

## EVALUATING THE NEED FOR DEVELOPING AN OPEN DATA CONCEPT FOR AFGHANISTAN

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### ABSTRACT

Governments around the world are increasingly applying the concept of open data by developing policies and implementing national and local open data initiatives. Today, developing countries are also benefiting from this concept since it brings more efficiency by increasing transparency, accountability, and public engagement. Although Afghanistan already initialized its steps toward open data, yet this concept and its realization are in the early stages of development. Furthermore, no legal framework has been established to disclose government data to the public and no research has been conducted regarding the demand for an open data concept in Afghanistan. Therefore, this paper develops a demand-driven concept of open data for Afghanistan that includes a proposed open data policy and a national open data portal while evaluating opportunities and challenges. This paper conducts a situational analysis of the open data initiatives and of the overall data publication policy in this country. This study resulted that the government of Afghanistan can create several opportunities by applying open data concept as improving public services, strengthening the e-government process, increasing efficiency, transparency, and accountability in governmental institutions and also advancing the participation of citizens in government affairs. Meanwhile, there are specific challenges at different levels.

**Keywords:** Open Data, Open Data Initiatives, E-Government, Open Government, Datasets, Policies.

### I. INTRODUCTION

In 2013 Barack Obama signed an executive order for establishing an open data policy and making all the government information available to the public [1]. Since then, all countries around the are trying to create a culture where the government provides access to their data for the citizens. In 2015 all member states of the European Union were required to publish their data to the public [2]. It is important to realize that the term "open data" became more popular when the open-government initiatives such as Data.gov and Data.gov.uk has launched. Open data has the potentials to improve transparency, accountability and citizen participation in governments. Furthermore, making data open by default can help fuel entrepreneurship, innovation, and scientific discovery [1].

On the global aspect, The Open Government Partnership (OGP) officially established in September 2011 and eight governments (Brazil, Indonesia, Mexico, Norway, the Philippines, South Africa, the United Kingdom, and the United States) signed the Open Government Declaration and created action plans for their countries [3]. The OGP aims to promote transparency, increase citizen participation, fight against corruption, and provide new technologies to strengthen governance. Currently, the organization has more than 70 OGP participants who all made over 2500 commitments to make their governments more open and accountable [3].

Today not only first world countries but also developing countries taking the benefits of open data. In 2011 Kenya became the second African country to make government data publicly available for everyone. Subsequently, the government has launched the Kenya Open Data Initiative (KODI) that focuses on national and local data and a portal in the same year [4]. Initiatives such as KODI had significant impacts on the lives of the Kenyan people. Moreover, Open Nepal initiative launched in 2013 to increase the availability of open development data and to improve and support the use of data. The Open Nepal initiative currently contains over 300 datasets that include health, geography, water and sanitation, energy, agriculture, education, poverty, infrastructure, and more data categories. Useful applications have been built on Open Nepal which helped to provide innovative services to the citizens.

Under those circumstances, Afghanistan, as a developing country, has the opportunity to gain the benefits of open data by applying the open data concept to this country. The potentials would bring many occasions and will open the doors for development and innovation. In the act of the global movements towards opening data by default and a more open government, in this research, we are focused on developing an open data concept

for Afghanistan. Together with this, the opportunities and challenges are also studied in the following research paper.

## II. METHODOLOGY

Specific scientific methodologies have been considered in this paper to answer the research questions. In the first place, a literature research has been conducted to define the term open data, the processes of open data and the open data ecosystem. At this stage, the opportunities and challenges of open data are also studied. In the second place, an exploratory research has been conducted to assess different developing countries which have already applied the concept of open data and have established open data policies as well as public data portals. After the exploration regarding the open data concept in multiple developing countries, the data and information are evaluated, and as a result, an open data policy and an open data portal are proposed for the government of Afghanistan with the observation of their opportunities and challenges.

## III. THEORETICAL BACKGROUND

### Definition of open data

There are many ways in which open data is defined. Different relevant organizations have their definitions from open data. These definitions have similarities as well as differences regarding data providers, types of data, users of data, the format of data, and the origin of data. For example, The Open Definition states regarding data and content that "Open means anyone can freely access, use, modify, and share for any purpose (subject, at most, to requirements that preserve provenance and openness)" [5]. It also defined that open work must satisfy the requirements such as open license or status, access, machine readability, and accessible format in its distribution. Furthermore, an open license must satisfy the conditions such as the required permissions for the use, redistribution, modification, separation, compilation, non-discrimination, propagation, application to any purpose and no charges. Also, an open license must satisfy fair conditions such as attribution, integrity, share-alike, notice, source, technical restriction prohibition, and non-aggression.

On the other hand, Open Data White Paper published by UK government defines open data with the criteria of being accessible via the Internet without user identity, in a digital and machine-readable format with no restriction in redistribution [6]. Moreover, data.gov consider open data as a high value, machine readable datasets which are published to the public excluding private or restricted information for national security reasons (data.gov). Additionally, the European Commission defines open data as public sector information which is produced, collected, accessed and re-used by public bodies [7].

There are similarities and differences in each of the above definitions however the idea is the same. Both definitions from the UK White Paper and data.gov focus on the accessibility and machine readability of the data. The machine readability characteristic of open data allows the developers access the data in a digital format and use them in useful applications.

As there is no standard definition [8, 9] for open data and, also for the uniqueness of this research and convenience, a new interpretation is constructed based on the above definitions. Hence, open data in this research is defined as: "Open data is data which is freely accessible in a machine-readable format, reusable and redistributable with no restrictions based on user identity and intent."

### The open data process

Open data process is created to facilitate the opening and reusing of the data. The process should not be considered as a product but rather an ongoing process [10], because new applications of open data may result in the new way of using open data. Open data process shows that public organizations open their data to the public to be used by citizens, profit organizations, researchers, civil society and others. Zuiderwijk [11] introduced a standardized process model for opening data. This process model has five phases: in the first phase a significant amount of data is produced, collected and integrated usually by government organizations. In the second phase, these massive amounts of data are decided to be published for the public generally in a national portal or on the organization platform itself. The third phase is to find the actual open data by users, and the fourth phase is to use this public data for their purposes. In the fifth phase, users provide feedback to improve the quality of open data. The feedback loop ensures a two-way communication between publishers and the users of open data [12].

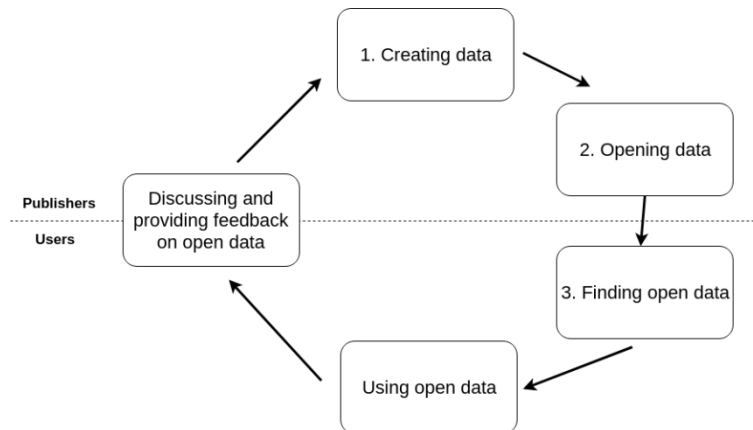


Figure 1: Open data process [11]

**The open data ecosystem and stakeholders**

Every digital ecosystem consists of cyclical, sustainable and demand-driven environment oriented features [13]. So, in the open data ecosystem, it should be clear that where the data comes from and who drives the demand for open data and who exactly are the primary stakeholders of open data.

Open data has diverse stakeholders and the most significant stakeholder, and also the leading publisher of open data is governments. They produce and collect data that is being opened, fulfilling their public tasks [14]. The governments still investigating the potential benefits of open data for development processes of a country [15].

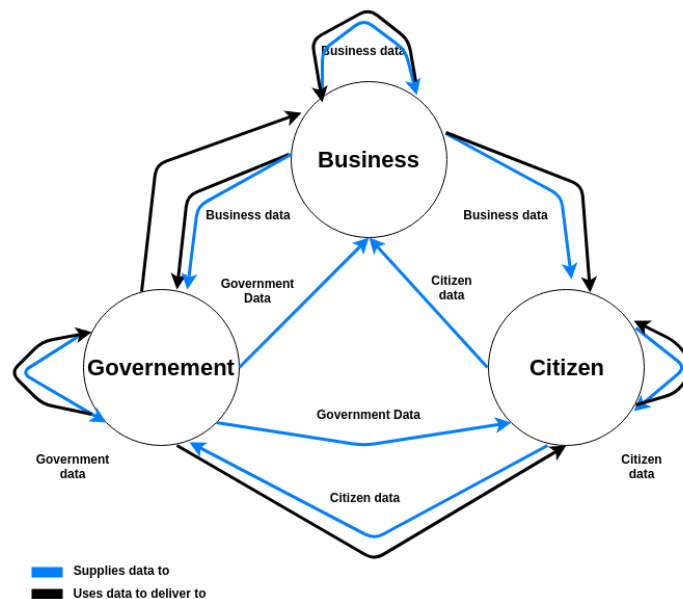


Figure 2: Open data ecosystem [16]

In addition to the governments which plays the central publisher role in open data ecosystem, business and citizens are also identified as the key constituencies (stakeholders) in a thriving open data ecosystem [16]. According to the figure below from the Deloitte report, every actor provides different types of data to the various stakeholders. The governments publish open government data, subject, and restrictions related to the national security, commercial sensitivity, and privacy. Businesses distribute open business data freely to the public, and finally, citizens release personal or non-personal data to the public domain. As open data is a new field, complete stakeholder analysis is needed to further identify the qualities of the diverse group of users of open data [17].

**Opportunities and challenges of open data**

The first discovered opportunities that open data will bring for the governments is the improved accountability and transparency inside government agencies [18] and also citizen participation [19]. Economic growth is one of the significant opportunities that open data brings to the today's world. As data growing intensively day by

day, the cost of processing these vast amounts of data gets very high. Thus, open data stimulate the economic growth by lowering the cost of data processes. It is said that the value of Public Sector Information is estimated at 30 billion euro per year in Europe [20]. Releasing the considerable amount of data by public bodies will have the consequences of innovation and development of new applications, products, and services which is quite a tremendous benefits and opportunity for a country [21]. The report regarding Learnings from Kenya's Open Data Initiative presented some of the key benefits and opportunities of open data, which includes transparency, accountability of government and donors to its citizens, empowerment of citizens, promoting inclusive development, and also economic benefits [22]. The further opportunity that open data bring to a government is that, by providing sufficient data for policymakers, the policy-making process will be improved and thus they can take well-informed decisions [23].

Besides all the benefits and opportunity for open data, there still challenges for open data which worth to be addressed here. The most significant challenge that open data is facing is the power play of politicians and government agencies which prevents open data initiatives to take full potential of it [23]. According to Huijboom and Broek research [24], they have examined five countries, and they have discovered particular challenges for open data. As the motivation for open data differs in each state, the problems also vary accordingly. The primary challenge was the closed government culture in government organizations. This issue makes the situation for opening data very difficult. It takes a very long time to change the frame and to learn in organizations, and this means for the data users that still not all the data is open [25, 26].

#### IV. EXPLORING THE EMERGENCE OF OPEN DATA CONCEPT IN DEVELOPING COUNTRIES

Open data is not only an essential movement in the first world countries but also in developing countries. International organizations are encouraging developing country governments to use open data to increase transparency, accountability and citizen participation [27]. As an example, the Open Government Partnership is supporting open data initiatives in developing countries. In this section, various projects, initiatives, and policies regarding open data are reviewed from different developing countries across the world. These are important movements for emerging and introducing the concept of open data in these countries. As the open data concepts are reviewed in this section, the impact of open data in these countries are also studied.

##### Open data in Kenya

Kenya joined the Open Government Partnership in 2011 with the commitment to being 'open,' and the Kenyan Government became the second African country to make government data publicly available for everyone. The Government subsequently launched the Kenya Open Data Initiative (KODI) that focuses on national and local data and a portal in 2011. The Kenyan Government also established an Open Data Policy in the same year.

The fundamental goal of the Initiative in Kenya is to make data about government expenditure, statistical, and demographic freely available for researchers, policymakers, ICT developers and the general public in a digital format [4]. It's not just about open data portal; all government departments are encouraged to make their open data policy available in on their web portals.

##### Open data in Nepal

The concept of open data is very new in Nepal. Unlike other countries which the primary driver for open data is the government itself or The World Bank, but in Nepal, the primary driver for open data is the civil society and technical activists with the aim of improving accountability and leading to more effective development [28].

Until 2012 there were two significant actors for open data in Nepal, the RTI (Right to Information) and Aid Transparency Movement. The RTI has tried to expose public and private sector corruption, and improve citizen participation to hold the government to account.

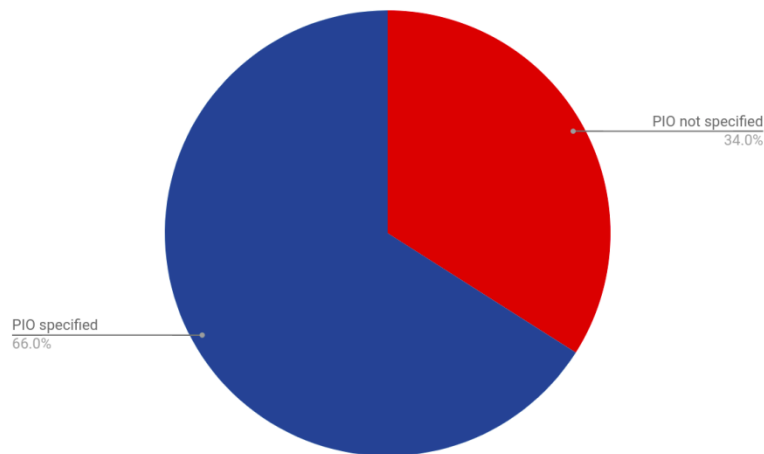
The number of open data initiatives in Nepal is now increasing, and they are trying to determine how best to improve accountability and accessibility of data. In February 2013, the first open data event held in Kathmandu where 400 attendees - researchers, CSO representatives, students, techniques and the general public participated to rise the open data awareness [29]. The government of Nepal launched the Aid Management Platform (AMP) public portal in 2013 to increase the aid transparency.

## V. FEASIBILITY OF MOVING TOWARD OPEN DATA IN AFGHANISTAN

### Situational analysis for accessing information in Afghanistan

Afghanistan is a developing country and instability in security, economy and existing of corruption in the government, high level of poverty and unemployment, all have their significant impact in the development process. Although, 28th of September is the International Day of Access to Information in national and international calendars, right to access information is still a dream for the people in the country, mostly because of the mentioned challenges.

Nai Supporting Open Media is an Afghan non-governmental organization established in 2005 to empower independent media and promote freedom of expression in Afghanistan [30]. They have surveyed in September 2017 and based on that survey 34 percent of the governmental departments do not have a dedicated office to allow public for accessing information [30]. However, the 10th article of Access to Information Law in Afghanistan indicates that "Institutions are responsible for specifying a Public Information Office for citizen's right to access information" [31].



**Figure 3:** Public Information Office (PIO) in governmental departments [30]

Furthermore, according to the following survey, 8 percent of the government departments that attended in the review does not have any awareness about the existing of Access to Information Law in Afghanistan, and 2 percent of the governmental institutions have not seen the Law yet [30]. In this survey 51, governmental departments were given questionnaires to participate in the investigation.

The government of Afghanistan is responsible for allowing citizens to access information based on Afghanistan's constitution and Accessing to Information Law and prevent any obstacles from the way. According to an official report from TOLONews in May 2016, it is stated that due to the political and technical problems in the country, the Access to Information Law in Afghanistan is not implemented yet [32].

A part of lawmakers in Afghanistan, however, believes that the Access to Information Law still has some problems [32]. Such as article 15 of the law states that giving information is prohibited if it puts someone's life, property, pride or dignity at risk. Lawmakers believe that the words pride and dignity should not be included [32].

### Access to information as key to promoting openness and good governance in Afghanistan

One of the main challenges for accessing to information in Afghanistan is the lack of citizens' awareness about their rights to access information. So far, no significant actions have been taken from the government to raise the awareness of citizens for their rights to access information. However, an inconsequential number of trainings, events, and workshops from the international organizations have been organized for this purpose.

In October 2017 Oversight Commission on Access to Information and UNESCO have organized an event in Kabul to help further people's right to access public information. It has been highlighted if "citizen's right to access information contributes to peace, promotes human rights, bolsters freedom of expression and remains an important factor in fighting corruption" [33].

Access to information is a fundamental human right that is both recognized in the Afghan culture and the government of Afghanistan. According to the article 50 of the constitution in Afghanistan, the citizens have the right to access information.

#### **Access to Information Law in Afghanistan**

Afghanistan's Access to Information Law has signed by Ashraf Ghani the president of Afghanistan in 2014. According to the Article 50 paragraph 3rd of the Afghan constitution, it is stated that "the citizens of Afghanistan shall have the right of access to information from state departments by the provisions of the law" [34].

The Access to Information Law in Afghanistan covers both governmental institutions and non-governmental entities such as NGOs, civil society organizations, and political parties.

#### **Afghanistan's first open data dialogue**

Opening up data brings many opportunities by providing access and availability, citizen participation in government affairs and reuse of the data in the research for development purposes. So how this helps Afghanistan?

The first dialogue about open data in Afghanistan held in a two-day seminar on the 13<sup>th</sup> and 14<sup>th</sup> November 2012. This event was organized by Central Static Organization in Afghanistan (CSO) and The World Bank office in Afghanistan. The primary objectives were to improve data dissemination, foster national dialogue and inspire partnerships between the users and producers of statistics [35]. The event created a dialogue space about open data for the first time among various audience including, government, media, civil society and academia which raised their interest in the topic. This event was the first and impactful event about open data in Afghanistan which drove the curiosity about the new data, making new knowledge from combining data sources and identified areas needed to collect data and improve statistical system [35].

## **VI. OPEN DATA INITIATIVES IN AFGHANISTAN; SURVEY OF CURRENT LANDSCAPE**

The leading drivers of open data in most countries are the governments. They are the principal actors for allowing citizens to access data published by public service entities. However, Data providers, open data legislators, open data facilitators and many different kinds of open data users, such as citizens, researchers, journalists, developers, entrepreneurs, and academics are all the actors of open data [36].

Open data is quite a new concept in Afghanistan. The government, national and international organizations in Afghanistan have played their roles to get benefits from using the open data concept in this country. Although, their efforts were not as much satisfying and significant as we could cultivate their results now. For instance, there are currently not many initiatives of open data mainly from the government of Afghanistan to provide open datasets so that the citizens and other open data users in the country could benefit from them. There are general reasons for the absence of using the open data concept in Afghanistan. Significant challenges are lack of technical infrastructure in the country, high cost of digitalization, lack of political will government departments, lack of the culture of opening and consuming data, lack of well-articulated demand from civil society, fear of exposing corruption or wrongdoing and more.

On the other hand, during the research about open data initiatives in Afghanistan in this research, it has been found that some initiatives are regarding open data in Afghanistan have already existed. An actual promising initiative is the joining of the Afghan government in Open Government Partnership<sup>2</sup>, which encourage other actors and drivers in this country to contribute more extensively for utilizing and publicizing of the open data concept in Afghanistan. Another important organization in Afghanistan which creates an integrated scientific system of statistical data in the country is the Central Statistical Organization; an Afghan government agency. However, the establishment of the organization is not based on the concept of opening data to the public but to collect statistical data for the government. Therefore, all data published by this organization is not completely free. Afghanistan Disaster Risk Info web platform is another new established open data initiative. The purpose of this public platform is to create, share and access geospatial data and maps for decision-making about disaster risk in Afghanistan [37].

A key deliberated number of initiatives and projects regarding open data in Afghanistan are explained below:

### Afghanistan Open Data Project

Afghanistan Open Data Project is a startup launch project which is developed by Development Seed organization in Afghanistan. Development Seed is an organization focusing on making solutions by using open data and open technology worldwide. The project is an effort made to release a combination of political, social, and economic datasets into the public domain significance to elections in Afghanistan [38]. The project facilitates the Afghan and international organizations sharing data with the citizens and with each other.

The website for the project contains data related to elections in Afghanistan. The data provided by the Afghanistan Open Data Project's website comes from different sources for instance, Independent Election Commission of Afghanistan which is responsible for administering elections in Afghanistan, Afghanistan Central Statistics organization, National Democratic Institute, Afghanistan Election Data, UNOCHA, Common and Fundamental Operational Datasets, MODIS Global Snow Cover Database and the U.S. Naval Research Laboratory.

Currently, 17 projects have already done by Afghanistan Open Data Project. The plans are available on their website and are all related to the data about the different elections in Afghanistan from 2009 and 2014 such as presidential elections and Wolesi Jirga elections. The projects cultivated the data from various credible sources and then converted into visual maps for easy comprehension of the users by open source tools such as TileMill project.

### Opening Afghanistan's election data

In December 2009 National Democratic Institute (NDI) in partnership with Development Seed organization opened up their Afghanistan election data browser under the name of Afghanistan Election Data in a website for the public usage [39]. The site is designed to make data from national elections in Afghanistan accessible and transparent. The data had been previously backed in PDFs which after the analyzation and visualization, this extensive data have been liberalized for the public. The open source tools used in this website allow users to browse the raw vote count from the previous elections on a national view and quickly drill down to a provincial, district, and even polling center view – showing the number of votes all the way down to the ballot box [39]. Users of the website can run custom queries to find the number of votes per voting station and the percentage for an individual candidate. The results came on custom maps of Afghanistan that have additional data overlays such as ethnic and security data. All of these voting trends are then graphed down to the polling center level [39].

The website, "AfghanistanElectionData.org" contains data about the presidential, Wolesi Jirga and provincial council elections from 2004 to 2014 in Afghanistan. It allows researchers, web developers and others who are interested in accessing, sharing and reusing the source data for each election in this website [40]. Maps, raw data, tools for using the data, and documentation to support its use in this website are provided all for free [40]. This project can improve the transparency and accessibility of data related to the Afghanistan election process.

The data browser in this website was built entirely with open data and the open source stack used to create the site are Managing News, a pluggable data aggregator built on top of Drupal, and all the maps have been generated by MapBox. The data provided on this open data website is in CSV, PDF, XLS formats and KML files which allows web developers to reuse the data on their websites.

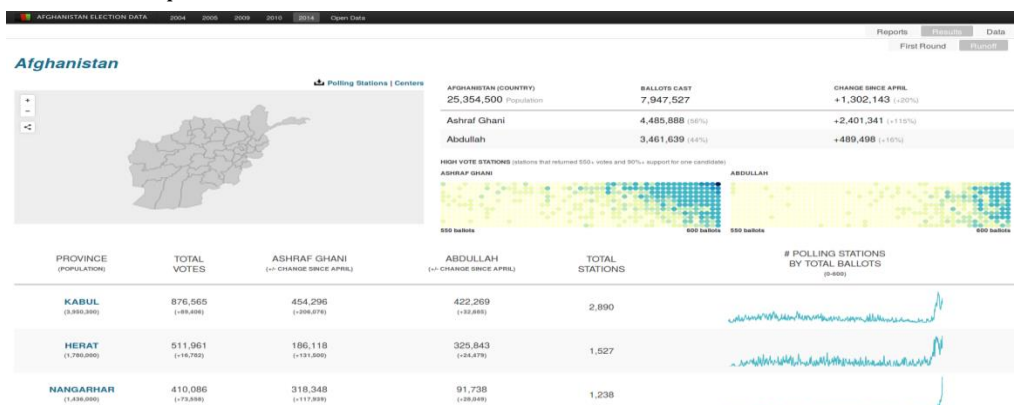


Figure 4: Afghanistan election data; runoff results [40]

### Afghanistan open data platform for disaster risks

Afghanistan is a country which is at particular risk to earthquakes, landslides, and riverine flooding. In the last decade, however, droughts and extreme temperatures have significantly impacted its population and economy as well [41]. Lacking infrastructure and high level of poverty makes Afghanistan more vulnerable to disasters. Informing about risks is critical for better decision making, development planning, public policy and investments and strengthening the resilience infrastructure to save lives and livelihoods in Afghanistan [42].

The Afghan Government and The World Bank funded by the Government of Japan and the Global Facility for Disaster Risk Reduction produced a multi-hazard risk assessment for Afghanistan. The assessment includes information on current and future risks including fluvial floods, snow avalanches, landslides, drought and seismic hazards [42].

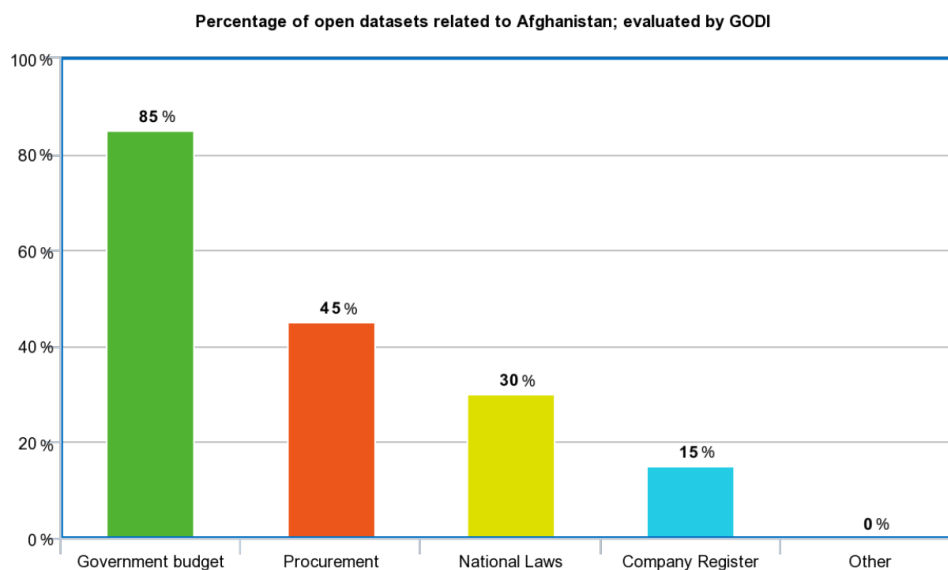
The result of the assessment is visualized in an online geospatial platform called Afghanistan Disaster Risk Info GeoNode. The data in GeoNode platform is mapped and is in open data format. This will allow users to run their analysis and assess risks in particular geographic location and plan accordingly [42]. This open data platform brings possibilities to the Afghan Government and decision makers, using the risk maps and information, mainstream and integrate it across sectors and strengthen the resilience infrastructure like education, agriculture, etc.

Currently, the platform contains 123 layers of geospatial data published by users, organizations and public sources. Furthermore, the data in this platform is available to the users for browsing, aggregating, and styling to produce maps which can be shared publicly. Additionally, GeoNode allows registered users to upload geospatial data in different formats including shapefile and GeoTiff.

The platform allows users to download the data in several formats such as GeoJSON, Excel, CSV, GML 3.1.1, GML 2.0, and Zipped Shapefile. Not only this but also the maps are available to be downloaded in formats such as KML, PNG, PDF, JPEG and could be viewed in Google Earth.

### Global ranking of Afghanistan in Open Data Index

The Global Open Data Index (GODI) Organization is the yearly global benchmark for publication of open government data, which is run by the Open Knowledge Network [43]. Afghanistan ranked 84 among 94 countries assessed in the index with the ranking score of 12 percent and zero percent for the openness in government data in 2016 [44].



**Figure 5:** Evaluation of open datasets related to Afghanistan [44]

The GODI analyzed 15 categories of datasets related to the Afghan Government such as government budget data, procurement data, air quality data, government spending data and others. According to the GODI, the only category of data which is mostly open to the public is data about the government budget. These datasets are available free of charge, in an open and machine-readable format, and licensed openly. Even though, it is not up



to date [44]. Similarly, data about procurement is publicly available; it is free of charge, and also up-to-date data. But the data is not in machine-readable format. Moreover, 30% of data related to the The National Laws of the country is publicly available and free of charge [44]. And finally, data about company registration is freely available. Whereas, all other datasets categories are not available in any way.

## VII. A PROPOSED OPEN DATA POLICY FOR AFGHANISTAN

Government around the world are realizing the importance of open data programs, as open data emphasizes transparency, accountability and continuously make political and economic impacts. Therefore, opening access to public sector data is a flourishing trend on a national and international level.

Under those circumstances, we propose an open data policy for Afghanistan in this research. First we need to answer the question: What is a policy? As defined, a policy is "a purposive course of action followed by an actor or set of actors in dealing with a problem or matter of concern" [45, 46]. Also, policy involved process, activities, decisions which tackle societal problems [46, 47]. We expect that the current efforts encourage the government of Afghanistan to develop an official open data policy in the country.

This open data policy aims that the government data shall be made accessible to the public under certain restrictions on access. Article 15 of Access to Information Law in Afghanistan stated that information which puts someone's life, property, pride or dignity at risk is prohibited to be given by the government organizations. With the observation of the Law, all government data are expected to be shared with the public except data which is personally identifiable information, data with national security or commercial or intellectual property rights [48].

### The policy vision

The vision of this open data policy is to embrace the culture of open data within all the government institutions with this intention to improve efficiency and effectiveness in public sectors, support citizen participation, increase transparency and accountability in the government, and to fulfill the public demand for open government data.

### The policy objectives

Availability and appropriate management of open government data is the fundamental objective of this open data policy. For this purpose, the following objectives have to be fulfilled:

To make assured that the government public sector data and information are publicly available.

- To strengthen the promotion of open data concept in Afghanistan.
- To encourage governmental and non-governmental institutions for open data initiatives in Afghanistan.
- To provide a structure for the implementation of open data initiatives.
- To create a central access point to the open government data.
- To comply with the open data standards and legislation.
- To fulfill the demand for citizens' access to public sector data.
- To support e-government and open government in Afghanistan.
- To support the development of open data skills in Afghanistan.

### The policy objectives

Aforementioned open data policy is aimed to be applied in all governmental institutions of Afghanistan including ministries, departments, agencies, commissions, public universities, local government administrations, parliaments, courts, government enterprises, government contractors and recipients of government funding [48].

The open data policy applies to all data and information which is under the protection and control of any governmental organization. The focus of the policy is both raw data and also other types of information such as data which has been already processed to make it useful [48]. Similarly, The Policy applies to all newly collected or created data and any legacy or modern systems that obtains or generates data.

All governmental organizations are obliged to consider the legislative requirements for publishing data, and the value of opening data against the cost and essential outcomes. This intention helps to better prioritize and manage the data.

This open data policy provides a framework for all governmental organizations including ministries, departments, and agencies to embrace the culture of open data and take further steps to open government data to the public through publishing it online considering the restrictions according to the law, policy or regulations.

### The Principles

This section of the paper consists of the following guiding principles which represent the core values of the policy. The contents of this principles section are the general beliefs of the author and aims to provide a fundamental framework for the development of the open data concept in Afghanistan.

- **Accessibility to open datasets:** A single open data portal is required to adhere to all the government's open datasets. All open data related to public services are published on the Government of Afghanistan (GoA) open data portal, and the data shall be accessible through the mentioned portal. The portal shall be designed for technical and non-technical users and comply with the open data standards. It is required that the data published on the portal should be in machine-readable format. Additionally, the portal must support an API to let developers use the data in their applications.
- **Use of standards for metadata:** Metadata is crucial for digital information resources and "understood to mean structured data about resources that can be used to help support a wide range of operations" [49]. Therefore, considering proper standards for metadata of the GoA open data portal is a mandate by this policy. This strategy allows the interoperability of the portal with other data platforms.
- **Data representation:** All public services organizations of Afghanistan mandate to publish their data in non-proprietary formats, for instance, comma-separated values (CSV) or HTML. Furthermore, public services organizations, with consideration of open data policy, prioritize the usage of open file formats which are non-proprietary, publicly available, and place no restrictions upon their use [48].
- **Data quality:** A particular number of metrics for the quality measurement of open data are existed for the governments to consider them to deliver a good quality (meta) data [50]. They are: Traceability, accuracy, completeness, understandability, availability, consistency, credibility, process-ability, timeliness, correctness, relevance
- **Data protection and privacy:** This open data policy ensures that the privacy and protection of all public sectors' data which are being shared to the public "open by default" are complied with the Data Protection Law of the country. Similarly, the intellectual property of public sector data stays with the public sector, not third-party suppliers, if further contracts and procurements have been made with data suppliers. Moreover, all data published by public sectors shall be free to copy, publish, distribute, adapt and exploit commercially, unless stated the opposite one. Then, they shall be required to acknowledge the source of information via an attribution of a statement. Coupled with these, if the public datasets used in the development of applications, the developers retain all intellectual property ownership in their applications, excluding public sector data, whose ownership stays with the public sector [51].
- **Public input and participation:** having public feedbacks concerning public datasets availability is essential. Public sector bodies shall publish data in a raw form with the possibility of errors and limitations which has noted in the metadata [48]. The GoA open data portal shall implement the facility for individuals, groups, and organizations to deliver their inputs [51]. The feedback mechanism helps select and disseminate information and data in a better approach.
- **Protecting the GoA open data portal:** It is mandated to implement rate-limiting and other security mechanisms for ensuring that the GoA open data portal is not abused, damaged, or impaired [51].
- **Responsibilities of the governmental organizations:** Every public sector body that owns the datasets has the whole responsibility of all the aspects of the quality, integrity, management, and security of their datasets. The public sector bodies do not relinquish their ownership to the datasets when the data is submitted to the GoA open data portal. Besides, the organization is responsible for reviewing the datasets for confidentiality, privacy, security, and any content limitation issues according to the country's law before the publication on the GoA open data portal [51]. Furthermore, the organization has the responsibility to regularly update the datasets identified in dataset's metadata on the portal.

- Data maintenance: Datasets published on the GoA open data portal shall be maintained for accuracy, timeliness, and accessibility. Additionally, all governmental organizations that own public datasets shall be ensured that each public datasets and associated metadata are maintained and updated correctly.
- Data archiving: The GoA open data portal shall be used to archive the data permanently. Whenever the information or data is required, it must provide the accessibility to the data with timestamps. Therefore, a particular archiving policy shall be developed with the consideration of the country law and the current best practices [48].

### **Risks for releasing public sector data**

Releasing government data to the public comprises some risks regarding the interpretation and usage of the data. The followings are the most important risks which require further consideration:

- Incorrect conclusions being drawn from faulty analysis
- Quality of data not being perfect
- Deliberate manipulation of the data or privacy disclosure [48]

Lack of communication or interpretation about limitations, errors, or timeliness of the data between data suppliers and the users is the main reason which creates risks concerning using open data [48].

The risks can be reduced by establishing appropriate communication channels and introducing clear validation procedures with correct and precise metadata. Similarly, privacy issues can be solved by anonymizing and aggregating data.

### **CONCLUSION**

Accessing the government data is very challenging in Afghanistan. On the other hand, disseminating public sector data would be a time-consuming endeavor and requires many efforts. However, it worths, regarding having significant values. This policy aims to promote the concept of open data as well as the culture of openness in Afghanistan, especially inside the governmental organizations to embrace more transparency and accountability.

Citizen participation in government affairs, innovating new products, strengthening e-governance and improving public services are all the values which the open data concept and the open data policy brings to the government of Afghanistan. The stakeholders of this Policy are data suppliers such as public sector bodies and data consumers such as individual citizens, groups, organizations, and developers. Implementation of the Policy requires proper governance to drive it and a technology platform to deliver it [48].

To summarize, adhering the policy by the Government of Afghanistan confirms their commitment to embracing the culture of "open by default" in all the governmental organizations [48].

## **VIII. INITIATING AN OPEN DATA PORTAL FOR AFGHANISTAN**

International open government initiatives are increasingly releasing a large number of open government datasets to the citizens via web-based platforms which results to create innovative services [49]. This effort has not just made in first world countries but also in several developing countries in recent years.

Therefore, Afghanistan as a developing country can also use from this opportunity by initiating an open data portal, which collects and shares public datasets and their metadata, to foster the process of development. This section discusses developing similar open government data portal to facilitate public sector to publish their data for the citizens.

Publication of open government data can be a vital communication channel between the government and the citizens. Before studying the technical aspects of developing an open data portal, we are going to explain the role of ICTs and open government data portal.

### **The importance of ICTs and open government data portals**

ICT had a significant role in releasing open government data to the public and counted as a prerequisite for data openness [53]. By enabling the hosting and publishing of open data, ICT encourages free and straightforward using of information through various data exchange channels such as radio, web, SMS, etc. More benefits of ICT include improved data quality and timeliness of reporting.

Establishing a national open data portal is among the priorities of most of the governments today, for the purpose of opening public sector data to the citizens. The portals are web-based interfaces designed to access

the data easily [54]. The raw and numerical datasets published on the portal contains metadata records which allow specific search functionalities. Similarly, Application Programming Interfaces (APIs) are built on the portal to let developers develop applications by directly accessing the data.

In this case, the government of Afghanistan can take a further step in applying the open data concept by releasing reusable data and making them available on a website. It is recommended that the portal should develop in such way that every citizen can easily access to the public sector data from home, library or any other places excluding the prior knowledge to the technical infrastructure [53].

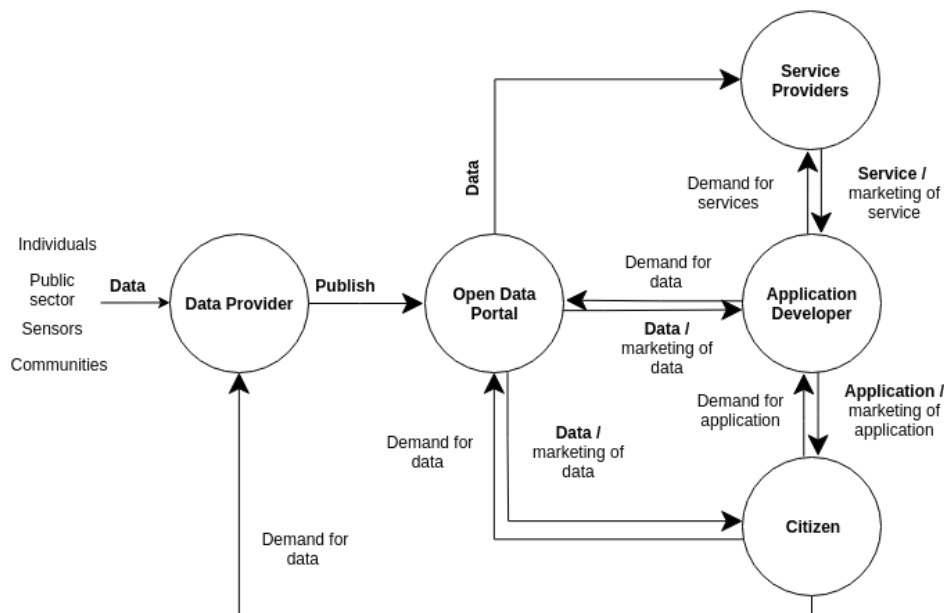
Also, there is the possibility of a challenge that the government interest appears for presenting the data in a particular fashion which limits the provision of data to the users that they are interested in using in their own purposes. The reason is that the government is not able to systematically adapt and improve websites as fast as technology progresses because of the institutional workings of the government.

**Open data suppliers and consumers**

The objective of the Open Government is to release government data to the citizens. In this case, the supplier of the open data is the government, and the consumer is the citizens. However, in the open data ecosystem, there could be data suppliers rather than the government such as the private sector, non-governmental organizations or even individuals.

Government is the principal actor of the open data which collects a large volume of public sector datasets and relinquish for the public re-use. The government can publish open data for the data consumers using a national open data portal. Service providers are one of the consumers of the data. They offer services regarding the data for those individuals or organizations who do not have enough resources to process or analyze the data [55].

According to the (figure 6), application developers who are themselves the consumer of the open data, that is published by the government or other sources, use services regarding the data from the service providers. Application developers can be businesses, groups, civil society organizations or individuals that develop customer-focused applications. Or the citizens, which means any individual, group or organization according to the author’s intention, can re-use the open data for their purposes.



**Figure 6: Actors and their relationships to the open data [55]**

**Portal is a key building block for an open data initiative**

A research note by Tim Davies draws an exploration of some different open data projects around the world to highlight fundamental building blocks that open data initiatives generally involve. These building blocks are, “leadership and bureaucratic support, datasets, licenses, data standards, data portals, interpretations, interfaces and applications, outreach and engagement, capacity building, feedback loops, and policy and legislative lock-in” [56]. According to this research, developing a portal is essential for an open data initiative.

### **Architecture of the open government data portal for Afghanistan**

We have previously mentioned that developing an open data portal is a pivotal building block for every open data initiative. These portals provide access to a vast amount of public sector data for the citizens. Not just data but also documents and applications. It is a central access point to locally managed files through a single user-friendly interface. Individuals, developers, data journalists, government organizations, and businesses can all have access to these data.

Thus, the proposed architecture for initiating an open government data portal for Afghanistan has two main components. The first one is a content management system (CMS) which provides an interface to publish news, information, links, comment and review functionalities, and a view of the data catalog. The second one is a data catalog for the metadata of data, documents, and applications. The following figure illustrates the general proposed architecture with more details. The architecture is adapted from the architecture of the open government platform in Germany [57].

### **Barriers for initiating the portal**

It's clear that Afghanistan is a developing country and the instability in security and economy, existing of corruption in government, poverty and unemployment have their significant impacts in the development process. Under these circumstances applying and promoting open data concept, particularly initiating an open data portal would face many challenges and barriers. Some of them are included in this section.

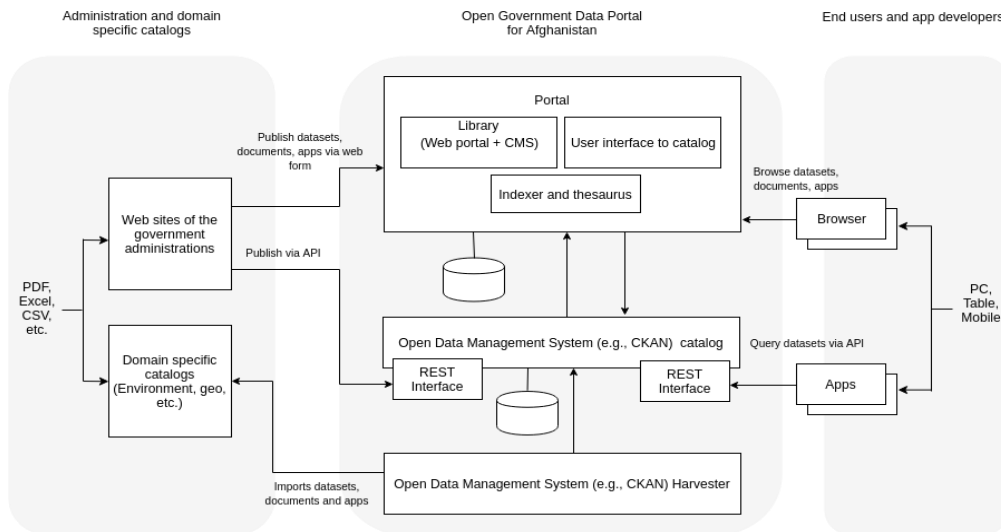
Although developing an open government data portal to publish data regarding public sector to the citizens helps to improve transparency and accountability in the government, but the challenge is mostly regarded to supplying and demanding the data. For example, most of the government data are not in electronic format. The governmental organizations mostly use the paper-based system in their work. A trivial number of organizations use electronic databases to record their data. Furthermore, some of them even don't have official websites. The others use the official sites to publish news regarding the organizations. This problem exists because of the lack of capacity of human resource and IT infrastructure. However, technology is rapidly progressing in the world, but in Afghanistan, people have limited access to the technology. This shortage makes the consumption of data very difficult.

Another barrier would be the culture of opening and consume data in the country. As open data is a new concept even in the world, it will take a much more time that the people and the organizations accept and implement the culture of openness and consuming open data. The process of digitizing the public sector data needs to be accelerated to foster the process of data openness in the country.

### **The benefits of utilizing the open data portal**

In the first place, it has to be considered that open data creates high values. These values are not limited to a single part of the community life; they include various aspects of life. Efficiency improvement in public administrations, accountability and transparency in government organizations, economic growth in public and private sectors, and social welfare is all the benefits of using open data. When it comes to establishing and using an open data portal in a third world country like Afghanistan, it will create tremendous social and economic impacts.

One opportunity that a data portal creates would be to let the citizens upload and download free public sector data from the portal. This ability will improve the citizen participation and allows them to use and re-use the data for their purposes. It also allows businesses and others to analyze and visualize the data and build tools and services.



**Figure 7:** Architecture of the open government data portal for Afghanistan [57]

The users of the open data portal would be, but not limited to:

- Ordinary citizens
- Civil society organizations
- The media
- Entrepreneurs and startups
- Universities, schools
- Government agencies
- Profit and not profit organizations

Ultimately, there is a high demand for developing and promoting an open data concept in Afghanistan. The government is required to create an open data policy. This action will institutionalize the culture of openness in the country and establishes a framework for different governmental and non-governmental organization to open their data to the public. Together with this, initiating an open data portal by the government can result in the creation of innovative services in the country.

## IX. OPPORTUNITIES AND CHALLENGES OF THE OPEN DATA CONCEPT IN AFGHANISTAN

We explained the demands for an open data concept in Afghanistan in the previous section. Similarly, we observed that transparency in the government, public services improvement, and fulfilling the requirement concerning the government data for the citizens of the country were the major applications to develop an open data concept in Afghanistan. Besides these demands, we are going to study the opportunities and the values which open data brings to the government as well as for the citizens of the country. Additionally, a particular number of challenges and obstacles which are ahead of development and promotion of the open data concept are described with details in the same section as well.

### Opportunities

The government of Afghanistan has been already started taking significant steps toward becoming an open government. Ratifying The Access to Information Law in 2014 by the president and participating in Open Government Partnership in 2016 are the primary examples.

To promote the open data sites concept and to encourage more initiatives, it is required to reveal the opportunities which we describe as follows:

- Improving transparency and accountability: One of the main opportunities that open data provide is improving transparency and accountability in government. On the contrary, it is a common assumption that preventing access to public sector data allows civil servants to engage in corruption behavior with impunity [53]. In the meanwhile, access to public sector data in Afghanistan is very challenging, and most of the administrative data are not in digital format. After all, Afghanistan is listed among the lowest ranked

countries regarding transparency [58]. Therefore, the Government of Afghanistan and the International Community support fighting against corruption to bring transparency in the government. By sharing government data with the public and making existing information more accessible to analyze, process and combine, GoA will experience more transparency and accountability in their public sectors, as it allows a new level of public scrutiny.

- Improving citizen's participation and self-empowerment: Access to public domain data enables citizens to make better decisions in their lives and increase their engagements in public affairs [53]. This opportunity allows Afghanistan to improve the living level of the people and increase their participation in civic activities. E-participation is the process of using IT for openness, transparency, and collaboration within the public sectors as well as it increases citizen participation in public life. Consequently, publicizing open government data using new technologies enables citizen self-empowerment, higher e-participation and civic engagement [53].
- Stimulate innovation and foster efficiency and effectiveness in the government services: By applying the concept of open data in Afghanistan and releasing government data to the public, efficiency, effectiveness, and innovation for delivering public services and internal operations within the public sectors can be significantly increased. For instance, as governmental organizations use shared datasets that published on the GoA open data portal, collaboration and exchange of information on who owns what information for what purposes is needed, this will provide the opportunity to simplify the internal procedures, automate the processes and finally reduce internal transaction costs which therefore improve the collaboration between public sector bodies [53]. Furthermore, the GoA open data portal will provide a platform to deliver innovative services. Individuals, groups, and organizations including private sector and civil society organizations can utilize the platform and re-use the data to make initiatives and develop useful mobile applications. The mobile apps built using public sector data on top of the open data platform can increase the public awareness regarding public services and help public sectors efficiently provide their services to the citizens.
- Improving trust in public institutions: In the first hand, unfortunately, Afghanistan suffers a widespread corruption inside government in the current situation. On the other hand, weakness of the public sector bodies in the implementation and delivering public services are caused that public institutions lose their credibility and trustworthiness to the citizens. To help the government build their trustworthiness image, data regarding public services required to be released and shared with the public [59]. Citizens, by accessing the data can be involved in delivering better public services.
- Creating value for the growth of economy: Open data has the potential to increase the national income which can be generated by commercializing government data. Re-using non-commercial data with no cost and reducing the cost for commercial use can increase the revenue, create new job markets such as infomediaries or innovation [60]. Moreover, providing data and information at no or low cost, allows individuals, developers, and private sectors to use that data or information for building added-value products and then marketing them [53]. This method will improve the private sector activities for increasing the national economy by paying taxes to the government.

### Challenges

Opening government data to the public creates significant social, economic and political impacts. A particular number of open data opportunities which were relevant to the context of this research were previously discussed. Besides these opportunities which open government data brings, there are many challenges toward applying the concept of open data in the country. If the proposed open data policy in this paper or any other open data policy dictate that all government data should be shared online in a machine-readable format, reusable and easily interpretable would not be useful in the current situation in Afghanistan [61]. The reason is lacking the infrastructure to deliver such a policy. However, bringing open data to the priorities of the government, Afghanistan can harness the opportunities of open data, such as fighting against corruption for improving transparency and accountability. Challenges regarding the open data concept in Afghanistan are divided into three levels:

- Technical infrastructure challenges: As already pointed out in the introduction of this section that one of the main challenges of applying the concept of open data in Afghanistan is the lack of technology infrastructure. Most of the governmental institutions do not have a proper IT structure. Therefore, it requires massive investments to provide infrastructure, enhance privacy and information security and integrate open government data tools and applications. In the same way, almost all the government data are not available in electronic format. Thus, it requires a long process with high costs to digitize all the data. Besides this, if there is a possibility of the availability of data in digital formats in some organizations, it is not up-to-date, or it is not relevant information or data. Moreover, it seems that this kind of data is not correctly formatted and are not reusable [53]. In the current situation, it may be advised for the government to establish an open data portal. This single portal will provide the possibility to integrate and share all public sectors data for significant enhancement in availability. However, poor data management practices can cause to extra efforts and costs for the government to make data available in machine-readable formats [62].
- Institutional and administrative challenges: There are significant challenges for opening government data at the level of institution and administrative. One of the problem is to ensure accountability and quality of data as well as the responsibility regarding opening data. An appropriate institutional structure inside the government is needed to drive the machine of open data in the country. A particular government agency, for example, The President's Office can act as a central body for coordinating, providing support and leading on open data initiatives and programs. There could also be another possibility that a particular ministry such as Ministry of Communications and Information Technology or Ministry of Information and Culture of Afghanistan become the responsible body to solicit the various datasets from different governmental organizations which is going be shared with the public [53]. In the case of Afghanistan, the regulations are weak or vague on what data to open and how to do it. Therefore, establishing policies considering the open data standard on what data to be free would be the responsibility of the dedicated agency regarding opening government data. There is possible lack of political will in some ministries who may not be interested in sharing the public sector data with the general public. They fear from exposing corruption or wrongdoing by publishing government data online. Currently, there is not an effective mechanism for collaboration among governmental institutions. To increase efficiency among the institutions, the establishment of an active communication channel is a requirement. Also, the capacity of human resource to elaborate and open the data is quite lacking which requires further consideration.
- Challenges at the level of demand: Lack of demand for the public sector data from the civil society and citizens is another significant challenge against open data. The application is well-articulated, and the culture of opening and consuming data in the country like Afghanistan is very low [61]. It is essential to raise the awareness of civil servants, the private sector and the citizens on their rights to access and reuse the public sector data to gain the benefits of the data. Fortunately, the government of Afghanistan has already acted for allowing the citizens to access information. The leading example is Access to the Information Law in Afghanistan. Besides, researching to discover the needs and barriers of the citizens to the information could help intensively. Public-private partners in open data shall be encouraged to participate in using, re-using and redistributing of public sector data to develop innovative services such as applications development [53]. Moreover, it is possible that the public sector data would be interpreted wrong by the citizens, as it was mentioned previously that the reason is lacking effective communication channels between the citizens and public sector bodies. Limited access to technologies is also another challenge that could reduce the speed of the process of supply and demand for open data. Besides this, the capacity to use open data is low such as analysis of the data or providing feedback, etc. [61].

In summary, developing and promoting the open data concept provide many opportunities for the government of Afghanistan and the citizens. One of the main benefits of this concept would be to bring more transparency and accountability in the government. This matter is so essential for Afghanistan because currently the government and the international community are trying to decrease the corruption in the government organizations. At the same time, there are challenges at different levels which create barriers to benefiting the open data concept.



## X. CONCLUSION

In the final analysis, governments around the world are considerably benefiting from the open data concept by initiating various national and local open data projects across the country. It is not just limited to developed countries but also developing countries have created many opportunities using the concept. On the other hand, the idea of opening data and allowing the citizens to access the government data have already existed in Afghanistan; this can be inferred from the constitution and The Access to Information Law of the country. Additionally, a particular number of open data initiatives and projects developed over the years in Afghanistan. However, the government has not yet established an open data policy or a legal framework to promote the concept of open data in a profound way. Therefore, the efforts have been made in this research to develop an open data concept for Afghanistan by suggesting an open data policy and a national open data portal. By applying the concept of open data, the government of Afghanistan can create several opportunities for the country such as strengthening the e-government and improving public services, innovating new products, increasing transparency and accountability, and advancing the citizen engagement. However, there exist specific challenges that require to be tackled.

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