social barriers. Furthermore, provision of security is related to risk management (Wade & Hunter, 2001).

Considering the changing dynamics of development due to CPEC in rural areas of Pakistan in general and Gilgit-Baltistan in particular, it is obvious that ICT — described as a collection of activities facilitating the recording, storage, production, dissemination and visualization of information by electronic means — can be used to support poverty alleviation initiatives and possibilities (Alam, Li, & Baig, 2019; Atif Shan Makhdoom,

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Dr. Aisha Bashir Shah, 2017; [Duncombe, 2006](#); [Rehman, Hakim, Khan, & Khan, 2018](#)). Using ICT systems, will boost opportunities for people by increasing access to markets, health and education. In addition, ICT will improve society more effectively by extending the use of government services and. increasing access to microfinance, reducing economic and financial risks ([Hussain, 2014](#); [Rao, 2004](#)).

Due to connectivity constraints, Gilgit-Baltistan (GB) remains isolated from the rest of the country ([Farooq Zain, 2010](#)). For instance, flight services are subjected to weather conditions and the only one surface road, Karakoram Highway (KKH), connecting the region to rest of the country. Consequently, it makes market accessibility difficult for local producers. The low bandwidth/speed internet and unavailability of 3G/4G services limits the prospects of e-commerce and e-business as well as online or internet-based employment opportunities. However, the installation of optical fibre cable network across GB under the China Pakistan Economic Corridor (CPEC) heralds a positive change. However, getting advantage of the optical fibre network and its utilization for the poverty reduction is conditional on proper planning and dissemination of reliable information to public regarding the opportunities it provides. It's also important to highlight the need for IT skilled human resource to make the youth of the area . to get benefits of the arising opportunities.

Objectives

As a baseline, this paper outlines the current status of ICT infrastructure across the districts in Gilgit-Baltistan. On the basis of this study, policymakers could design training initiatives to enhance the technical skills of the aspirant labor force. As noted earlier, ICTs have the potential to reduce poverty in the mountainous region by creating opportunities for the youth and women. In this scenario, the current research aims:

1. To gather baseline information for the ICT that will be helpful in promoting and developing an integrated ICT framework for Gilgit-Baltistan.
2. To find out the gaps in the existing ICT infrastructure in the Gilgit-Baltistan.
3. To suggest policy recommendations for improvement, promotion and diversification of livelihood opportunities through identification of ICT related employment opportunities.

Keeping in view at aforementioned objectives: the analysis of the baseline data revolves around these questions. First, what are the specific challenges faced by mountain community regarding usage and existing infrastructure of ICT. Second, what are the expectations and the level of awareness among mountain community about direct or indirect benefits and opportunities of optical fibre? Third, what is the level of preparedness among the aspirant labor force to take advantage of these benefits. Finally, the research identifies required skills, gaps, trainings, for ICT-enabled opportunities.

Materials and Methods

Study Area

Gilgit-Baltistan (GB) is located in the extreme north of Pakistan ("[Government of Gilgit-Baltistan,](#)" n.d.). Strategically located at the cross-roads of High-Asia, borders with China, India, Afghanistan, Azad Kashmir, and Khyber-Pakhtunkhwa province of Pakistan. GB covers an area of 72,9,71 Square Kilometers and is mountainous which is highly vulnerable to natural disasters and hazards, e.g., land sliding, floods, etc. Population of the area is 18,00,000 and most of the people depends on agriculture, trade, and government jobs for their income. In the recent years, the area came into limelight again due to the initiation of CPEC project as it provides the only geographical highway to connect Pakistan with China.

GB is divided into 10 administrative districts. The Karakoram Highway is the main artery, connecting Pakistan with China that passes through four districts of GB: Hunza, Nagar, Gilgit, and Diamer as shown in figure 1. As the Optical Fibre Cable is installed through the four districts. Gilgit-Baltistan has seen drastic changes in recent decades from an agro-pastoral society to the age of information ([Khan, Najam Ul Hassan, Baig, Khan, & Muhammad, 2019](#); [Saranjam Baig, Aftab Ahmed Khan, Amjad Ali Khan, 2019](#)). In 1894, British built the first telegraph line from Sirinagar to Gilgit to protect its northern borders against the expansion of Russia. Radio Pakistan set up its first broadcasting stations in Gilgit and Skardu almost a century ago. In the late seventies, the [Special Communication Organization \(SCO\)](#) introduced its telephone services in the Gilgit and

Skardu regions followed by the first television broadcast in 1987. ComSATS Internet Service Provider (ISP) launched its first services in 2001 to connect this remote region to the rest of the world through ICT. During the 2004 revolutionizing means of communication, [Special Communication Organization](#) (“[Special communication Organization :: Official - SCO,” n.d.](#)) launched its first cellular services in Gilgit-Baltistan.

Five cellular companies are currently providing services in Gilgit-Baltistan's isolated and far-flung areas. 46 Electronic exchanges operating in the area with installed capacity of 36,896. The first ever private radio network was founded in 2011, 'FM-99 Gilgit-Baltistan.' In 9 districts of Gilgit-Baltistan, 68 cable operators broadcast national and international channels. 13 Local newspaper , various web-based news portals and social media platforms provide the masses with daily news and information. By 466 KM of optical fiber Gilgit-Baltistan is connected to the worldwide web ([“Institutional Framework of CPEC | China-Pakistan Economic Corridor \(CPEC\) Official Website,” n.d.](#)). Work is completed on \$44 million Pakistan-China Optical Fiber Project that was laid 820 KM of cable from Rawalpindi to Khunjarab (CPEC, 2017). The project would give Pakistan and China an alternate telecommunications path. It is claimed to help in bringing new technologies to the GB.

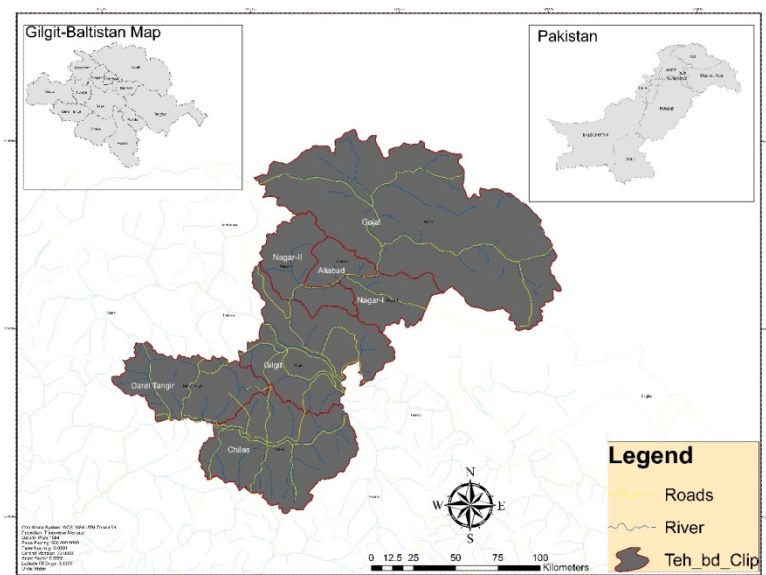


Figure 1. Study area of four districts of Gilgit-Baltistan (Hunza, Nagar, Gilgit, and Chilas).

Methods and Data Description

Sampling

Clustered-stratified sampling technique was used to select the desired sample size from the sample population in four selected districts of Gilgit-Baltistan. The sample size was calculated using confidence level of 95% and margin of error ± 5 .

Data

A mixture of quantitative and qualitative methods was used for data collection. The quantitative sample has a size of 569 individuals representing unique household. The sample size is selected based on 3% of total number of households of each village. The source of population of each village is from Government of Pakistan's flagship poverty reduction program (Benazir Income Support Program). The major tool for data collection was individual survey and Focus Group Discussions (FGDs). Survey questionnaire has two parts; first was about ICT profile of each village and second part was focused to determine usage of ICT at household and individual level.

The purpose of FGD is to determine the awareness, perceptions and expectations of public regarding ICT initiatives of CPEC.

For data collection from the field, a group of 5 enumerators (all of them are graduate persons) was identified and trained in using the questionnaire and village profile. After the training, the questionnaire was tested, and another session was held to refine the tool. The team was then sent to the field for data collection under the guidance of four field supervisors. A total of 569 respondents participated in the study besides one FGD in each district. The data from the field are organized in Excel and after punching, sorting, and cleaning; the findings took shape of table and graphs. The characteristics of each village selected for the survey are recorded by means of a questionnaire for the village profiles through a process of main informant interviews with the representatives of the village authorities.

Results and Discussions

ICT facilities and Infrastructure

A sense of ICT facilities and infrastructure at village level is determined through questionnaire from the experts in the field. The details of the information are as follows. The total number of telephone exchanges, number of telephone lines used by the people, status of mobile service availability in selected villages of each district are shown in Table 1. The table shows that the villages of Gilgit have more mobile and telephone services as compare to other districts of Gilgit-Baltistan.

Table 1. Status of Mobile and Telephone Services (Unofficial information).

	Diamer	Gilgit	Nagar	Hunza
No of Telephone Exchanges	1	2	1	2
No of Telephone Lines	54	6000	200	889
Mobile Service Availability	Yes	Yes	Yes	Yes
Name of Mobile Companies available	SCOM, Telenor, ZONG	ZONG, SCOM, TELENOR, Ufone, JAZZ	ZONG, SCOM, JAZZ, TELENOR (JAZZ has very limited coverage)	ZONG, SCOM, TELENOR, Ufone (Ufone has very limited coverage)

The status of internet services in each district is shown in Table 2. Special Communication Organization (SCO) is the only internet service provider in the region and given the ports unavailability getting a new connection is not easy in each district except the Diamer district.

Table 2. Status of Internet Services.

	Diamer	Gilgit	Nagar	Hunza
No of Internet Service Providers (ISP)	1	1	1	1
Names of ISP	Special Communication Organization (SCO)	SCO	SCO	SCO
No of Internet Connections	51	3100	48	295
Bandwidth Available	Shared	Shared	Shared	Shared
Availability/ easiness to have internet connection	Yes	No	No	No
How long it takes to have internet connection after application	One to three days if connection ports available	One to three days if connection	One to three days if connection	One to three days if connection

	ports available	ports available	ports available
Internet Connection Cost per month	(SHARED: 1MB Rs. 1200, 2MB Rs. 1500, 3MbRs. 2000) (DEDICATED: 1M Rs. 35000, 2MbRs. 65000)	(SHARED: 1MB Rs. 1200, 2 Mb Rs. 1500, 3MB Rs. 2000) (DEDICATED: 1M Rs. 35000, 2Mb Rs. 65000)	(SHARED: 1MB Rs. 1200, 2 MB Rs. 1500, 3Mb Rs. 2000) (DEDICATED: 1M Rs. 35000, 2Mb Rs. 65000)

The number of internet users is very high in Gilgit as compared to the users in rest of the three districts. The prices of the packages vary according to the bandwidth from Rs. 1200 to Rs. 65000 per month. Information regarding computer training institutes is shown in Table 3.

Table 3. Information about Computer Training Institutes.

	Diamer	Gilgit	Nagar	Hunza
Computer Related Training Institutes	0	15	1	4
Average No of Personal Computers Available in Institutes	-	20	15	25
Average No of Passing Graduates per Year	-	25	15	20
Areas of Specialization Fields from these Training Institutes	-	MS Office, Advance Web Designing.	Basic Typing, MS Office	E-Marketing, Online Accounts and Finance, Web Graphics, Basic and advance Programming

In contrast to the other three districts, Diamer doesn't have a single computer training institute. Whereas, number of institutes in Gilgit, Nagar, and Hunza, are 15, 1, and 4, respectively. The number of graduates on average is 20, 15 and 25 in Gilgit, Nagar, and Hunza districts respectively. There are three software houses in Gilgit whereas there is no software house in other districts as presented in Table 4. Detail information about number of shops and workshops related to ICT are given in Table 5.

Table 4. Information about Software Houses and Software Companies.

	Diamer	Gilgit	Nagar	Hunza
No of Software Houses/ Companies	0	3	0	0
Average No of Employees	0	15	0	0
Average Net Income	0	Rs. 1 Million	0	0

Table 5. Information about Software and Hardware Businesses/Workshops/Shops.

	Diamer	Gilgit	Nagar	Hunza
Total No of Mobile Phone related workshops	3	79	6	9
No Mobile Phone Sale Shops	8	45	3	12
Computer Related workshops	0	22	1	3
Computer Related Sale Shops	0	17	0	4
Telephone/Radio set related Shops	0	4	1	2

ICT Usage at individual and household level

Several questions were asked from individual participants of the survey to sense the usage of ICT at individual and household level. In this survey, 15% of the participants were female and 85% were male (Figure 1). The professional background of the survey’s participants is given in figure 2, 49% are students, 22% businessmen, and 6% teachers and other professions that include drivers, farmers, etc. The main reason for more participation of students is in accordance with the objective of this survey is to target the young generation who may have more awareness about current and future technologies and related opportunities, followed by businessmen with the assumption that they have more awareness about current business trends and be able to generate business and jobs opportunities in future using ICT.

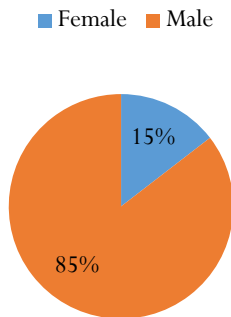


Figure 1. Gender-Based Distribution of Respondents.

The individual usage of computer and internet was determined through asking questions about access to computer (Have you or any of your household person have access to computer?) and access to internet (Have you or any of your household person have access to internet?). The results of these questions are shown in figure 3 and figure 4.

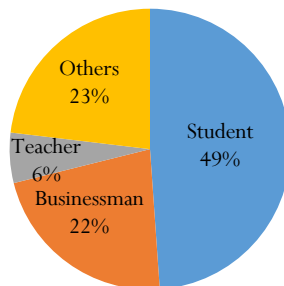


Figure 2. Professional-Based Distribution of Respondents

Figure 3 shows that 96%, 31%, 89%, and 15% individuals from Hunza, Nagar, Gilgit, and Diamer respectively responded positively for having access to computer. Similarly, 60%, 13%, 60%, and 3% were having internet access in Gilgit, Nagar, Hunza, and Diamer districts, respectively. Those, who have access to internet, were asked about the type of connection they are using which is presented in figure 5. DSL connection is used by 55%, 87%, 66%, and 100% in Gilgit, Nagar, Hunza, and Diamer districts respectively. Whereas 38%, 12%, 33%, and 0% use Wi-fi connection in sharing with other users in Gilgit, Nagar, Hunza, and Diamer districts

respectively. There are a small percentage of people, who use internet through mobile internet service. For instance, it is 5 percent in Gilgit district only”.

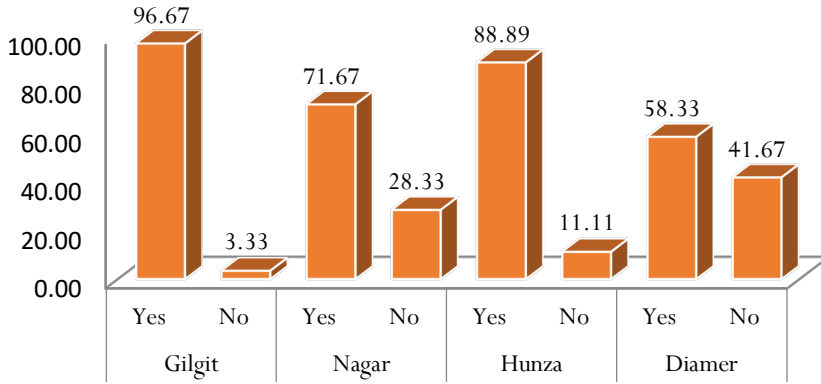


Figure 3. Access to Computer in each District (In percentage).

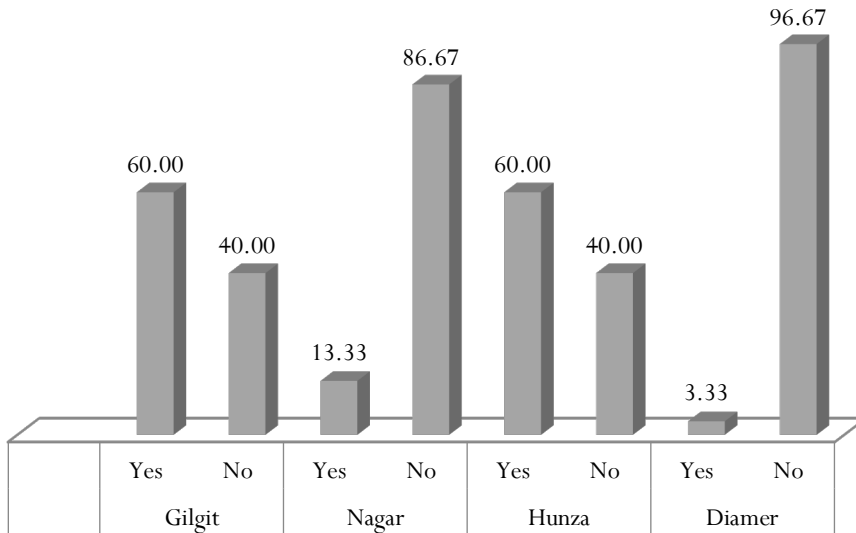


Figure 4. Access to Internet in each District (In percentage).

In another question, individuals who don't have internet connection were asked about the reasons for not having internet connection. The response to that question is shown in figure 6. Among the responses, 25 percent individuals in Gilgit, 13 percent in Nagar, 27 percent in Hunza couldn't afford internet connection due to its high cost. Likewise, 20%, 65%, 16%, and 23% responses gave reason for non-availability of internet connection in their area. In Diamer district, 73% comparatively maximum have other reasons for not having internet at home that include “not interested”, “not aware of internet”, or “family restrictions”.

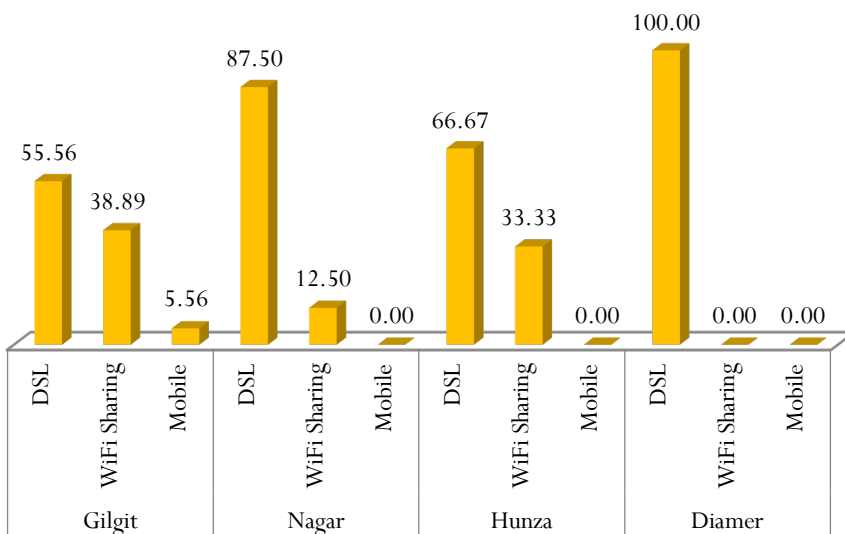


Figure 5. Type of Internet Connection used by Respondents in Each District.

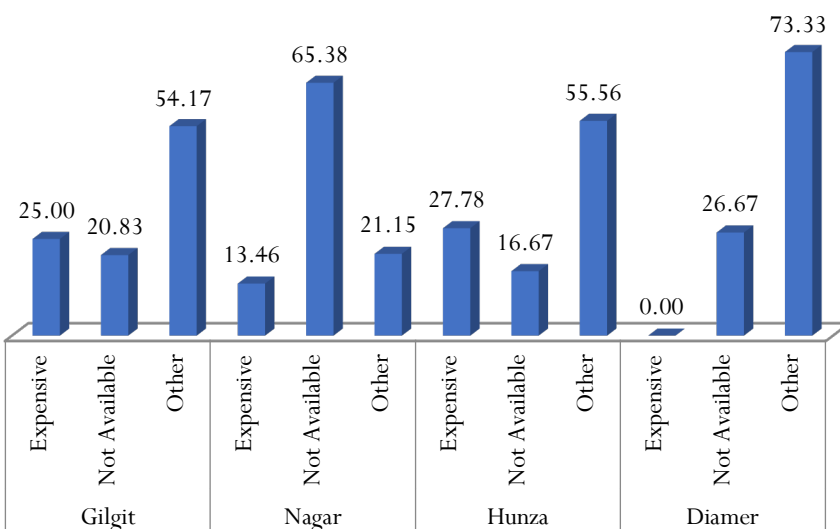


Figure 6. Reasons of not Having Internet Connection by Respondents in Each District.

Those respondents who have internet connections were then asked about their internet usage patterns such as the duration of internet usage weekly, using internet for income generation, and e-business. The responses to those questions are recorded in figures 7-10. Figure 7 shows that most of the people use internet for less than 11 hours weekly except in Hunza district where 48 percent of the people use internet between 11 to 20 hours per week. When the respondents were asked about using the internet for business purposes, the response was negative in Nagar and Diamer districts whereas in Gilgit only 21 percent and in Hunza 11 percent used internet for income generation as presented in figure 8. Overall in the four districts, only 4 percent of the people used internet for selling products online whereas the majority 96 percent did not sell or purchased any product on

internet (figure 9). The 4 percent were then asked about the type of their trading products. The responses are recorded in figure 10 which shows 77 percent people did business in software products and 11 percent sold dry fruit and other products that include mobile etc.

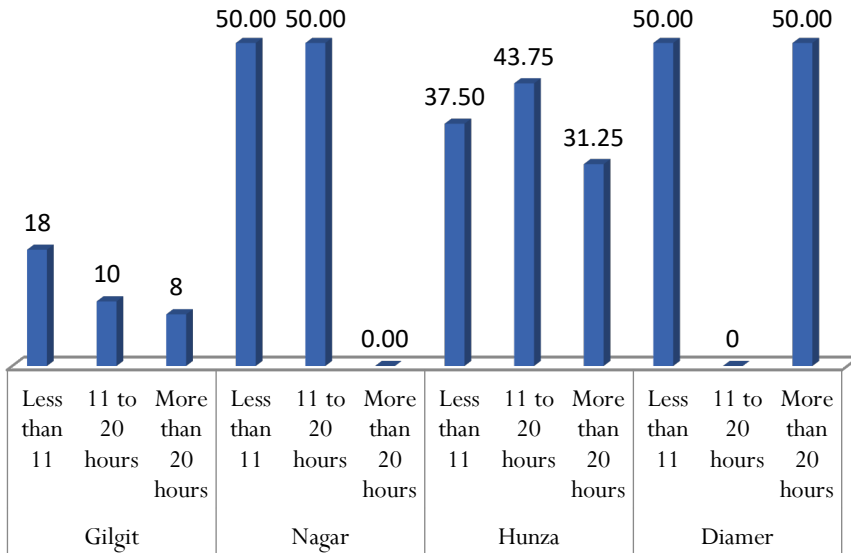


Figure 7. Duration of Internet usage by Individuals in each District.

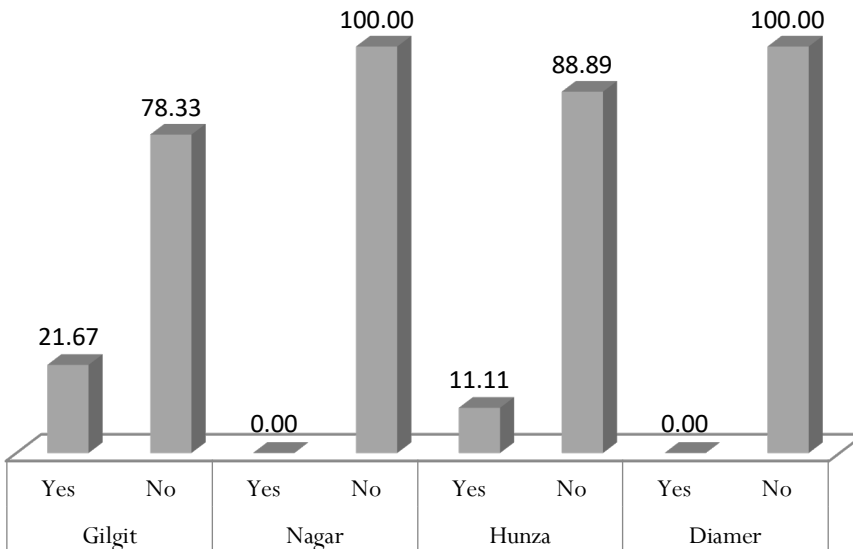


Figure 8. Response for any Economic or Financial Activity on Internet by Respondents.

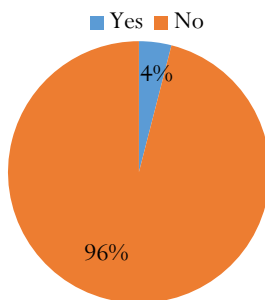


Figure 9. Response for use of Internet to sale a Product by Respondents.

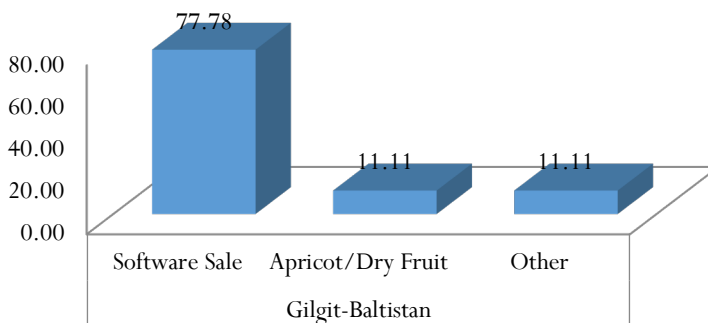


Figure 10. Type of Products sale on Internet by Respondents.

Comparison of ICT usage in Gilgit-Baltistan with other Parts of the World

The comparison of ICT usage in GB with rest of the world can be seen in Figures 11-14. Figure 11 shows that the usage of active mobile broadband subscriptions in GB is far less than as compare to other parts of the world whereas fixed broadband subscriptions are moderate as the figure 12 shows that it is much better than developing countries but less than developed world. Similarly, the status of access to computer at household level is also encouraging as it is much better than least developed countries (LDC) and closer to developed countries' situation as shown in figure 13. Figure 14 shows the status of internet access as compare to other parts of the world which is very low, almost equal to developing countries access to internet.

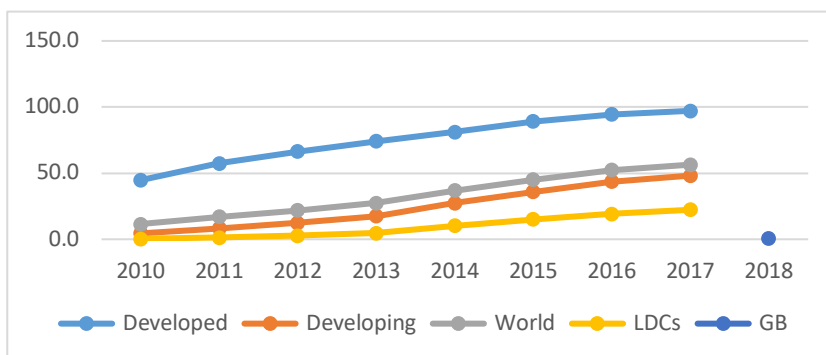


Figure 11. Comparison of Active Mobile-Broadband Subscriptions in GB with other parts of the World (Source of data: ITU ([Union, 2011](#))).

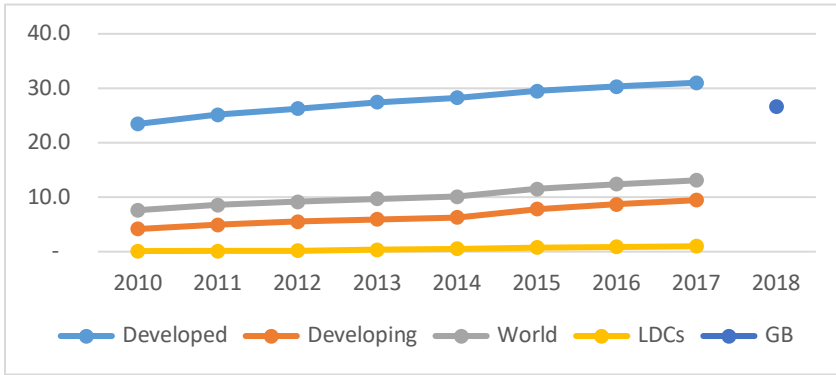


Figure 12. Comparison of Fixed Broadband Subscriptions in Gb With Other Parts of The World (Source Of Data: Itu)

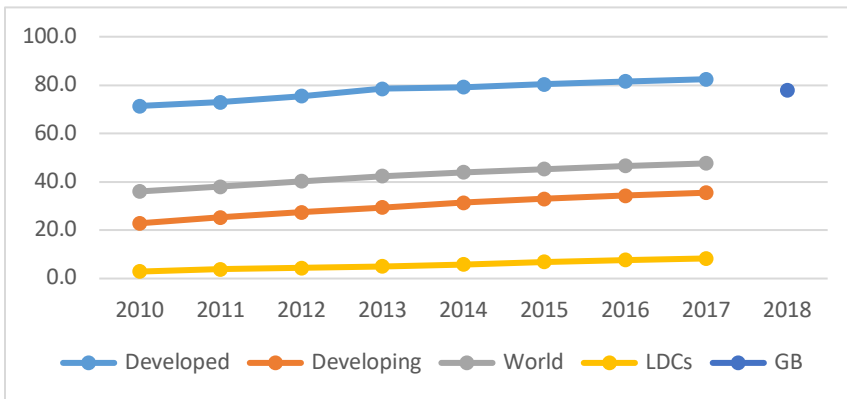


Figure 13. Comparison of Access to Computer at Household Level in Gb With Other Parts of the World (Source Of Data: Itu)

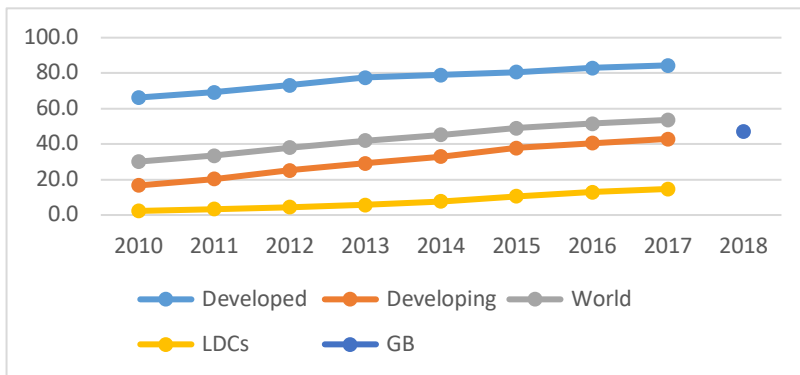


Figure 14. Comparison of Access to Internet at Household Level in Gb with other parts of the World (Source of Data: Itu)

ICT usage, awareness, and expectations from new initiatives (e.g., Fibre optic project) through FGDs: Findings and Analysis.

There is little or no understanding of CPEC's new initiatives or their direct and indirect benefits to the public from ICT-related projects. Ultimately, the general nature of the CPEC and optical fiber project continues to be very vague to ordinary people, such as what projects are part of CPEC, what total investments would be made in different sectors in the country, etc.

Many participants believe that e-commerce has great potential to provide access to international markets for the local market. GB's citizens will buy and sell products or services directly across the border with e-commerce. The ease with which CPEC's fiber optics project will bring products or services to trade will significantly promote e-commerce. All this will only be possible because of the provision of high-speed internet services under the umbrella of CPEC's fiber optic network and related 3G/4 G technologies.

In order to reap the benefits of CPEC using technology, most FGD participants agree that local people need to be trained and technologically developed to take advantage of the opportunities CPEC would bring. They focus on the use of technology to promote and stimulate growth in other sectors of the region. It can be used to promote GB at international level, for example, . to encourage tourism in the area, that will lead the visitors . to make online reservations well in advance.

The participants accept that information technology is necessary because of its applications in almost every sector of this huge project to take maximum benefit from CPEC. IT, for example, has industrial and business applications to make it more effective. The optical fiber project is one of the few CPEC projects that will create jobs and give maximum benefit to the people of GB . without degrading the environment.

Once the optical fibre project is completed, it will help local businesses to market their products online internationally. In order to compete with international market, the ICT based products should have high quality. This requires developing technical skills among the local youth as the participants of the FGDs also highlighted its importance. Building partnerships with non-profit and non-governmental organizations can help in training the labor force about the digital economy. Online businesses and ecommerce have potential to create employment for the youth.

Likewise, most of the participants of FDGs highlighted the issue that nearly all of the local businesses and credit providing institutions are following traditional models of operations. There seems an immediate need to change their business models and credit products (Baig, Qasim, Xuemei, & Alam, 2020).

Another important issue raised by the participants of the FGDs is the high rate of unemployment among the youth with regard to limited employment opportunities in GB. Once the local economy accepts and adapts to digital economy, it has the potential to create job and business opportunities for technical graduates in different sectors, like in mobile applications and software developments. Apart from job opportunities, there is a need to encourage entrepreneurship among youth of GB in IT sector. For this reason, there is need of business incubation and technical institutions in the area. There will be high demand for skilled and trained labor force in the region due to the China-Pakistan Economic Corridor (CPEC). However, planning and preparation is the key to get advantage of the opportunities accompanied with CPEC.

Conclusions and Recommendations

This baseline information on the usage and existing infrastructure of ICT in Gilgit-Baltistan will be helpful to understand the current challenges related to ICT in this mountainous region. Further, this information will be helpful in the coming years to understand the impact of fibre optic initiative on the livelihoods in the mountain community of GB. The usage of ICT at district level differs drastically as the access to computer at household level in Hunza district is very high, whereas, it is very low in the district Diamer. This huge digital gap among the different districts in a small geographical area (though the areas are detached due to high mountains) merits attention to address ICT integration issues with various approaches considering their cultural, educational, religious, and political contexts. Similarly, access to internet in district Diamer is very low as compare to Gilgit and Hunza districts. Most of the people in Diamer are not aware of internet or they are not interested due to cultural constraints of the society and family. In all districts, very few people are using internet for economic activity. . Gilgit city hosts only few software houses. When we compare the overall situation of the ICT usage

with other parts of the world, the situation in GB is satisfying. Nevertheless, there is potential to explore new economic activities through ICT usage in this mountainous region. It is anticipated that after this fibre optic cable project there will be fast internet and internet lines will be available for public, making more employment opportunities and economic activity through ICT.

In the background of the discussions in the above mentioned paragraphs, our recommendations are outlined:

- **Communication:** In order to keep the potential labor force informed about the programs and projects initiated by the government, a proper communication and dissemination system needs to be developed by the provincial government.
- **ICT policy:** There is no provincial ICT policy or framework in GB. The policy document should have defined its current status, future plans, and steps to realize its plans about ICT. The GB government should define its ICT priority to facilitate public in governmental departments (e.g., e-governance initiatives). In addition, it should outline policy reforms to create an environment that is conducive to ICT-based entrepreneurship and job creation vis-à-vis CPEC's successful implementation. The policy should also consider facilitating investors to invest in ICT related projects and ensure the provision of ICT services to customers without interruption.
- **Skills and training initiatives:** There is a need to initiate skills and training courses to prepare youth to avail job opportunities. Some of the courses can be initiated in following areas but not limited to:
 - Networking and telecommunications
 - Software development (Web designing, mobile apps development, etc.)
 - Online freelancing/opportunities (finance and accounting, Forex trading, E-marketing, content writing, call centers, etc.)
 - Electrical, civil, automobile, mobile, hydro, environmental, geographical, computing, etc. engineering systems
 - Alternate energy engineering (solar, wind, etc.) systems
 - Custom clearing, goods forwarding, transport management, tourism management, and retail-housing systems
- **Key Digital Economy Sectors:** The important sectors that may offer ICT-enabled employment opportunities to potential labor force in Gilgit-Baltistan in future and should be the top priority areas in ICT policy include: 1) Call centers; 2) financial services based on ICT; 3) ICT services; and 4) retail based on ICT.
- **Public-Private Partnerships:** There are many service providers in Gilgit-Baltistan whose services could be hired for providing training to existing entrepreneurs as well as to ICT-related public employees. This will speed up the process of digitizing the economy as well as the government infrastructure.
- **Awareness campaigns:** awareness campaigns regarding ICT benefits and opportunities in GB needs to be initiated. This will enable switch their businesses and business models to ICT based systems to make them more efficient and competitive. Further, to make business environment more conducive, there is a need of credit providing institutions and investor attractive campaigns.
- **Encouragement for free market:** There should be a policy to attract and encourage ICT-based infrastructure development businesses. Once there will be more free market competition, then there will be better services and benefits for customers.

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