



OPEN DATA  
COUNTRY REPORT  
BANGLADESH

# Open Data Country Report Bangladesh

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## List of Acronyms

A2i	Access to Information
BANBEIS	Bangladesh Bureau of Educational Information and Statistics
BB	Bangladesh Bank
BBS	Bangladesh Bureau of Statistics
BCC	Bangladesh Computer Council
BCS	Bangladesh Civil Service
BNP	Bangladesh National Portal
BTRC	Bangladesh Telecommunication Regulatory Commission
CAPI	Computer Assisted Personal Interviewing
CPD	Centre for Policy Dialogue
DSE	Dhaka Stock Exchange
DGHS	Directorate General of Health Services
EPB	Export Promotion Bureau
FOIA	Freedom of Information Act
GED	General Economics Division
GoB	Government of Bangladesh
ICT	Information and Communications Technology
IMF	International Monetary Fund
KII	Key Informant Interview
MOOC	Massive Open Online Course
OGP	Open Government Partnership
OGD	Open Government Data
RTI	Right to Information Act
SDG	Sustainable Development Goals
SID	Statistics and Informatics Division
UGC	University Grants Commission of Bangladesh
UNDESA	United Nations Department of Economic and Social Affairs

## Executive Summary

The rapid pace of advancements taking place in Bangladesh's information and communications technology (ICT) has led to the generation of data from various sectors and institutions. In line with the sustainable development goals (SDGs) and to encourage more usage of data, such as service provision using data, the Government of Bangladesh, with the support of UNDESA, has developed a strategy to make data open through the Open Data Portal. Journalists in Bangladesh, on the other hand, rely mostly on open data for their reporting purposes but they encounter challenges such as data unavailability. This raises incongruity issues among many others. This report aims to present the current situation of open data and data journalism in Bangladesh, the challenges and the needs.

This report was based on primary and secondary research. The primary research consisted of two instruments for data collection: key informant interviews and surveys. Other than data collection purposes, the key informant interviews also served to inform the design of the survey. We identified 5 primary stakeholder groups for the data collection: Government agencies, editors, journalists, data analytics agencies, and civic hackers. All the stakeholder groups participated in the key informant interviews but the survey was designed to accept responses from journalists only. The resulting data was analyzed to report on the state of data journalism and open data in Bangladesh, and to develop the recommendations.

The secondary research involved examining existing literature on the global open data and data journalism practices. Documents on open data strategies and government policies were also taken into consideration for analysis and recommendation. Furthermore, open data portals around the world, including Bangladesh, were examined and compared to identify usability problems and inform better user experiences.

We divided the findings into two main groups: the supply side and the demand side. The findings for the supply side actors mostly concern the provision and availability of open data. Open data is connected with the vision of "Digital Bangladesh", and according to A2i, it has implications for the Bangladesh's E-Government Development Index. The Open Government Data (OGD) initiative of Bangladesh sought to increase the availability of public sector data through the development of a open data portal, among many others.

Supply side actors have allayed the concerns regarding data integrity and quality by maintaining that the data collection process incorporates quality control tests at various stages of the collection process. Enumerators are well trained for the purpose and computer assisted personal interviewing (CAPI) methods are implemented to ensure the highest quality of data. Regarding data privacy and security concerns, we have learned that these are taken seriously by the BBS. However, security can be compromised sometimes and anonymization is still not fully uniform across BBS. The paucity of data in the open data portals will be fixed steadily in the years but anyone can request for data to BBS directly, if it is not available online.

Supply side stakeholders shared various challenges faced. A2i believes that raising awareness regarding the benefits of open data is a big challenge.

The majority of the demand side actors have reported that the lack of time owing to demands from media houses make it difficult for them to engage in data journalism. But inspite of that,

media houses are generally supportive in the case of pursuing data journalism. We have found that the demand side actors, especially journalists, are not well acquainted with the definition of data journalism.

The recommendations were developed following a comprehensive review of the primary (KIIs and Surveys) and secondary research. Recommendations were suggested for the two stakeholder groups:

### **Supply Side:**

#### *Ensuring Data Availability and Strengthening Interoperability*

There is a need to ensure that data is easily available for everyone. As open data is the most popular modality among journalists for accessing data, it is important that all kinds of data are made available in these sources. Often, it can be noticed that only a portion of the data is available in these government repositories or sites, and as such we recommend that the government “open up” data through these repositories. While data or information can be obtained through RTI, it is often slow and cumbersome leading to less usage among journalists in Bangladesh.

#### *Ensuring Data is Updated*

We have learned that journalists and stakeholders often do not have access to updated data. Journalists have surmised that organizations in charge of open data repositories do not monitor or track the data for updates, and hence it is often neglected. It is imperative that journalists and media houses engage the government through the help of civil society organizations to bring attention to this problem.

#### *Promoting a bottom-up approach through mass publicity*

Our findings show that the open data initiative is mostly a top-down approach in Bangladesh with the demand side being mostly passive. As such government should take initiatives to encourage the uptake of open data and publicize the usefulness of it and its connection to the SDGs. This could result in more publicity and demand, leading to more datasets being made public and updated.

#### *Improving the Usability of Open Data Portals and Websites*

We recommend that the user experience of open data portals and websites be improved through the provision of dashboards and summaries, and data in user friendly formats such as csv and xlsx.

#### *Cross country collaboration*

The open data barometer is a global measure of how governments are publishing and using open data for accountability, innovation and social impact. Based on this measure, the US remains the torch bearer of open government data along with countries such as the UK. Considering India is one of the relatively better performers in the South Asia region, we recommend the Government of Bangladesh to engage in more cross-country collaboration regarding open data with India and other better performing nations.

### *Engaging with Media houses*

Thus, it is imperative that the government engage the media houses in their discussions and implementation plans for more uptake and usage of open data. The government should specifically focus on the needs of media houses. Media houses feel that the government has the capability to ensure more open data uptake and promote data journalism. More specifically, media houses have asked for more funding in the aforementioned areas. Media houses reckon that the provision of funds will serve as a motivation and they will feel a sense of responsibility to reciprocate through increased data journalism activities and more open data uptake.

### **Demand Side:**

#### *Contrasting between Data Journalism and Traditional Journalism*

Journalists often find it difficult to differentiate between data journalism and traditional journalism considering the strong practise of traditional journalism in Bangladesh. Based on the interviews and subsequent findings, there is a general consensus among us that data journalism – although cannot be strictly defined – is not being practiced in accordance to its definition despite journalists believing they do. It is imperative that media houses acquaint journalists about these differences through practical demonstrations and workshops, preferably conducted by organizations/media houses that prioritize data journalism in their objectives or works.

#### *Increasing Awareness about the Benefits of Data journalism*

There is a need to create a strong culture of data use and data appreciation among stakeholders, mostly journalists. Like the government, media houses have a role to play in raising awareness regarding the benefits of data journalism to its journalists as awareness is very low.

#### *Training in quantitative and reasoning skills*

Based on the discussions, we surmise that journalists are not adequately trained in quantitative and reasoning skills leading to less participation in data journalism. Furthermore, journalists did not make use of quantitative skills in their current works, and as such, it is ideal that trainings in quantitative and reasoning skills are conducted to ensure journalists can transition smoothly to areas of journalism that rely on quantitative aptitude and reasoning.

#### **Exert “Positive Pressure” on the government**

Journalists and editors agree that it is not only the duty of media houses to promote data journalism. A feat such as this remains a difficult task and requires the active support of the government and civil societies.

#### **Self Initiatives and self capacity building**

Journalists and media houses have underscored the importance of self initiatives and self-capacity building during the interviews conducted. We recommend journalists to engage in data journalism through personal projects and showcase their works within media houses to pique their interests.

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## Chapter 1 Introduction

The use of data in stories by journalists can be traced back to the very beginning of the journalism profession. However, the ubiquity of data nowadays coupled with incredible internet connectivity, and other technologies such as cloud computing, mobile devices and open-source software has led to the emergence of a new paradigm in journalism: data journalism (1,2). There is no agreed upon definition of data journalism, however, an often-cited definition is the “gathering, cleaning, organizing, analyzing, visualizing and publishing data to support the creation of acts of journalism” (3). Another definition of data journalism incorporates the term open data: “a qualitatively new way of reporting which gains insights about relevant societal trends by analyzing open datasets using (semi-)automatized methods to detect meaningful patterns in data structure” (4).

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*“Open data is data that can be freely used, re-used and redistributed by anyone - subject only, at most, to the requirement to attribute and sharealike.”*

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Building on the second definition on data journalism, it is still a matter of discussion among researchers whether data journalism needs open data, or vice versa. Open data has been used in data journalism, often in combination with datasets obtained through Freedom of Information Act (FOIA) or Right to Information Act (RTI), to deliver interesting content; however, at the other end of the spectrum, there have been contents of very little journalistic value too. The relation between open data and data journalism is precarious: journalists will not make use of open data if they do not consider it to be rich source of journalistic content, while data policy makers will not find the urge to improve on the stream of data or provision of open data until they are under pressure to do so (5).

Globally, opening public data by the governments is a fruit of arguments and persuasion of development professionals, activists and researchers. In certain cases, the government was responsive, and, in others, the idea of open data was not welcomed. In the US, the open data movement gained momentum when then president Obama mandated for government data to be made available to the public in 2009. As such, in 2009, the United States launched the national data.gov portal. Soon, other countries followed suit, with the 2016 Open Data Barometer (<https://opendatabarometer.org/>) reporting that 79 countries out of 115 surveyed had official open data initiatives, with many others indicating plans to start such initiatives soon. 78 countries are members of the Open Government Partnership (OGP) (<https://www.opengovpartnership.org/>) , a multilateral network established in 2011 to promote more transparency and accountability within governments. A sizable half-percentage of those member countries are from the developing world, indicating that the open data movement is not only confined to the developed world.

Much of the discussion so far referred to the open data produced by the public sector, and as such, the term Open Government Data (OGD) will be adopted in the report to refer to public sector data that are published in an interoperable and standard format for enhanced public usage (6). In fact, research reveals that open data is primarily driven by governments rather than by users (7). Despite the numerous initiatives taken to promote open government data

around the world, there are accessibility and usability challenges that prevent more usage (8,9). On top of that, open data in the developing world is limited in supply; data portals are not updated with the latest data series and data, in many instances, are not available in machine-readable format (10).

Bangladesh, a developing country, has witnessed rapid pace of advancements taking place in its information and communications technology (ICT). This has led to the generation of data from various sectors and institutions. Data pertaining to the economy, broadband and mobile data usage, health, education, among many others, are collected at the national, division and district levels. Despite open government data being available online through multiple public sector institutions, it is highly fragmented and sometimes inaccessible by the general populace (11).

The Government of Bangladesh mandated in 2016 to make open data a reality – in line with its development strategies. The then Access to Information Programme at Prime Minister's Office (A2i), a whole-of-government program of the ICT division of Bangladesh, initiated a project to increase the accessibility of data among the citizens through an open government data portal (<http://data.gov.bd/>). More specifically, the OGD portal developed by a2i targeted to solve the problem of data fragmentation and inaccessibility. This meant that the collected data would be made available to the public through a centralized portal, paving the way for the open data movement in Bangladesh.

Despite the creation of the OGD portal by a2i, the data download rate and the number of applications created based on the data have been less than expected (6). A criterion to measure the success of open data, among others, is through the number and the impact of the services created through the data (12) and, as such, it is pertinent to ask why this success has been limited in Bangladesh. In our findings, it was found that the relevant ministries were not in a position to share data in the portal due to lack of priority.

Compared to Bangladesh, other countries such as the US have a more thriving open data culture. The US boasts a growing community of open data users. This can be attributed to the size of the journalism community in the country and the relative coherence of the data journalism community within it, which have shaped the ecosystem that gives rise to more creative forms of reporting and data usage. Despite that, in the U.S, journalists are not seen as the end users of open data by the government. As president Obama sought to involve the public in open data initiatives – effectively giving the people to scrutinize and decide for themselves - and other broader reporting, journalism was cut out by not being emphasized nor mentioned in U.S open data manifestos and policies (5). A similar case can be made for Bangladesh where journalists have not been specifically identified as end users (13).

As described above, one of the important stakeholders that can possibly play a role in the propagation of open data or open government data is journalists. This leads to the question if, and how, journalists in Bangladesh can play a role in the propagation of open data and data journalism, similar to their US peers. There are vast differences between the journalistic climate of Bangladesh and the US, where the latter boasts significant media freedom. For instance, the Right to Information act (RTI), a landmark legislation, that is meant to instill transparency and accountability in public administration through “openness” is not very

popular among Bangladeshi journalists due to its “slowness” (14). The scenario is much different for US journalists, where the freedom of information act (FOIA), the US equivalent of RTI, is preferred for data collection– even more than open data. (5). Aside from the external constraints, the journalism curricula in Bangladesh emphasizes the traditional skills which means new and specialized media skills are not taught in classrooms (15).

### **State of Open Data and Data Journalism: Scope of the Country Report**

The descriptions above highlight that the current situation of open data and data journalism in Bangladesh is not favorable. Bangladesh presents a distinct context where there is information asymmetry, emerging technologies, and journalism norms which are unique to the region. A comprehensive study on open data and data journalism in the context of Bangladesh has not been conducted before. Hence, it is high time to have a systematic review of open data and data journalism. In light of all the discussion above, this study contributes to the literature through the investigation of the following scopes:

**Data Infrastructure:** Despite the rapid pace of advancements in ICTs, Bangladesh’s data infrastructure and technical platforms within institutions is still in its nascency. The data collection system will be explored for robustness.

**Legal Framework:** Legal frameworks usually are put in place for the benefit of the community as a whole but there can be differing perceptions among stakeholders. Legal frameworks like the Right to Information Act, and section 57 of the ICT act, among others, will be explored to find out if they conducive to open data and data journalism.

**Open Data repositories in Bangladesh:** The government of Bangladesh collects enormous amount of data and releases some of them to the public. We will explore if there are particular mandates and policies regarding what kind of data are to be made public. Additionally, the general populace is often not aware of these repositories, hence we will map the open data repositories of the government and the private sector.

**Capacity:** A capacity assessment will be conducted for professional journalists in terms of understanding of data and usage for generating insights for reporting. It has been outlined that new and specialized media skills are not taught in classrooms, hence we will find out how, if any, journalists are learning new skills to adapt to the changing face of journalism.

**Data usage and sharing culture:** As assessment will be made on how journalists make use of the data and how data is collected. With data being generated on a daily basis, we will explore the sentiment of the demand side stakeholders when it comes to accessibility and usage, particularly analysis.

**Data Quality:** With the enormous quantity of data generated, there are concerns regarding the data quality aspects, including data integrity, which journalists need to be cautious about. We will explore if there are specific mandates or policies pertaining to data quality, and how data quality is ensured from collection to release.

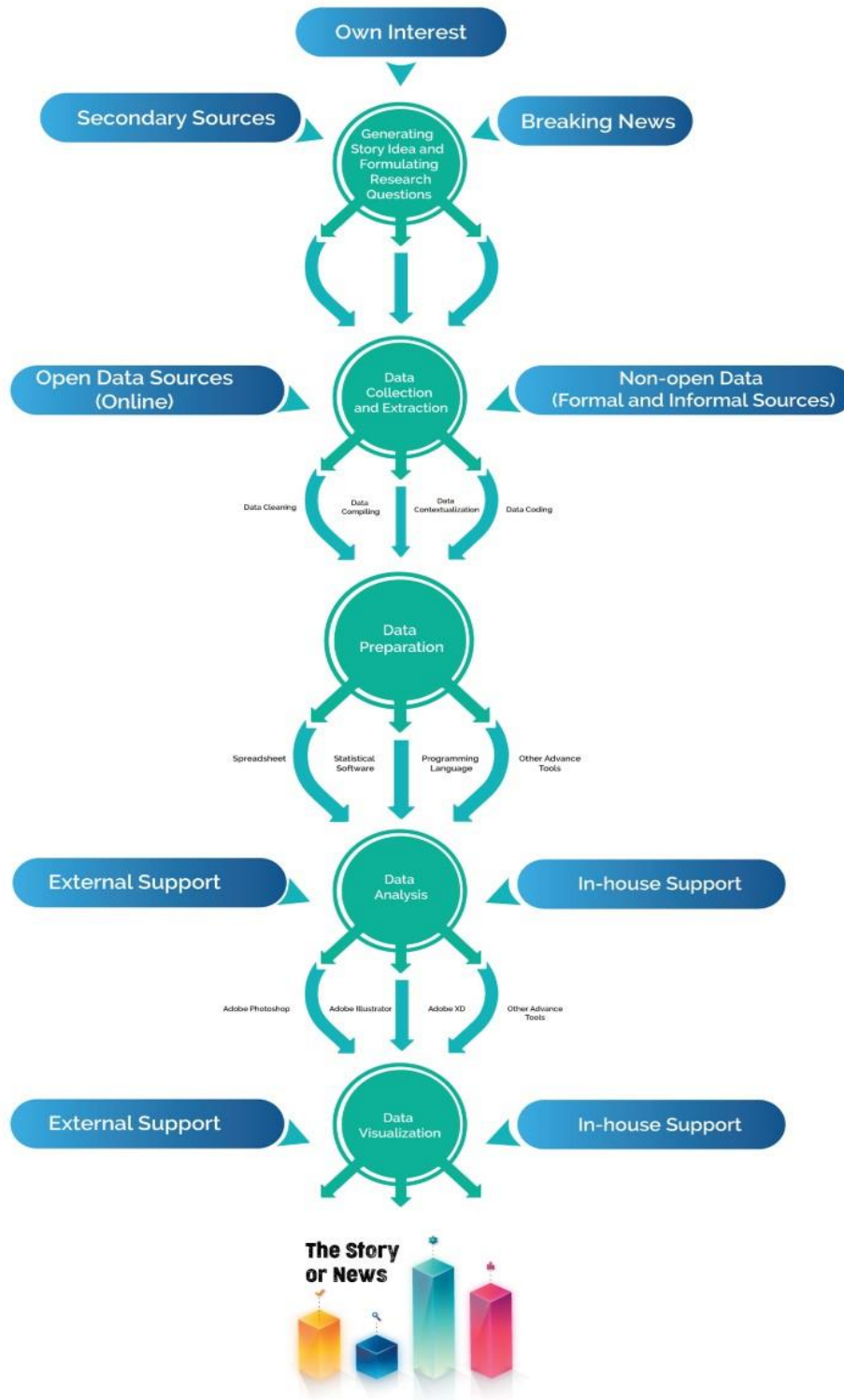
The report is organized as follows: Chapter one lays out the big picture of open data and data journalism in Bangladesh, and why it is imperative a study is conducted on issues pertaining to open data and data journalism. Chapter two lays out the methodological framework of the

study where we present how the study is designed, including the definition of supply-side and demand-side stakeholders. Chapter three explores the supply side issues, including challenges and needs. Chapter four looks at the demand side issues, highlighting their particular challenges and needs. Chapter five presents a compilation of recommendations and action agendas derived from the evaluations of the supply side and demand side, and literatures.

## Chapter 2 Conceptual and Methodological Framework

This study incorporates secondary and primary findings. Extensive desk research of existing literature was conducted which includes documents from relevant government agencies and private institutions. A checklist for the key informant interviews (KIIs) was developed iteratively using information obtained from KIIs and past reports. Subsequently, the key informant interviews informed the design of structured questionnaires. Structured questionnaires or surveys were developed specifically for the journalists (sample size = 30).

Figure 2.1 Data Journalism Flowchart



The data gathered from the secondary and primary research were analyzed and presented from both the supply side and demand side perspectives.

The supply side includes those who generate data, and who may or may not publish data openly for everyone to use freely. Government agencies such as the Bangladesh Bureau of Statistics (BBS) and Bangladesh Bank are the supply side stakeholders in this report. Private institutions may also generate data and publish it openly for use, however, they were not considered to be a part of the supply side in this report.

The demand side includes users of open data who may or may not use it for data journalism purposes. Thus, it includes editors, journalists but also data analytics agencies and civic hackers. It should be noted that government agencies can also be a part of the demand side, particularly during the provision of public services using open data. This demand side issues chapter of this report particularly focuses on data journalism and hence data journalists, despite there being many stakeholders in the demand side.

The particular stakeholders in this study are as follows: Government Agencies, Editors, Journalists, Data Analytics Agencies and Civic Hackers.

*Table 2.1 List of Stakeholders*

Stakeholder Group	Side	Number of interview sessions <sup>1</sup>
<b>Government Agencies</b>	Supply Side	2
<b>Editors</b>	Demand Side	9
<b>Journalists</b>	Demand Side	14
<b>Data Analytics Agencies</b>	Demand Side	1
<b>Civic Hackers</b>	Demand Side	2

**Table 2.1** presents the particular stakeholder groups considered in the key informant interviews, the corresponding sector they belong to and the number of respondents (participant) from each stakeholder group in the interviews. It should be noted that six journalists were engaged in economic and business reporting.

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<sup>1</sup> All the interviews sessions consisted of individual interviews with the exception of a2i and Economic Reporters' Forum (ERF). The interview session consisted of 6 and 5 personnel from a2i and ERF respectively.

## Chapter 3 Supply Side Issues

### 3.1 Current Scenario of Open Data in Bangladesh

The concept of open data in Bangladesh has its roots in the vision of “Digital Bangladesh”. As such, it is imperative that an understanding of “Digital Bangladesh” is established before proceeding to open data. “Digital Bangladesh” is a development strategy that aims to utilize ICTs for poverty reduction and improvement in the daily lifestyles of people. It also aims to ensure people’s democracy and human rights, transparency, accountability, and justice that will ultimately benefit the citizens of Bangladesh and lead Bangladesh to become a middle-income country by the year 2021.

*Figure 3.1 Outline of Info-Sarker Initiatives*

**Bangla-GovNet Network Coverage:**

- 240 Ministry/Division/ Department
- 64 Districts
- 64 Upazila as a pilot project
- IP Telephony

**Info-Sarker-II Network Coverage:**

- Connect all government offices at the district level (on an average 55 offices for each District).
- Connect all government offices at the upazilla level (on an average 30 offices for each Upazilla).
- Backbone Connectivity from 64 Districts to 487 Upazillas (including those 64 Upazillas which have already been covered in Bangla GovNet project).
- 803 Video Conferencing System at different Ministry/ Division/ Departments/ Divisions/ Districts/ Upazillas
- 25 Telemedicine service at Rural government Hospital.
- 487 Solar system at 487 UNO Offices.

**Info-Sarker-III Network Coverage:**

- 20,000 km optical fiber cable to 2600 rural administrative units (Union) and 1600 police offices within June 2018.

Info-Sarker Project is the benchmark initiative to make Bangladesh “digital” by connecting the entirety of Bangladesh including its people, organizations and resources through internet connectivity. The Info-Sarker Projects form the ICT backbones to power government offices in districts and upazillas (16,17) and have been conducted in three phases. The main objective of the third phase of the project is to extend the government ICT network to the lowest tier of administration, especially at the union level. Under Phase-3, popular e-services (public and private) like

birth certificate, citizen certificate, migrant worker’s registration, mobile financial service, etc. are now serving smoothly to the rural people (18).

The vision of “Digital Bangladesh” ties the citizens and the government together, and involves the efficient and transparent delivery of public services through e-governance (19). Initiatives such as Eksheba which bring all the government services in one place, such as the renewal of passports or the application for National Identification Card replacement, form the cornerstone of e-governance initiatives (20). It is not only apt to speak of these initiatives as most of the open government data rest on the ecology of these government informatics, but also because systems of such scale, and hence open data, would have been inconceivable before the advent of “Digital Bangladesh”.

In connection with the Digital Bangladesh agenda, the Government of Bangladesh creates and maintains vast amounts of different types of data in different sectors including Health, Education, Agriculture, Tourism, Finance & banking, and etc. The government of Bangladesh also maintains the national SDG tracker, a searchable database which provides a snapshot of



the global and national priorities. Through the SDG tracker, the government of Bangladesh provides meta data and data visualization of the various indicators and goals of the sustainable development goals (SDGs). This is possible because of the data that is collected by the Government of Bangladesh, as mentioned earlier. However, the SDG tracker does not provide access

to the datasets that are used for the provision of the snapshots which include the visualizations. Providing the citizens open access to such datasets has been demonstrated to have positive impacts such as transparency, good governance, efficiency and more citizen participation. It is expected that citizens and the private sectors, through the use of these open datasets, will add value to the original datasets through the creation of more services and facilitating the uptake of more services (13).

The Open Government Data (OGD) initiative of Bangladesh was undertaken to materialize the idea of opening up public sector data. But, it is interesting to note that that the OGD, and hence the opening up of public sector data, was itself part of an initiative to achieve the sustainable development goals (SDGs), particularly goal 16, which sought 'to promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels' and its targets. In fact, the access to more and better data is a precondition of all the 17 SDGs (21,22,23). Furthermore, discussions with a2i, a whole-of-government program of the ICT division, revealed that the OGD initiative is also one of the ways through which Bangladesh seeks to improve its ranking in the E-Government Development index conducted by the United Nations Department of Economic and Social Affairs (UNDESA) every 2 years.

a2i undertook the initiative to develop the open data portal by providing technical support. Three committees were established to operationalize the initiative: executive committee, implementation committee, and a working committee.

The objectives, as highlighted in the Open Government Data Strategy are:

- 1) To encourage developing innovative solutions for better public service delivery
- 2) To enhance scope of research to identify and develop innovative solutions.
- 3) To create opportunities for new jobs and more investment.
- 4) To make government more transparent and accountable

Our discussion with a2i lead to the finding that Bangladesh Bureau of Statistics (BBS), and Statistics and Informatics Division (SID) have been tasked with supporting a2i with the data. These two institutions will be accountable for the collection of data from the various ministries, data validation and planning. a2i is responsible for the technical and implementation parts to make sure the data is freely available online for different stakeholder groups. a2i has expressed plans to integrate all the public departments – under the ministries – through the OGD platform.

The OGD development in Bangladesh first began with the implementation committee sending letters to each of the public sector departments/ministries, explaining the initiative of OGD and asking each of the departments/ministries to nominate a data focal. It is also important to note that this data focal will also be responsible for providing data for the OGD and the SDG tracker too. A data focal is meant to represent a particular departments, mostly working to ensure departmental data is shared with a2i. Every data focal gets to attend workshops to

acquaint themselves with the OGD initiative, receive training and participate in meetings with a2i to relay their particular concerns and issues. The OGD portal went live initially with 14 departmental data. There are currently 170 datasets from 36 government agencies in the data.gov.bd portal.

### The Open Government Data Strategy

The open government data strategy outlines the strategies of the government with the aims to:

1. Embed open data practices within the Government.
2. Engage with the open data community.
3. Enhance open data based on demand

In this section, we review some of the core parts of the open data ecology which comprise of the identification of open data, assessment, release, and publishing and enhancements.

#### **Identification of data to be released as open data**

This will be determined by the Government of Bangladesh through various ways, some of which include:

- a) Reviewing data that has already been published on National Portal
- b) Reviewing requests for datasets received directly from the public through departmental correspondence process.
- c) Reviewing the data searching trend in the National Portal and in e-Thathyakosh.
- d) Data request survey by Open Data Portal
- e) Engaging Open Data Working Group to assess existing data repositories in both the public and private Sector.
- f) Engaging potential users of open data to understand the demand for datasets.

#### **Assessment of Open Data candidates**

Through such assessments, the government will determine which datasets are to be made public. According to the Open Government Data Strategy, private or commercially sensitive data will be subject to protection and will only be released provided it is summarized or in de-identifiable formats. Competent authorities of the Government under some standards and policies will be tasked with the assessment and validation.

#### **Releasing Open Data**

Prior to the release of open datasets, quality checks will be performed on it. The releases of open datasets will be scheduled based on assessment results, logical groupings of datasets and available resources.

#### **Publishing Open Data**

Open data will be cataloged and published so it can be easily discovered in the Government Open Data Portal integrated to Bangladesh National Portal.

#### **Enhancement of Open Data**

Enhancements to open data will be demand driven and may take many forms including:

- a) frequency of publication;
- b) new data download formats;
- c) correcting reported errors and
- d) Using standards-based classification schemes.

### Mapping Open Data in Bangladesh

There are various government ministries that openly publish datasets (partial/full) and reports. Below we list some of the popular ones based on the key informant interviews.

**Table 3.1 Popular Open Data Institutions**

Organization	Sector	Data Type
Bangladesh Bureau of Statistics (BBS)	Public	Various Sectors
Bangladesh Telecommunication Regulatory Commission (BTRC)	Public	Broadband, Mobile Data
Bangladesh Bank	Public	Finance and Economy
Bangladesh Institute of Development Studies (BIDS)	Autonomous (Public Body)	Socio-economic Data
Bangladesh Bureau of Educational Information and Statistics (BANBEIS)	Public	Education
University Grants Commission of Bangladesh (UGC)	Public	Education (Universities)
General Economics Division (GED)	Public	Economy
Centre for Policy Dialogue (CPD)	Private (subject to formal requests)	Economy, Agriculture, etc.
Export Promotion Bureau (EPB)	Public	Exports, Trade Balance
Dhaka Stock Exchange (DSE)	Public	Securities
Directorate General of Health Services (DGHS)	Public	Health

According to a research conducted by a2i, education and health data are the most demanded datasets by the citizens of Bangladesh (24). This was also observed during our key informant interview sessions where participants – both demand and supply side – brought up conversations pertaining to the education and health sector data, despite the majority of the participants being business and economy journalists.

**Table 3.1 Popular Open Data Institutions**

Organization	Sector	Data Type
Bangladesh Bureau of Statistics (BBS)	Public	Various Sectors
Bangladesh Telecommunication Regulatory Commission (BTRC)	Public	Broadband, Mobile Data
Bangladesh Bank	Public	Finance and Economy

Bangladesh Institute of Development Studies (BIDS)	Autonomous (Public Body)	Socio-economic Data
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According to a research conducted by a2i, education and health data are the most demanded datasets by the citizens of Bangladesh (24). This was also observed during our key informant interview sessions where participants – both demand and supply side – brought up conversations pertaining to the education and health sector data, despite the majority of the participants being business and economy journalists. lists the institutions that demand side users have frequently identified as important data providers – for their professional work. While data analytics and consulting agencies - from the private sector - shared with us that they store a significant number of datasets, they unfortunately cannot share such datasets publicly owing to the clients’ restrictive data sharing policies. However, one analytics agency mentioned that there are plans to openly share old (2 years or more) datasets of clients provided the clients concur.

Before proceeding to the subsequent sections, it is pertinent to define what we mean by a dataset. We posed this question to our stakeholders, demand side and supply side. We have found out that the definition varies between these two groups and this difference in the nomenclature is often the source of most of the “misunderstandings” between the supply side and demand side.

When the demand side – in this report - speaks of a dataset, they are mostly referring to summary statistics which are often not disaggregated and number in the tens, at most hundred observations. The supply side defines a dataset as consisting of a large number of observations often in 4 digits or more, which they term as “micro-data”. The supply side has made it clear that no such large “datasets” or “micro-data” can be found online with the exception of the open data portal. What the supply side provides online are reports containing summary statistics.

How, then, does this difference in definition contribute to one of the many disagreements between the supply-side and the demand side is a vital question. The demand side users often complain that “datasets” provided in pdf and image formats are not conducive to reporting, with almost all of them preferring them in machine readable formats such as xlsx and CSVs. But, the supply side reiterated that what they provide are reports containing summary statistics, and as such, reports are to be provided in PDFs.

## Data Integrity and Quality

Data integrity and quality is an important aspect of the open data process. There have been concerns with many demand side participants sharing that the data quality and integrity leave a lot to be desired in terms of accuracy and currency. To understand these concerns, we spoke with government officials who are involved in the provision of data and quality checking.

One government official working for the BBS reported that there should be absolutely no concerns regarding data quality and integrity considering the data that they collected have to undergo numerous tests in different stages. He/she gave us a description of this process. For instance, in the past five years, as a result of digital Bangladesh, their institution has switched from “paper and pencil method” to the CAPI (computer assisted personal interviewing) method to collect data. The CAPI method entails the use of tablets for the purpose of data collection which is set up with their institution’s data collection application. The application is configured with various logical parameters and restrictions that ensures the data quality. For instance, a variable like monthly income is configured to not accept extremely high values in a poor region. Additionally, to prevent the input of spurious data, GPS trackers are set up with every device to ensure that enumerators are collecting data from the predefined locations.

BBS has its own pool of trained enumerators but regardless of their abilities, they get around 10 days of training before the commencement of any data collection survey. Interestingly, BBS also recruits university students as its enumerators in the case of core surveys – which are deemed to be very important and are of national interest.

The data that is collected through the enumerators has to go through stages of data quality checks. The first is the data quality checking at the enumerator level which is through the use of the application logic in the tablet. Next, this data is sent back to a server which is operated by a BBS personnel for the purpose ensuring integrity and checking data quality. The BBS personnel makes sure to send back dubious survey forms to enumerators to conduct all or part of the survey. These personnel also make sure that the sample size and gender representation is achieved. Region-wise averages are calculated from the collected datasets which are checked to ensure they agree with the expected region averages.

Once the supervisors or the personnel believe that data quality and integrity are ensured, this data is sent back to the project supervisors for approval.

## Data Privacy and Data Security

Data privacy remains a core concern all over the world and it is slowly being integrated in Bangladesh. The government of Bangladesh, through the enactment of the Digital Security Act, 2018, has stepped into this data protection and privacy realm. Section 26 of the Digital Security Act, 2018, underscores the need for consent when it comes to the collecting, selling, preserving, supplying, or using “identity information”, with a breach resulting in fines and jail time.

We asked a cyber security expert who currently resides outside the country regarding the state of the data security infrastructure in Bangladesh. He opines that it is very poor. As of 2020, there have been two major hacking incidents in Bangladesh. One during 2013 and the other occurred in 2016 which involved bank reserves.

According to him/her, the government was not that alert while developing their infrastructural securities and improving the systematic flaws. In fact, the government does not invest in security development and the structure is very primitive. In Bangladesh, the ICT security is still firewall centric (90's security system). But, nowadays AI driven security culture is growing and Bangladesh is lagging behind in this respect.

A BBS official shared with us that the data privacy and security is taken very seriously in BBS with good security and protection systems. However, he does believe that sometimes hackers maybe smart enough to infiltrate even the most advanced systems, and as such there is not much that can be done in this aspect. Regarding protecting the privacy of the those that provided data through surveys, the official shared that this is one area where BBS faces some weaknesses. The system of anonymization must be strengthened, which he very much agrees. However, he described how he goes to deep lengths to prevent the identification of users and to protect their privacy,

"I make sure that the column which identifies them through their name is deleted, alongside that, we also make sure to remove GPS and other location data".

#### Data Availability and Currency

Demand side users have expressed how data unavailability, especially the lack of update causes problems during news reporting or report publishing, referring to the paucity of data

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*"I went to the ministry of finance, the finance division website, to find out the budget update, so there I found that, FY20, that is for fiscal year 19/20, the update is there till the month of April. Please try to understand, 19/20 April, which means April of this year. Whereas now it is October, .... It has been six months."*

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for reporting. But one demand side user acknowledged that there are other public sectors

sites like BTRC that are producing timely data and Bangladesh Bank's selected indicator data among others.

With regard to these concerns, we tried to find out why data is not being made available, especially in the open data portal. We especially relayed this concern to BBS, considering they are tasked with making datasets available in the open data portal. We found out that BBS will be increasing the number of datasets in the open data portals steadily in the upcoming years. However, considering BBS generates revenue through selling datasets, this "opening" of datasets could slowdown.

But officials from the BBS have ensured that almost all of the datasets they collect are open in the sense that these can be collected through the payment of fees or a request letter. But, there are still restrictions such as only 5 percent of the census data can be provided.

We also sought to find out why datasets are made available through pdf formats and not in machine readable formats like xls/x/CSVs which are conducive for data analysis. The official

informed us that they never publish BBS datasets in public, with the exception of the open data portal. Hence, all the “pdfs” are in actuality reports and not datasets. These pdfs are summarized descriptive reports of the collected datasets.

#### Extent, quality and access to ICT facilities by government officials

The government body that is responsible for the provision of ICT support and services to the government organizations and agencies is the Bangladesh Computer Council (BCC). According to Wikipedia, it is a “The Bangladesh Computer Council (BCC) is a statutory and autonomous government body located in Dhaka, Bangladesh, that aids in the use of information technology and the formulation of related policy”<sup>4</sup>.

The main aims & objectives of BCC include<sup>5</sup>:

- a) Promote the effective application & Expansion of ICT
- b) Develop Human Resource for effective use of ICT
- c) Formulate & Implement National Strategies and Policies regarding Computer & ICT
- d) Cooperate with the Government and other agencies to implement the Objectives of the National ICT plans
- e) Advise and Encourage the Government and other agencies for the use of Computer & ICT
- f) Determine the Standards and Specification for Computer and ICT at the National level

BCC has been tasked with the implementation of the national E-Government network. There have been three phases of implementations so far:

- 1) Development of National ICT Infra-Network for Bangladesh Government Phase-I (BanglaGovNet) Project
- 2) Development of National ICT Infra-Network for Bangladesh Government Phase-II (Info-Sarker-ii) Project.
- 3) Development of National ICT Infra-Network for Bangladesh Government Phase-III (Info-Sarker-iii) Project.

#### Capacity and Interest

Capacity and interest of the supply side is always an area of contention. Demand side users are of the opinion that supply-side stakeholders are not actively ensuring smooth transmission of data for public usage due to lack of capacity and interest. As such, we sought to understand this from the supply side perspective.

An official from the BBS notes that their institution is one of the few institutions in the country that one can rely on when it comes to statistical data analysis and processing. He/she notes that this is what they have been doing for years and he/she has no reservations when it comes to capacity and interest levels. He/she provided an example that BBS personnel are well equipped with the skills to work with large datasets.

However, he notes that there can be differing methodologies between different project supervisors or leads, and this lack of uniformity can cause issues considering each and every project supervisor has his/her own way of designing the methodology.

## Legal Framework

The legal frameworks listed below are pertinent to issues surrounding open data and data journalism in Bangladesh.

### **The Right to Information Act**

The right to information act, 2009, specifies that any citizen can seek or demand information from an authority, and the authority is bound to act on that request barring some exceptions. The RTI Act, 2009, has not designated only government or public authorities but private organizations that run on government or foreign funds also fall under the purview of this act.

Concerned citizens, which include the likes of human rights defenders, academicians, civil societies, non-governmental organizations, media personnel among many others have placed demands for such an Act for a long time. The RTI act, 2009 is thought to be a landmark and progressive legislation promoting human right and ensuring transparency and accountability (25).

### **The Official Secrets Act 1923**

The Official Secrets Act, 1923 is Bangladesh's anti-espionage act held over from the British colonial period which states that actions which involve helping an enemy State against Bangladesh are strongly condemned. It mentions that one cannot approach, inspect, or even pass over a prohibited government site or area. According to the Act, helping the enemy State can be in the form of communicating a sketch, plan, a model of an official secret, or passing of/transfer of official codes or passwords, to the enemy.

Punishments under the Act range from two to fourteen years of imprisonment, or fine or both and a person prosecuted under this Act can be charged with the crime even if the action was unintentional and not intended to endanger the security of the state. The Act empowers only persons in positions of authority to handle official secrets, and others who handle it in prohibited areas or outside them are liable for punishment.

When a company is seen as the offender under this Act, everyone involved with the management of the company, including the board of directors, are liable for punishment. In the case of a newspaper, everyone – including the editor, publisher and the proprietor – can be imprisoned for the offence. Likewise, it is applicable to any governmental and non-governmental position whatsoever.

### **Section 57 of ICT Act**

Section 57 of ICT Act authorizes the prosecution of any person who publishes, in electronic form, material that is fake and obscene; defamatory; "tends to deprave and corrupt" its audience; causes, or may cause, "deterioration in law and order;" prejudices the image of the state or a person; or "causes or may cause hurt to religious belief."

### **Digital Security Act**

The Digital Security act has purportedly replaced section 57 of the ICT Act and seeks to address a wider range of cybercrimes than its predecessor. Section 8 of the Digital Security Act allows for removal or blocking of data-information if it is found to be a threat to digital Security



and/or disrupts the unity of the country, including economic, security or public order disruptions.

### 3.2 Challenges and Needs for Open Data in Bangladesh

The challenges and needs for open data in Bangladesh are best viewed from the perspectives of different stakeholders including demand side stakeholders. Hence, we present some of their viewpoints regarding the challenges and needs.

#### **Stakeholder: a2i**

A2i have raised three key challenges they face while trying to make open data operational. The first challenge is not being able to raise awareness regarding the usability of data among the departments – under ministries - providing the data. This means making those specific departments understand that the purpose of sharing the data is so that other stakeholders can generate services out of the data they have provided. According to the supply side, this is crucial because if the ones providing the data do not understand the purpose behind their sharing, then they (departments) themselves will lose interest someday. But a2i believe that this awareness raising is also applicable to the ones who will be using the data, that is the citizens, otherwise interest levels would not sustain in the demand side as well.

The second challenge involves the regular transfer of focal persons who are assigned to deal with the data sharing process on behalf of their respective departments. The data focals comprise of bcs cadres, and they often get transferred – taking a different role - to other agencies/ministries which renders the entire sensitizing and training process futile. This means that the same process of training and sensitizing a new data focal has to start again from the beginning - to get him/her acquainted with the whole process - which is problematic.

The third challenge is the lack of funding. Conducting initiatives and workshops require money which is often challenging with limited funds.

A challenge, although not explicitly mentioned by a2i, is that BBS has a mandate/policy through which it can sell data for money. As a result, BBS are reluctant to share data (survey data) - to make it open - in fear of losing revenue. There has not been much progress in the sharing of those survey data with a2i which means a lot of useful data do not get uploaded to the open government portal. However, according to a2i, BBS have started the initiation to share and may continue to make such surveys data open owing to the new decisions that will be decided by the management of BBS.

For a2i, the needs are inherently linked to overcoming the three challenges identified above. A2i have suggested that stakeholders including the general populace should be made more aware regarding open data. They feel that the supply side requires the engagement of the demand side too, which particularly has not been very much optimistic, for the propagation of open data. A2i have also suggested that assigning non-BCS personnel, particularly those who are less likely to get transferred such as programmers and systems engineers, as data focals will address the second challenge and immensely reduce the costs (including time).

#### **Stakeholder: Civic Hackers and Security Experts**

Civic hackers and Security Experts (demand side stakeholders) have maintained that the open data scenario in Bangladesh is not a thriving one. However, civic hackers believe that the amount of data or the number of datasets is “good enough” for demand side usage. The problem that they have identified is accessibility. Similar sentiments were also echoed by journalists. Accessibility issues such as data not being easy found, and broken links to datasets have plagued users for a long time.

## **Our Thoughts**

### Interoperability and Infrastructure

We have extensively reviewed country reports on open data, and examined numerous open data portals around the world. While we also echo the same thoughts as civic hackers and security experts when it comes to accessibility issues, we believe that the problem stems from the underlying ICT infrastructure. Despite the fast and steady progress in the field of ICT in Bangladesh, based on our observations, there seems to be a lack of standardization in the data collection process across the departments. This lack of standardization across various government departments contributes to interoperability issues whereby data that is collected is not in a format that is uniform across departments.

We have heard from a2i that the data that they collect is of differing formats, despite their repeated attempts to solve this issue. It is extremely difficult and time consuming for data to be processed from PDFs, which makes opening datasets slow. This is also problematic for demand side users who often find data available in PDF formats which is not very useful for usage, particularly if the datasets are large.

## Chapter 4 Demand Side Issues

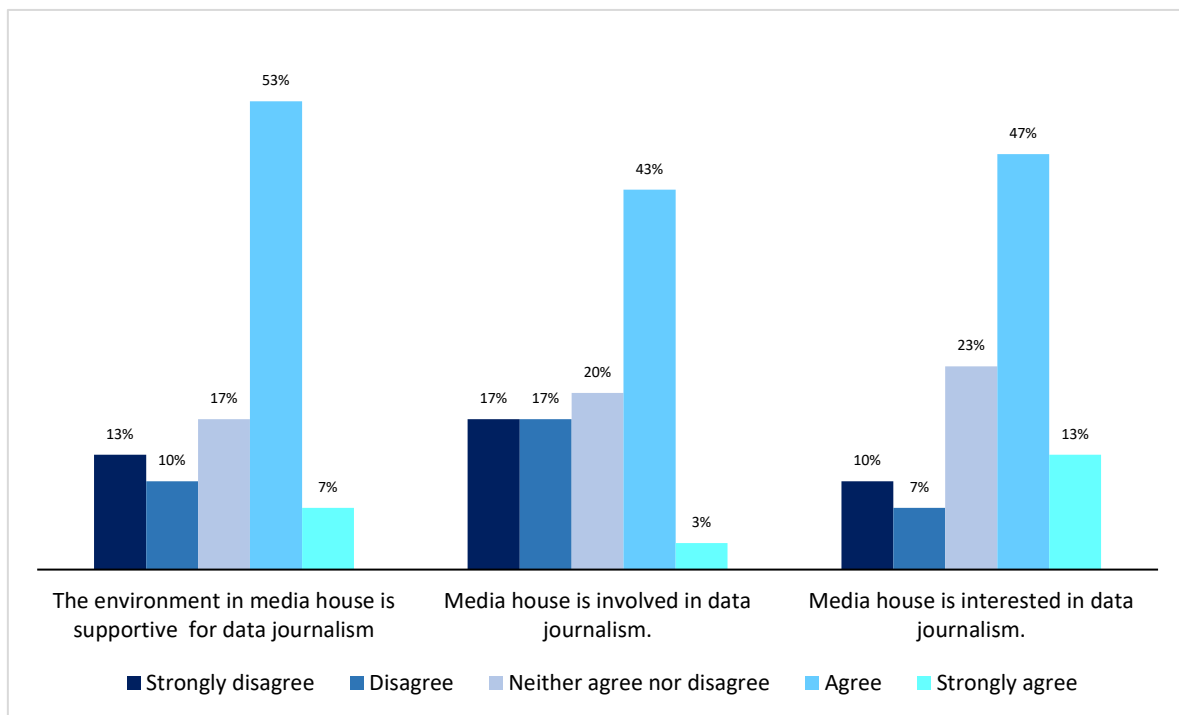
### 4.1 Current Practice of Data Journalism in Bangladesh

Data journalism is often paired with open data in the age of publicly available datasets. In fact, it is often thought of sharing a symbiotic relationship with open data. Despite this, open data has not had much influence over data journalism. This is true even for the United States where journalists prefer to obtain their data through FOIA. In this section, we will explore data journalism in the context of Bangladesh and understand if open data has had any impact over it.

We begin by understanding how well acquainted the demand side stakeholders are with data journalism. The KII conversations with the demand side stakeholders firstly reveal that they are not well acquainted with the proper definition of data journalism. This is something we observed indirectly instead of explicitly asking them to define the term. Despite that, our survey with the journalists reveal that 87 percent of them have experience in data story telling or data journalism.

When journalists and editors refer to data journalism, they often equate it with data visualization. Despite there not being any standard definition of data journalism, the stakeholders did not bring up aspects of data journalism such as cleaning, analysis and data storytelling during the discussions for us to confidently say that they understand what data journalism is or entails.

Figure 4.1 Role of Media Houses We then tried to understand how big of a role their media



house plays when it comes to data journalism. *Figure 4.1* shows that 43 percent of the journalists agree that their media house is involved in data journalism with only 3 percent agreeing strongly. Thus, less than half of the journalists surveyed agree, in general, that their media house is involved in data journalism. However, we notice that 60 percent of the

journalists agree that they have a supportive environment for conducting data journalism, and the media houses have interests. Thus, there are hints of adoption of data journalism being at its nascent stages.

Figure 4.2 Media House Amenities

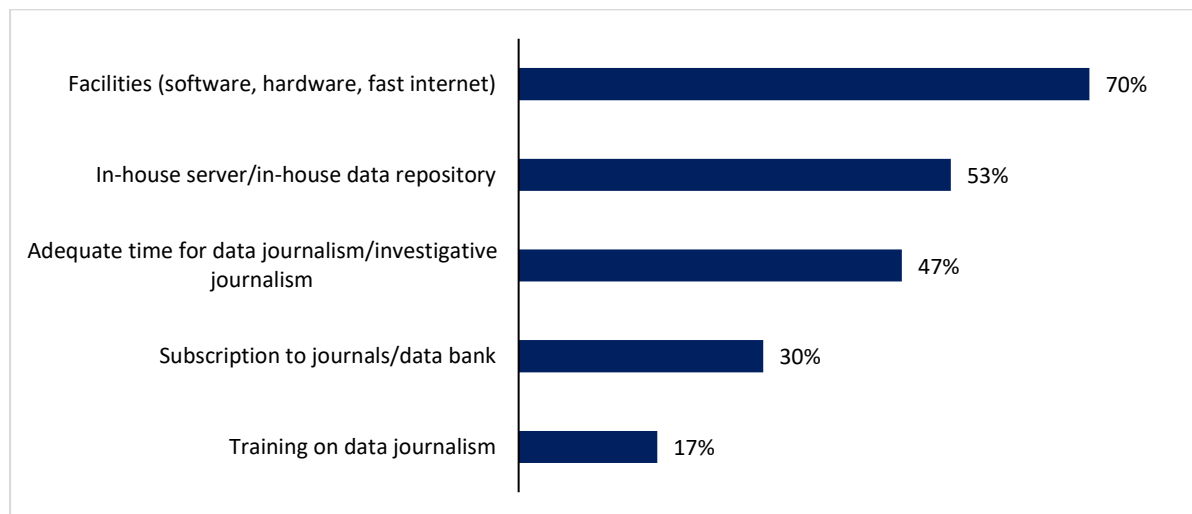


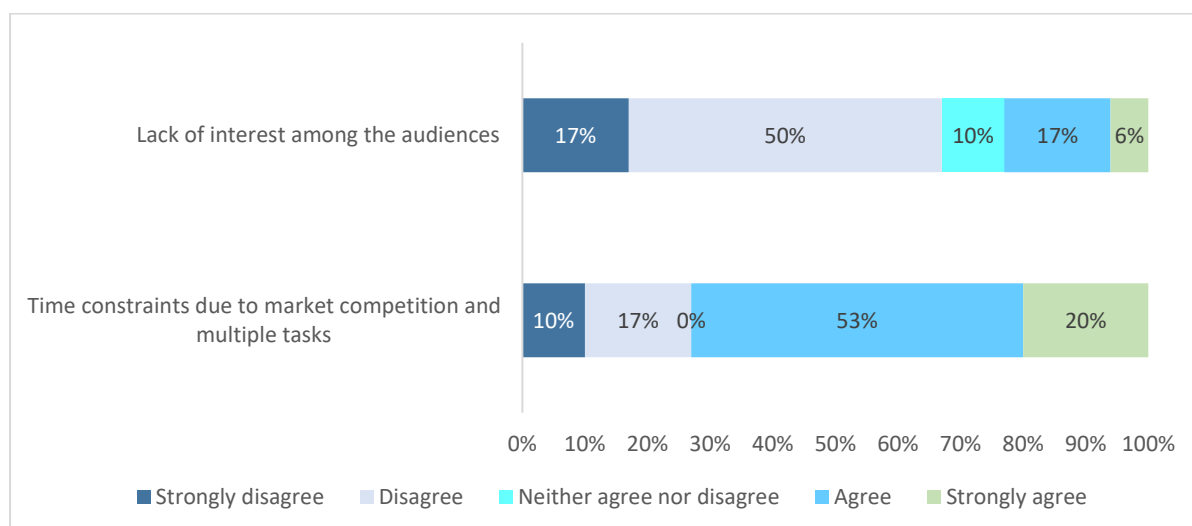
Figure 4.2 above tries to understand if the media house environment is conducive for data journalism. 70 percent of the journalists reported that they have adequate facilities in their media houses. 47 percent reported that adequate time is not available for data or investigative journalism. And most importantly, only 17 percent said they have had training sessions on data journalism. The last statistic on training sessions is particularly alarming for two reasons:

First, as data journalism is not taught in academia, journalists will not be able to build the necessary skills to engage in it. Second, it often deals with numbers and statistics which can lead to erroneous reporting if the necessary math/statistics skills are not taught.

Despite the nascent interest and involvement – as reported earlier - in data journalism among media houses, we learnt through the key informant sessions that data journalism does not still feature prominently in their outputs or is not promoted. This is particularly surprising considering that 90 percent of the journalists surveyed believe that data journalism or data stories can help expand audiences. Below we try to understand why data stories do not feature heavily in outputs or are not promoted.

Journalists shared that media houses often compete with each other to try to come up with the latest “scoops”, which according to most journalists make it less feasible to conduct data journalism. They conveyed to us that the daily reporting demands from the media houses make it difficult for them to partake in data journalism activities and the desire to participate in data journalism, or any other form of journalism, fades away. 73 percent of the journalists agree or strongly agree that time constraints act as barriers to data journalism in media houses.

Figure 4.3 Barriers for Media Houses

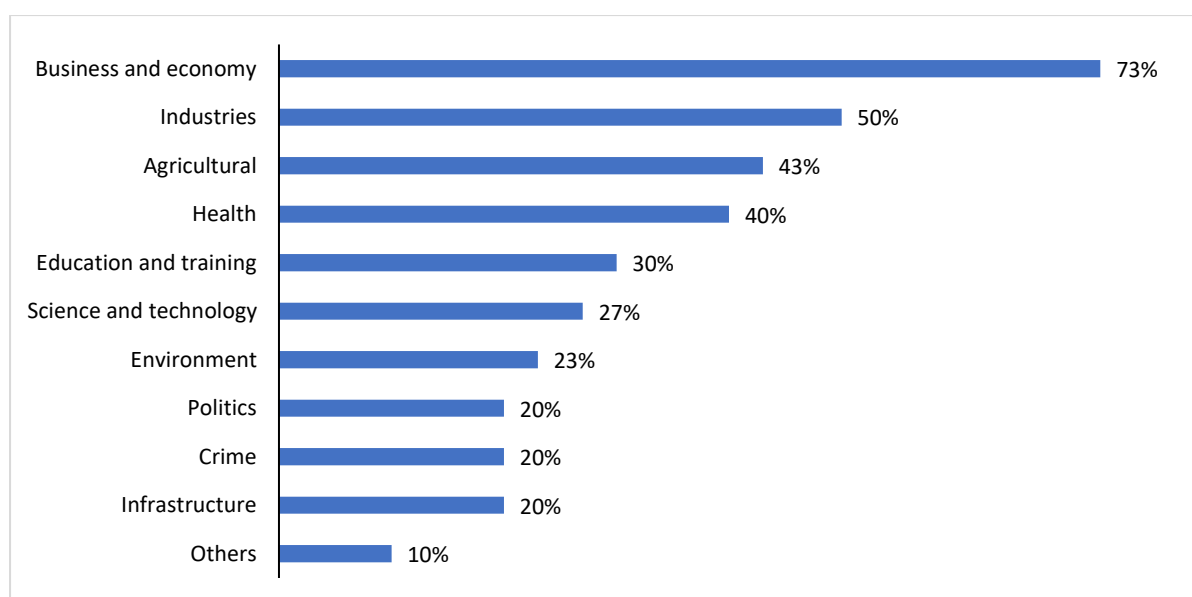


However, most editors have said that time is not a big factor, rather it is the lack of interest from journalists to venture into other journalism areas. One journalist felt that the lack of interest arises from the fact that journalists feel comfortable at what they have been doing for years, which is traditional reporting.

As to why such media houses do not feature or promote data stories, editors opined that the consumer base lacks awareness regarding data driven reporting and data literacy. So, as audiences do not seem to demand such data driven news, media houses do not prioritise data journalism or data stories. One can question how audiences can develop an interest and understanding of data journalism if media houses do not actively promote or produce such data journalism pieces in the first place.

However, journalists report that the lack of interests among the audiences cannot be a barrier as the editors suggest. Figure 4.3 above shows that 67% of the journalists either disagree or strongly disagree with the lack of interest among the audiences being a barrier to data journalism.

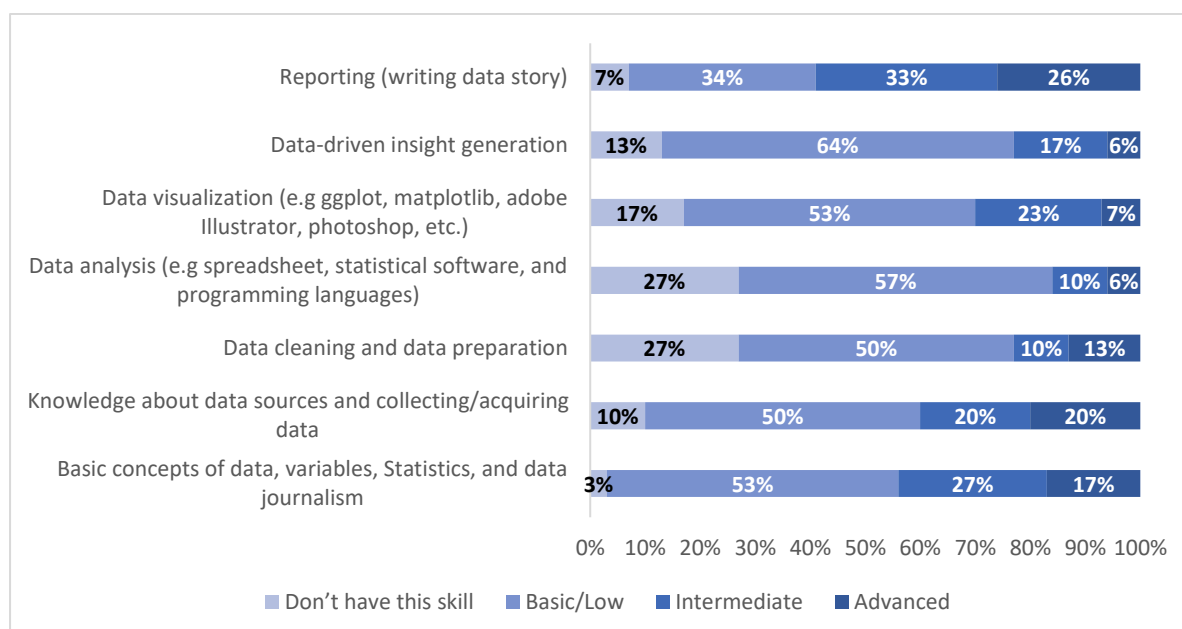
Figure 4.4 Popular Sectors for Data Journalism



Despite journalists insisting that the lack of time acts as a barrier for data journalism within media houses, our conversations with journalists reveal that they are of the opinion that certain areas of journalism, such as business reporting, are more suitable for data journalism. Business reporting entail working with numbers and as such, they believe that data journalism is largely non-existent or not feasible in other areas such as politics. In fact, some journalists have mentioned that their engagement in data-driven reporting, or data journalism as they like to call it, is only because the particular area of journalism that they work in requires them to do so. The chart above shows the survey results of the sectoral data that are mostly used by journalists for their reporting purposes. Business and economy data are the mostly widely used (73%) data according to the responses from the journalists, followed by industries (50%) and agriculture (43%). However, it must be noted that business journalists formed the majority of the participants in the survey and as such, this figure may not be representative.

It is widely believed in the media community that journalists in other areas apart from business, economy and finance traditionally do not require such data driven reporting. However, we found the aforementioned statements to be not true. There are various examples of use cases in other areas.<sup>2</sup>

Figure 4.5 Data Journalism Proficiency



Having the right set of skills is essential for engaging in data journalism, and are particularly important considering that only 17 percent reported receiving training in data journalism. Figure 4.5 shows the proficiency of journalists in tasks which are important for data journalism. With the exception of reporting, more than 50 percent of the journalists reported that they (or their team) have basic or low skills in the tasks deemed important for data journalism. Furthermore, 27 percent of journalists said that they do not have skills in data analysis, and data cleaning which are deemed to be very important skills to have for data journalism. This is highly concerning and conflicting considering that 87 percent journalists reported having experience in data journalism. More than 50 percent of the journalists said that they or their

<sup>2</sup> <https://gijn.org/2019/08/08/gijns-data-journalism-top-10-visualizing-climate-change-numbers-from-phrases-democratic-donors-moscow-money/>

teams have intermediate or advanced reporting skills in data stories. This is not surprising considering that most journalists are well trained in the area of writing or reporting.

Figure 4.6 Adequacy of Academic Curricula

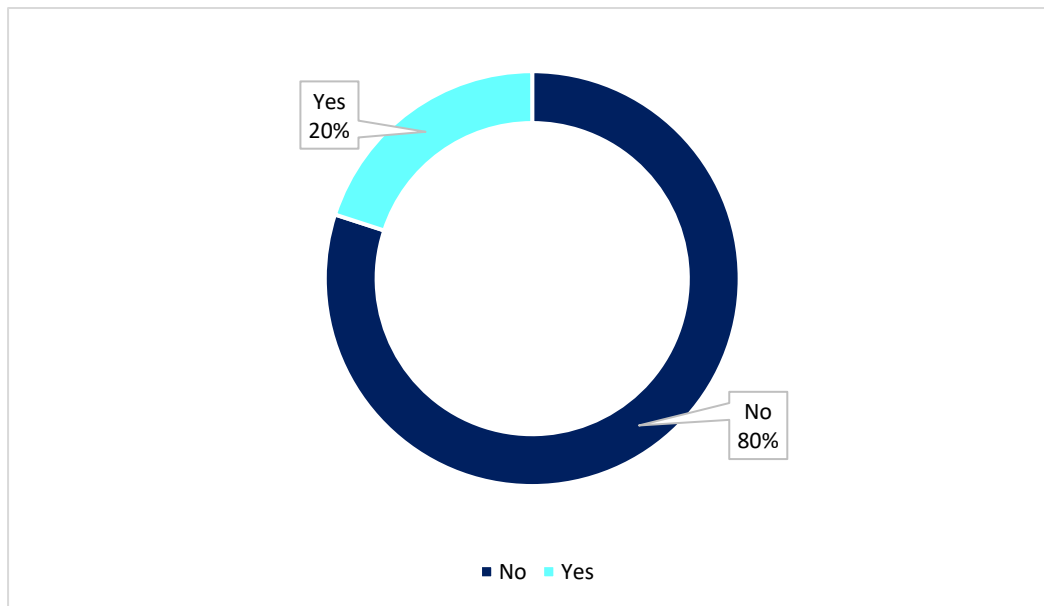


Figure 4.6 shows that a staggering 80 percent of the journalists surveyed believe that the current academic curricula is not adequate for data journalism. This could be a possible reason behind observing such low or lack of skills.

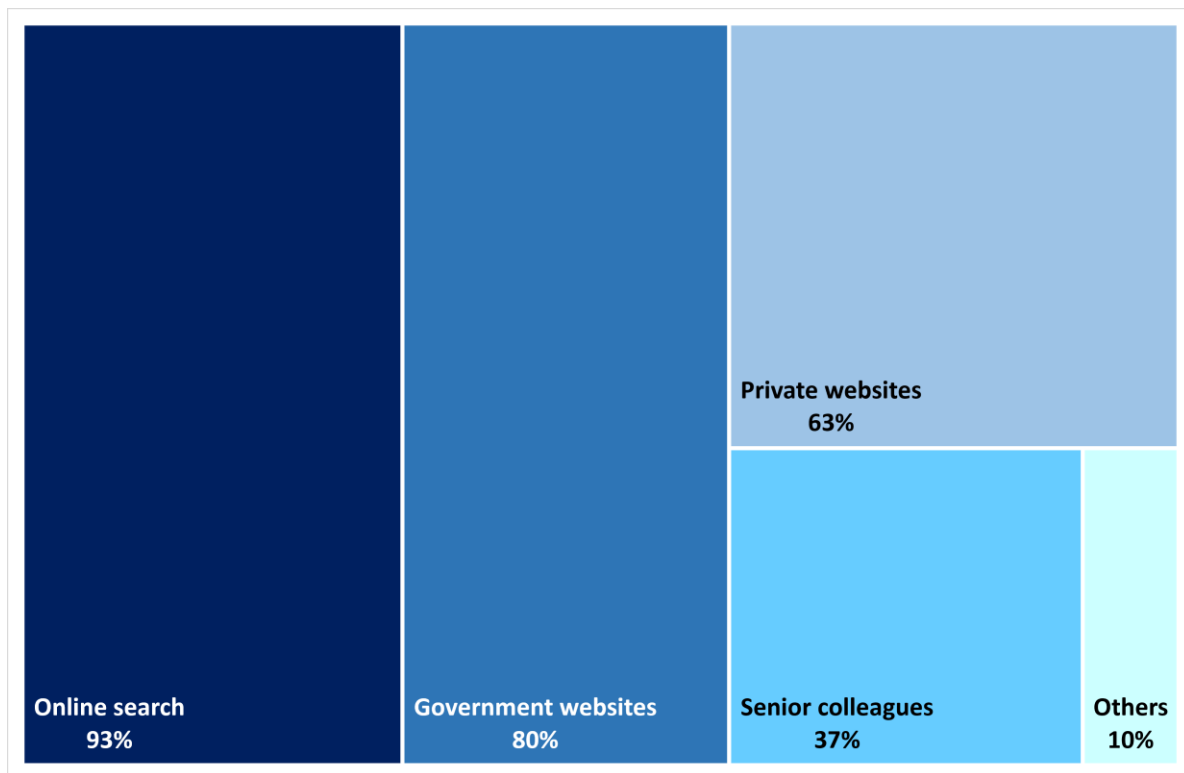
## 4.2 The Data Journalism Process in Bangladesh

In this section, we dive into the data journalism process in Bangladesh, from its inception to its completion.

### Data collection

We start with data collection although the first step is to conceive a topic for reporting. Our conversations have revealed that the data collection process begins once a specific topic, which journalists or editors deem insightful or interesting, is approved by a committee. Although not all media houses have such committees, or require approval of topics, journalists do seek advice from sub-editors or senior reporters before committing on a topic. More specifically, the topics of interest are mostly ideas or suppositions that stem from other news reports or published government reports.

Figure 4.7 Data Availability Searching



For the purpose of searching for data availability, 93 percent of the journalists make use of online search, followed by government websites (80%) and private websites (63%). This shows that the internet is a popular medium for searching data. 37 percent of respondents said that they consult senior colleagues regarding the availability of data

Media houses collect data through three main modalities:

- (1) Open Data (online)
- (2) Formal Sources
- (3) Informal Sources

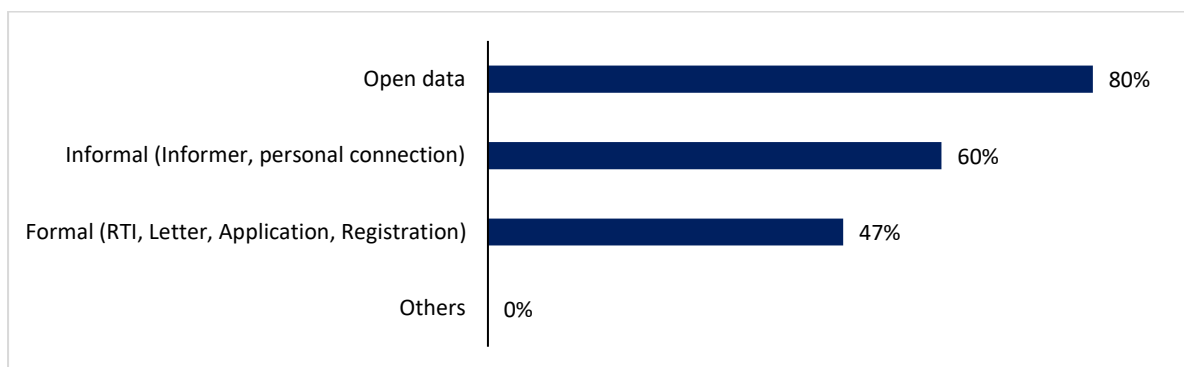
**Open Data:** Media houses generally agree that they first look into open data, or open data portals, for their data journalism purposes. They cite that they do so because it is fast and available at a “mouse click”. One participant described the open data collection process,

“In this context, for data, we mostly rely on open data, yes open data, and another one is the data which the government releases regularly, we rely on those data mostly. In this case, what we do is look into the data which the government has already released or till now whatever data is in open repositories, be that a website or collecting data through some institution’s director, whatever is available we try to use those.”

This participant is a journalist who relies on data that are freely obtainable online, especially the open data repositories and government websites that release data. In fact, as Figure 4.8 below shows, media houses and journalists prefer open data the most.



Figure 4.8 Data Collection Modality



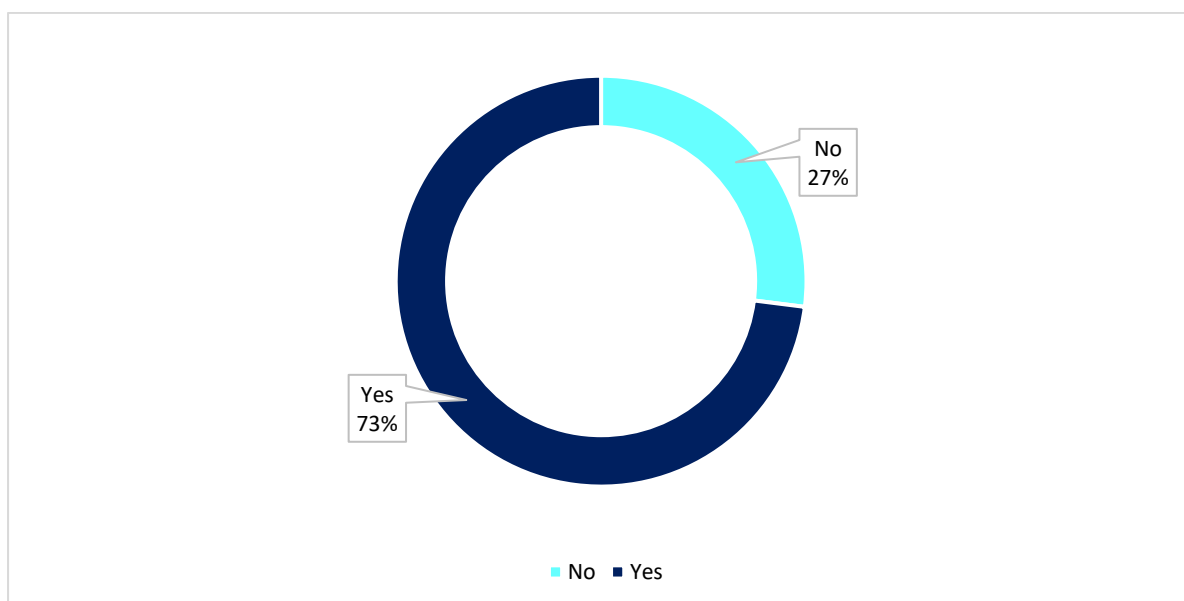
**Informal Sources:** Informal sources are also a very popular method for data collection among journalists with 60 percent of journalists reporting to make use of it. We define informal sources as those sources through which data or information is obtained without any legal or formal channels. More specifically, what differentiates informal sources from formal sources is that the latter requires an official request – and hence permission – to collect data. One journalist describes how he/she collects data through informal sources,

“One thing is that, we journalists do not collect data through official methods, we collect it ... for instance I go to my personal source and I say, brother I will need particular data, I will need last five years’, or 2 years’, or say last year’s daily transaction data.”

This method was overwhelmingly reported by almost every journalist we interviewed. The “personal source” here refers to a close acquaintance who secretly supplies information outside the purview of his/her organization – almost all in the public sector. However, we cannot accurately ascertain how such connections are established between “sources” and journalists, and how this trust is built.

Upon finding out the ubiquity of these sources, we asked our participants how they tend to cite data collected from these sources. But before proceeding with this question, we first tried to gauge if journalists, in general, cite data or information that they make use of.

Figure 4.9 Citing Data Sources



73 percent journalists have stated that they always mention the data sources. In regard to citing data collected from informal sources, all journalists were unanimous in that they never mention the particular sources, but they do mention the organization from where the data was collected.

Journalists maintained that the informal source is actually reliable but a few have shared experiences where they have had to spend their own money to collect these data. Based on that information we gathered from the KIIs, we posed a question – in the survey – which sought to find out if journalists need to spend money to collect data. Figure 4.10 below shows that 50 percent say that the payment depends on the type of data collected thus hinting that not all data collected can be obtained for free. 20 percent reported that they have to pay for data collection.

Figure 4.10 Payment for collecting Data

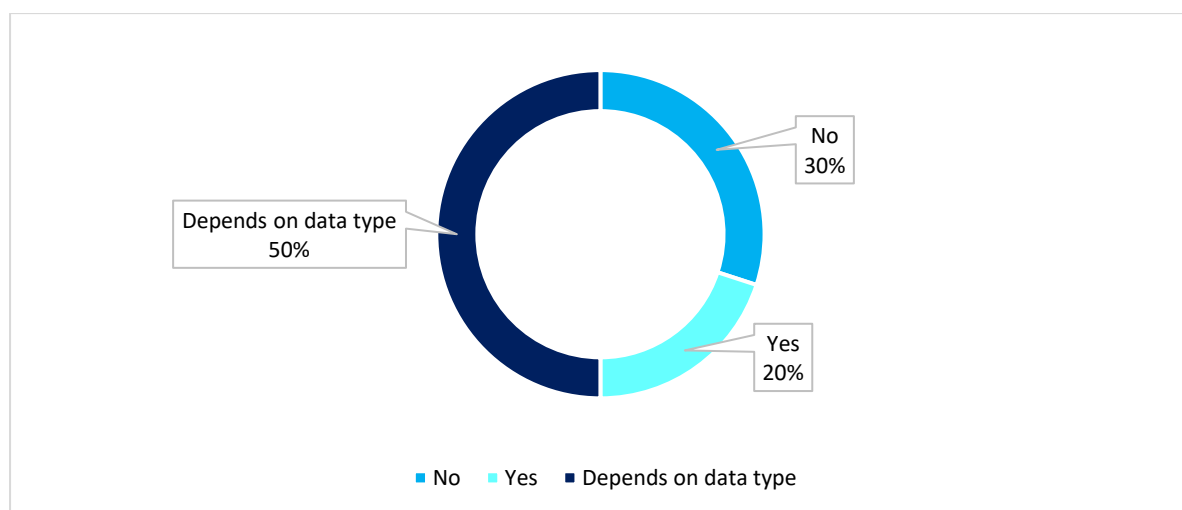
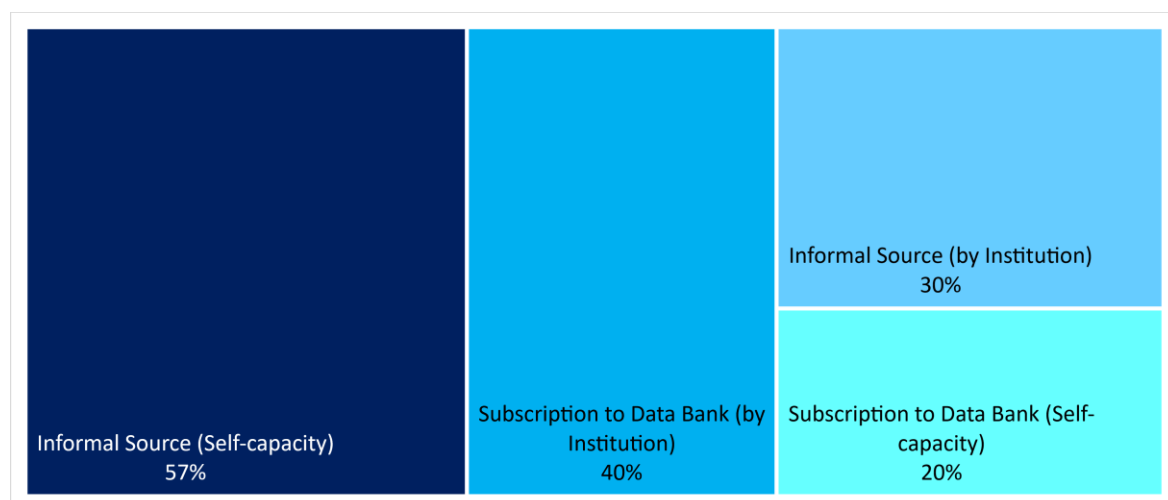


Figure 4.11 below also confirms that for those that have to pay for collecting data, 57 percent have to pay out of their own pockets to informal sources and 30 percent reporting that the institution pays for the informal data collected. We surmise that the institution is not directly involved in the payment process but rather reimburses the journalists who paid for the data.

Figure 4.11 Data collection payment breakdown



Many journalists believe one has to be assertive to collect data from such sources. They have also pointed out how journalists starting out their career can face difficulties collecting from

such sources owing to the lack of “personal sources”. In such cases, one journalist said that he has assisted new comers in getting connected with the ones providing such data informally. A journalist shared an interesting anecdote where he/she claims that his/her networking with these “personal sources” over the years is what helped him land a job at a top media house. He opines that the management found his network of such sources advantageous for their reporting activities, and thus offered him a job.

**Formal Sources/Methods:** Formal sources require a formal permission or letter to collect data. This could include payment of fees as well. The most talked about formal method is RTI. While the incidence of RTI application is low among all the participants, almost all the participants felt that the uptake of RTI could be increased.

Our discussions had several participants sharing that the RTI Act of 2009 was not very convenient for collecting public sector data. In our interviews, the most frequently cited reasons were the long application processing time, and uncertainty regarding when the data will be made available to the applicants. A similar observation was made in a report which stated that the RTI Act of 2009 is not helping journalists as the process of collecting information – once requested - is slow (14). According to the journalists and editors, time is extremely important in the media industry as media companies compete with each other to “break news first”. The delay and uncertainty stemming from RTI make it infeasible for use in the media or journalistic community. One participant from the journalism community described,

*“Regarding RTI, if I can obtain the data in the first try, then it does not take much time. The problem arises in the second and third tries. Well, this is also correct that I won’t get all the data in the first try, we, in fact, consider that we won’t get anything in the first try, if we have to go through the RTI application process. If we could ensure that we can obtain it in the first try, that I don’t have to apply it the second time, or I would not need to go to the respective authorities the second time, then it would have been easier. Or, the steps in between, if the time taken for processing at each of these tries were reduced, like if it takes at most 15 days for obtaining the data I requested, this would have been good for my journalism.”*

This participant goes on to explain that the data usually obtained in the first try is in a nominal form which he already has. Explaining the reasoning further, the participant explains that the ones who provide data at the first try may not have the “full data” which he/she (the participant) is seeking. They are then often advised to go to the “higher authorities” if they want to obtain the rest of the data, and this process continues till one is satisfied with the data obtained.

### Data Cleaning

The next step after data collection is the data cleaning process. It is often the case that collected raw data need to be “cleaned” or processed before analysis. Examples of cleaning include removing outliers or imputing missing data, among many others. However, it has been observed that this step is entirely missing in the context of data journalism in Bangladesh.

The reason why this step is missing is because journalists in Bangladesh do not collect raw data nor large datasets. Data journalism often requires large datasets. Whether the data is collected through requests (e.g. FOIA) or open data portals, it is often necessary for the dataset to be large enough to extract meaningful information. However, raw data with

observations numbering in the thousands or even hundreds are of “no use” to journalists and editors. Through our conversations, we found out that journalists and editors confine themselves to small data sets, which are mostly higher-level aggregates or summaries of raw data, requiring minimal to no cleaning or analysis. We tried to understand why such raw data are of “no use” to journalists and media houses. The responses were almost unanimous in that they believe that the summary statistics or the aggregated figures have already been analyzed and that their job is to present these figures in a way that audiences can comprehend. Considering a vital step is missing from the data journalism process, it would be highly controversial to label it as data journalism.

However, journalists do resort to their own version of “data cleaning”. It involves validating the data collected by comparing it with previous trends. We observed this data validation in a number of KIIs conducted with journalists. This is what constitutes “data cleaning” for the majority of the journalists through which they try to examine if there are any discrepancies in the data collected. If there are no discrepancies in the data collected, then the journalists deem the dataset to be “clean”. However, what journalists are actually engaged in is checking for data integrity (accuracy, completeness, consistency) which can be considered as a best practice of data cleaning.

#### Data Analysis

The next core component is data analysis. It should be noted that while data analysis generally includes cleaning, visualization and reporting, here we are using the term data analysis in a self-contained manner to refer to the use of tools and statistics to uncover insights, thus excluding the cleaning, visualization and reporting aspects. The rationale for doing so is that journalists in Bangladesh do not generally consider cleaning and visualization to be part of data analysis. The term mostly alludes to conducting statistical tests to uncover insights in the journalism community of Bangladesh.

Our interviews have revealed that the data analysis procedure across most of the media houses is very much limited in terms of usage of statistical knowledge and tools. This is mostly due to a lack of skilled-human resources. Almost every participant has shared that journalists lack quantitative reasoning skills. Some, however, maintained that the job of journalists does not require the usage of statistics. Such similar statements were also echoed in previous research where students and teachers pursued journalism due to their view that the field requires little to no math (26,27,28).

While it is difficult to quantify as to what serves as a benchmark for a satisfactory usage of statistical knowledge and tools, overall our discussion led us to the conclusion that the analysis is mostly confined to descriptive summary reporting using MS Excel and trend comparison between datapoints, which mostly involves eyeballing rather than conducting formal statistical tests.

Trend comparison between different time periods is the dominant form of analysis conducted by journalists. This analysis involves the comparison between indicators or data points in different time periods. It should be noted that this mode of analysis has been reported by the journalists working on business and financial reporting, and as such cannot be generalized to other areas of reporting. However, given that the journalists we have interviewed have reported that other sectors do not usually make use of such datasets for analysis nor

reporting, it can be stipulated that this is the most common form of analysis in the media houses.

Another form of analysis that journalists often resort to is to verify statements or substantiate one's own hypothesis. Some journalists have reported that the data that are collected are sometimes not used for the sake of analysis in the traditional sense but often just to substantiate their reporting, to give it more weight, or just to verify statements.

### Reporting and Visualization

The process of data journalism ends with reporting which is almost always accompanied by visualizations. Our conversations with the media houses revealed that infographics formed the bulk of data journalism reports. Several journalists have pointed out the reasoning for the use of infographics, one of which was the ability of infographics to capture a lot of findings in a relatively compact manner. They shared how infographics have the ability to take up less space in news-reports yet convey a lot of findings. Journalists also feel that infographics are useful in highlighting the trends and patterns which they mostly try to accentuate or focus on. Also, infographics are easier for the general populace to comprehend.

A very common challenge, shared by the participants, when it comes to reporting is the data story telling part. Participants have described how they have a hard time conveying their findings to the general populace considering that most of them are not data literate. The difficulty usually arises during the reporting of figures.

### 4.3 Data Journalism in Media Houses

In this section, we look into how journalists perceive the data journalism process and how it gets done.

Figure 4.12 Missing Steps in Data Journalism

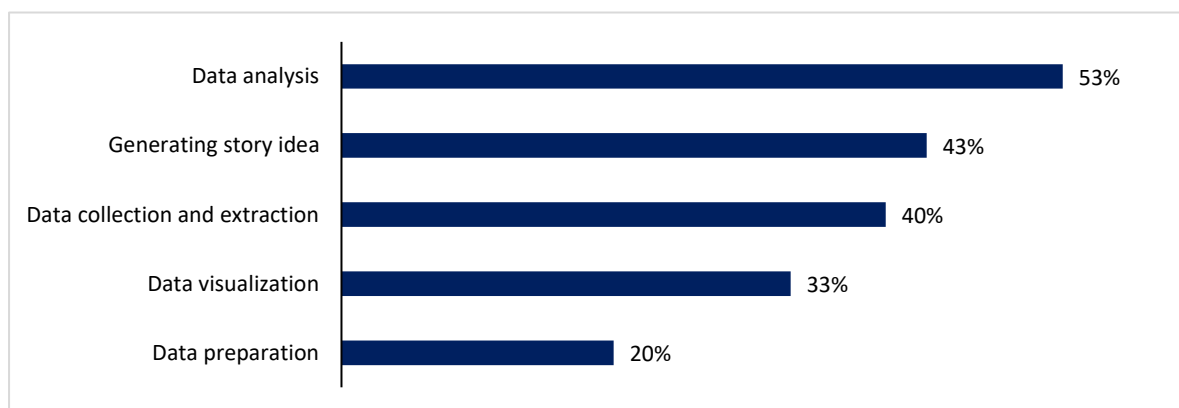


Figure 4.12 above shows that 53% of the journalists surveyed agree that data analysis is not practiced in data journalism in Bangladesh, while 43% percent agree that the generation of data story ideas is also not widely practiced. These results are in line with our KII discussions. We have highlighted earlier that the data analysis process is very limited, and this is reflected in the survey findings. It is also of no surprise that the generation of story ideas is deemed as the second most aspect of data journalism that is not practiced in the media houses; earlier KII discussions and survey findings show that journalists cannot dedicate much time to data journalism. The generation of ideas often requires longer time dedication owing to prior research that must be conducted.

Figure 4.13 Availability of a Dedicated team

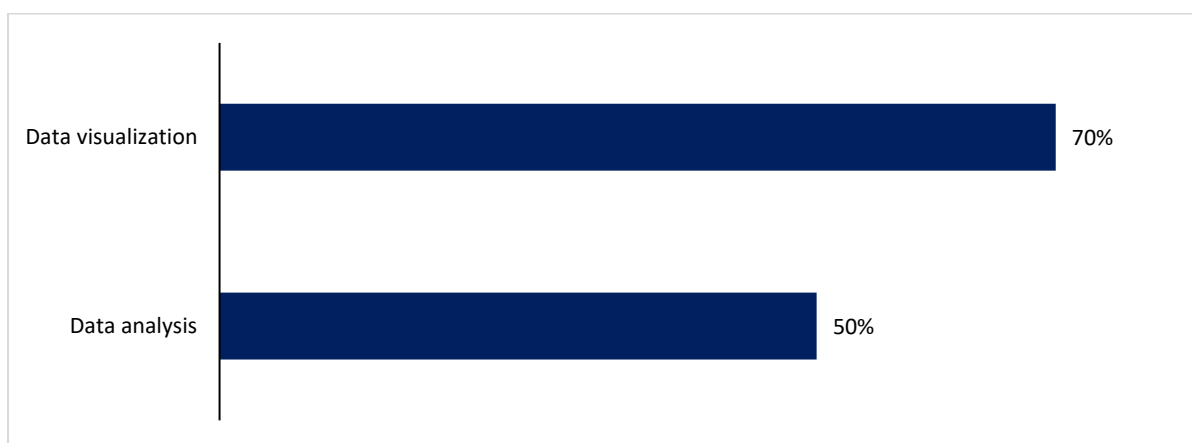
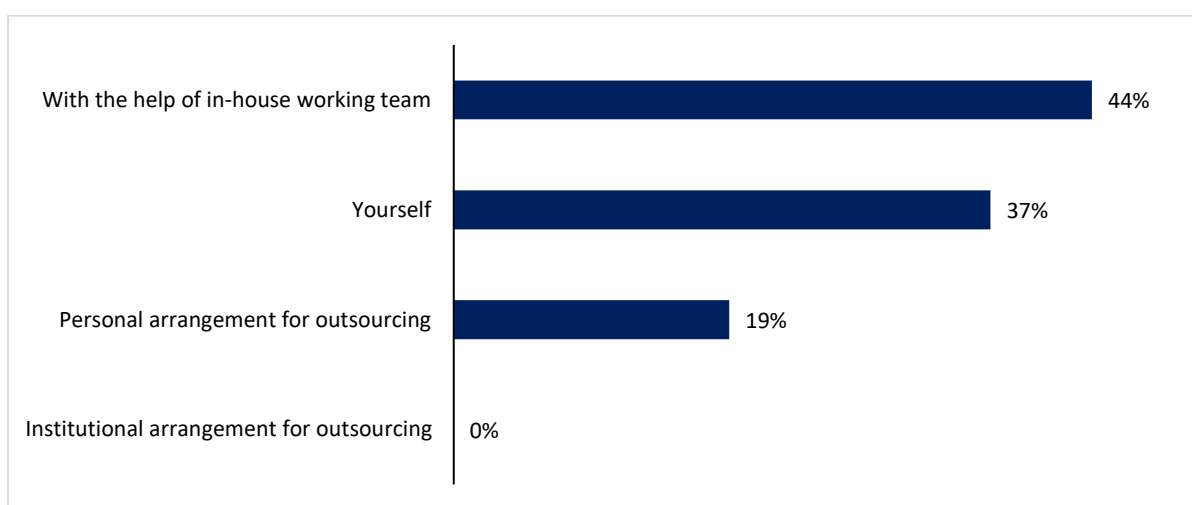


Figure 4.14 How Data Stories get done



Journalists were asked if they have a dedicated team for data visualization and data analysis. 70 percent and 50 percent of journalists reported that they have a dedicated team for data visualization and data analysis, respectively. When asked how they (journalists) get things done, 44 percent journalists said that they rely on an in-house working team, and 37 percent reported that they are self-sufficient. 19 percent reported that they outsource their work, though we surmise this is partially.

### 4.3 Challenges and Need Assessment for Data Journalism in Bangladesh

There are various dimensions of challenges when it comes to data journalism in Bangladesh. Earlier findings suggest that journalists prefer open data for data collection. However, our survey results report that open data unavailability or inaccessibility is the third biggest challenge for data journalism in Bangladesh. We first look at the accessibility challenges associated with open data. Figure 4.15 below shows that despite the preference for open data during the data collection process, 77 percent of the journalists do not find all the necessary data on online platforms.

Figure 4.15 Is Data Availability in Online Platforms

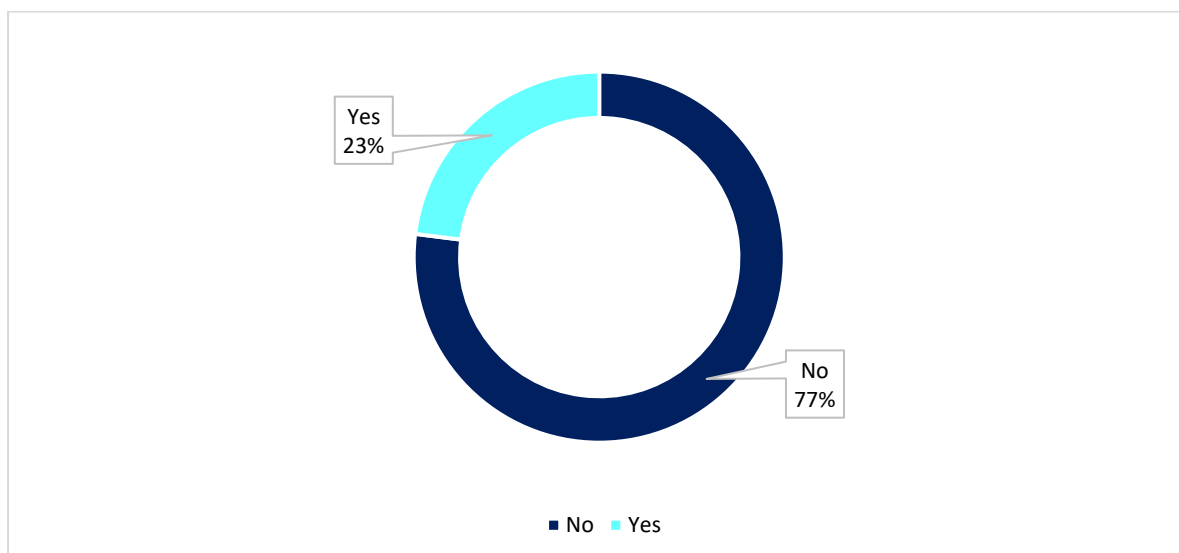
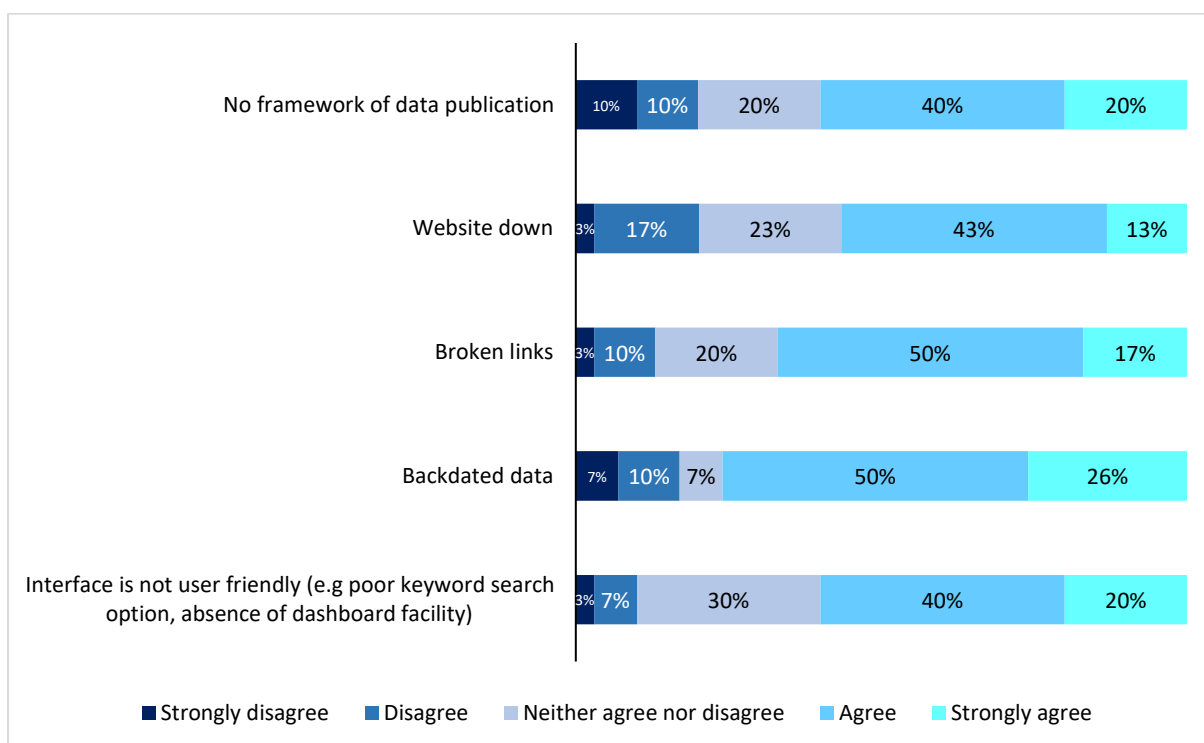


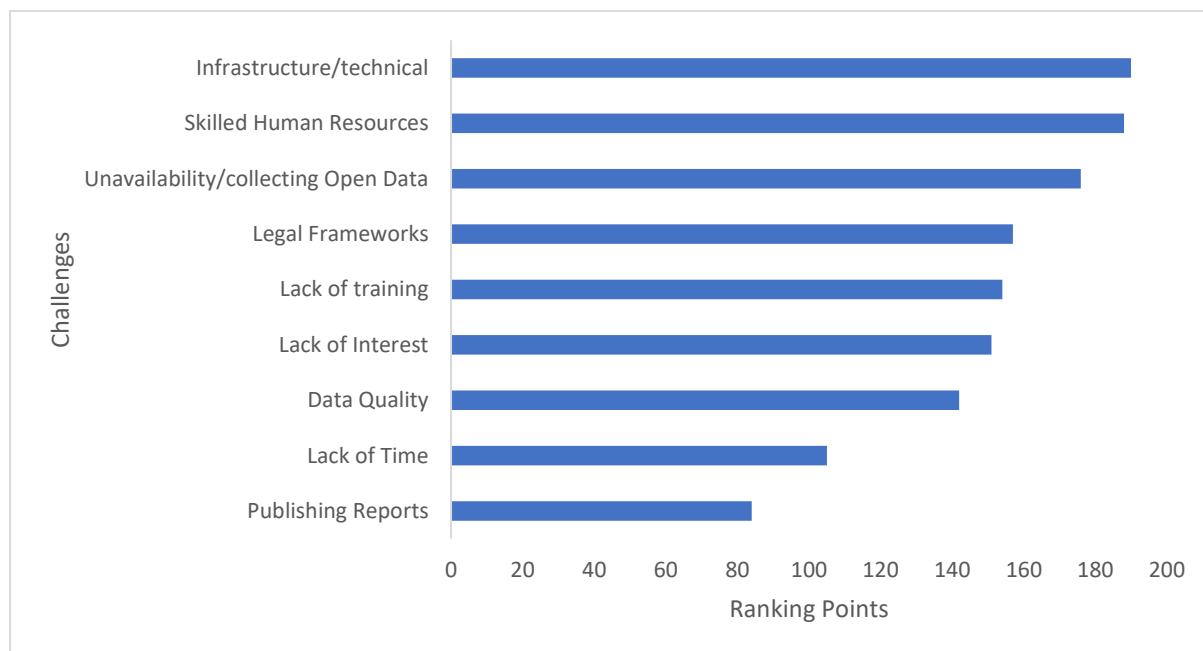
Figure 4.16 Accessibility Issues of Online Platforms



More specifically, we see that backdated data is the biggest issue for journalists. Figure 4.16 shows that 76 percent of the journalists either agree or strongly agree that data is backdated or unavailable. However, through our key informant interviews, we have also found that a small percentage believe that the available data – mostly open government data – is sufficient enough for engaging in data journalism. Of those who cited unavailable data, many took issues with the delay in data release by the relevant bodies. The journalists described that this delay and unavailability conflicted with their daily or weekly reporting activities, causing them to seek help through informal sources. As such, it is imperative that the government makes data available in a timely and fast manner if it is to sustain this interest in open data. There is the added benefit of transparency and public trust.

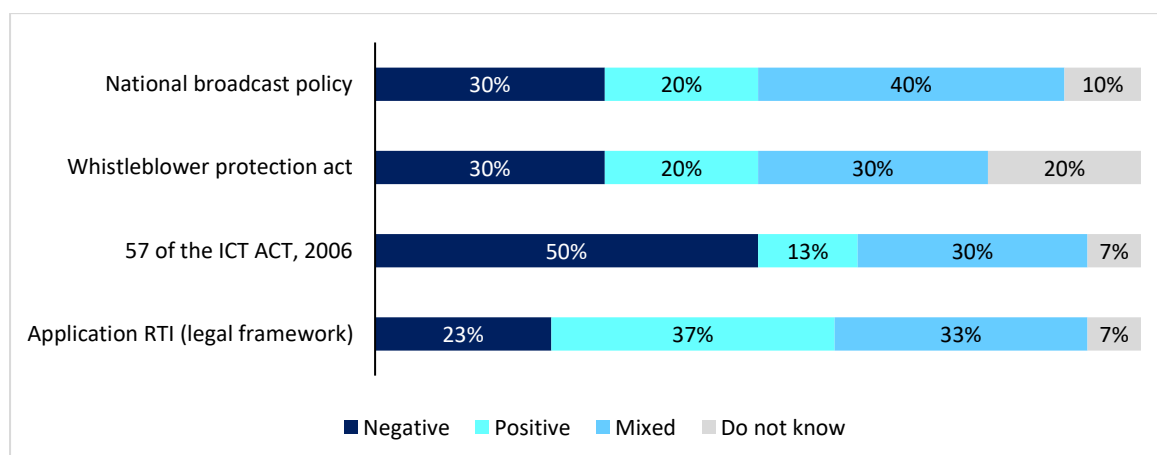
However, we surmise that these journalists were mostly speaking from the point of view of the day to day journalism that they are engaged in and not data journalism or investigative journalism in particular – which are not that much time sensitive. Furthermore, broken links (67%) in local open data websites are a source of consternation for journalists and researchers. This presents significant roadblocks that compel journalists to look into other sources, such as informal sources.

Figure 4.17 Ranking of Data Journalism Challenges



However, the biggest challenge for data journalism according to journalists is infrastructural or technical issues. Infrastructure and technical issues include the lack of high quality data centers and technologies, lack of interoperability among different data centers, security among many others. The second biggest challenge according to journalists is the lack of skill human resources. The majority of editors and management representatives of media houses have also agreed that the lack of skilled human resources is indeed a big challenge for data journalism in Bangladesh. One particular institution shared that the job applications for a data journalism-centric position were not up to their expectations, but they were obliged to call up at least one participant for an interview just because they spent resources on this hiring process. Eventually, they ended up picking no one resulting in loss of time and resources.

Figure 4.18 How Journalists Perceive the Legal Frameworks?





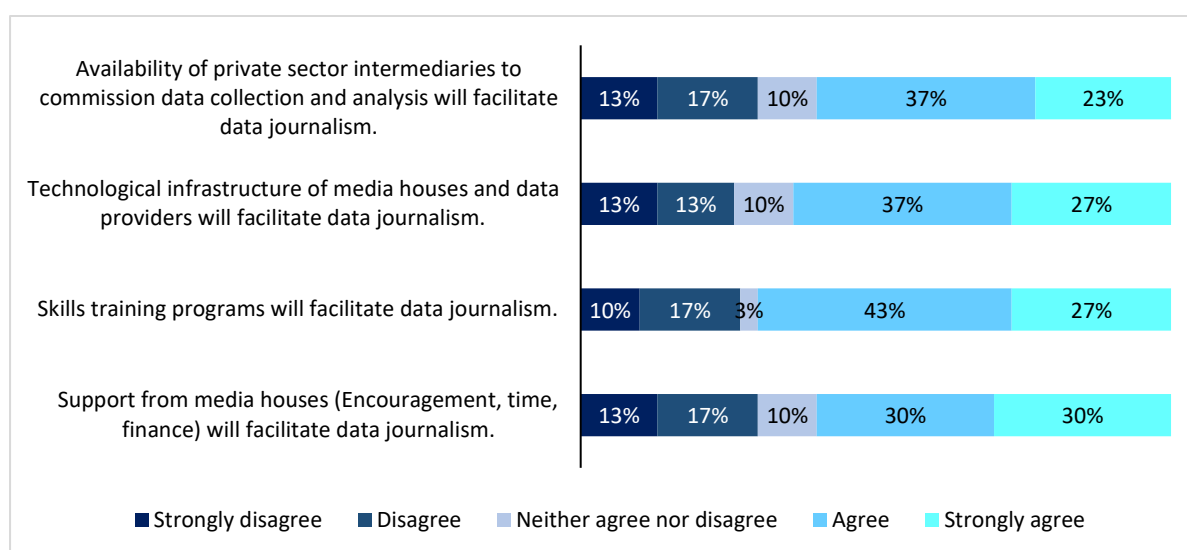
Legal frameworks were ranked as the fourth biggest challenge for data journalism. To better understand the challenges associated with legal frameworks, journalists were asked about their perception of the four legal frameworks in the surveys. It has been found that the negative perceptions outweighed the positives in all except the RTI. Section 57 of the ICT ACT, which has now morphed into the Digital Security Act, has the most negative perception (50 percent). A journalist shared his view of section 57 and how it impacts his life.

“Outside of journalism, if I speak as a citizen, then if I have to make any comments on social media, then this particular act always revolves in my head, that if I post any comment, would I land in trouble. As I am well aware of this law, this thing always revolves in my head. I will say that for freedom of speech, or for freedom of journalism, this is a big barrier. But, yes, it is true that, by using journalism, various illegal acts are being committed, which is also a reality. In this particular case, this law is alright.”

This participant reveals that this act has a good and a bad side too. Other “good sides” include the control of fake news portals and rumors that are meant to disrupt society. Additionally, the ICT act is helpful for combatting cybercrimes and harassment, especially against women. Other journalists did not talk much about this act except they also implied that each law/act has a good and a bad side.

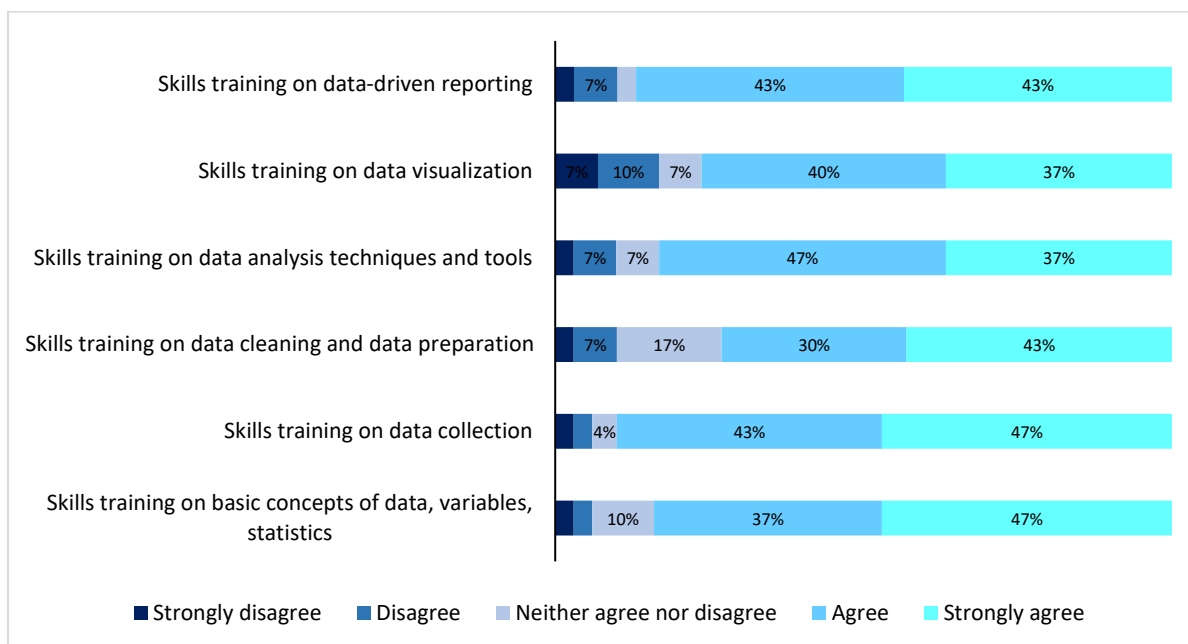
Having identified the challenges, we conducted a needs assessment of the journalists.

Figure 4.19 What can facilitate Data Journalism?



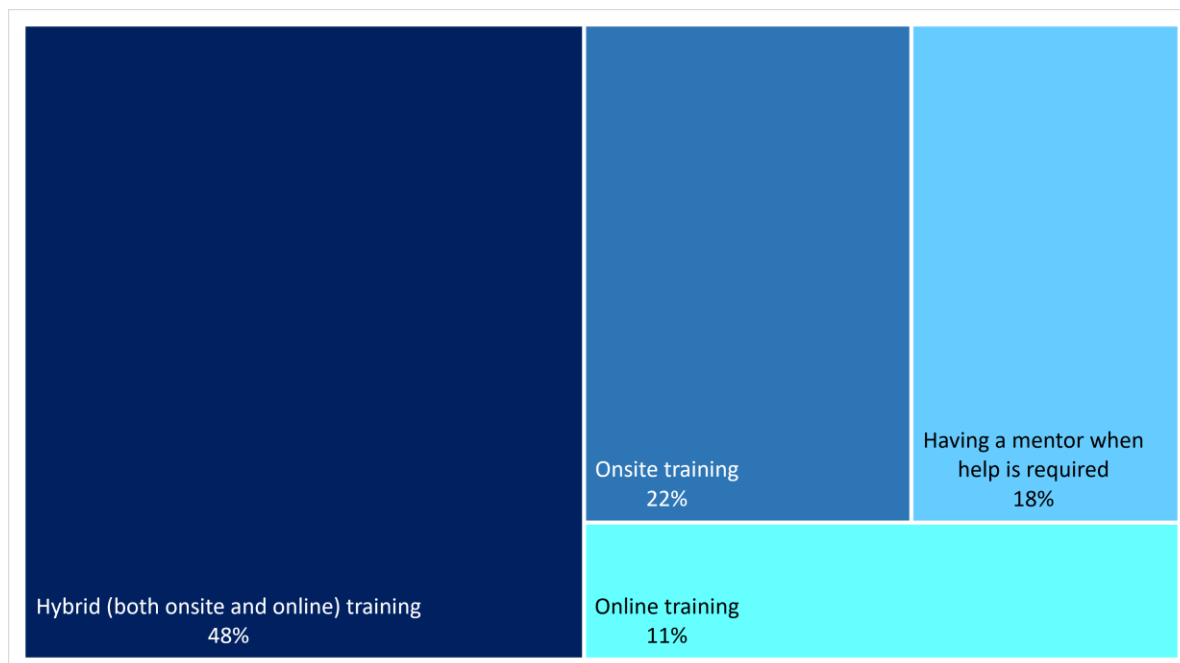
We have earlier reported that essential skills for data journalism are missing or not adequate among the journalists. We have seen that media houses reported that lack of human resources was also an issue. As such, it is not surprising when 70 percent of the journalists agree or strongly agree that skills training programs will facilitate data journalism. Figure 4.19 above outlines some of the views/statements of journalists (found through KIIs) which, according to them, can facilitate data journalism, and it shows that over 60 percent of the journalists agree or strongly agree with all the statements.

Figure 4.20 Necessity of Important Data Journalism Skills



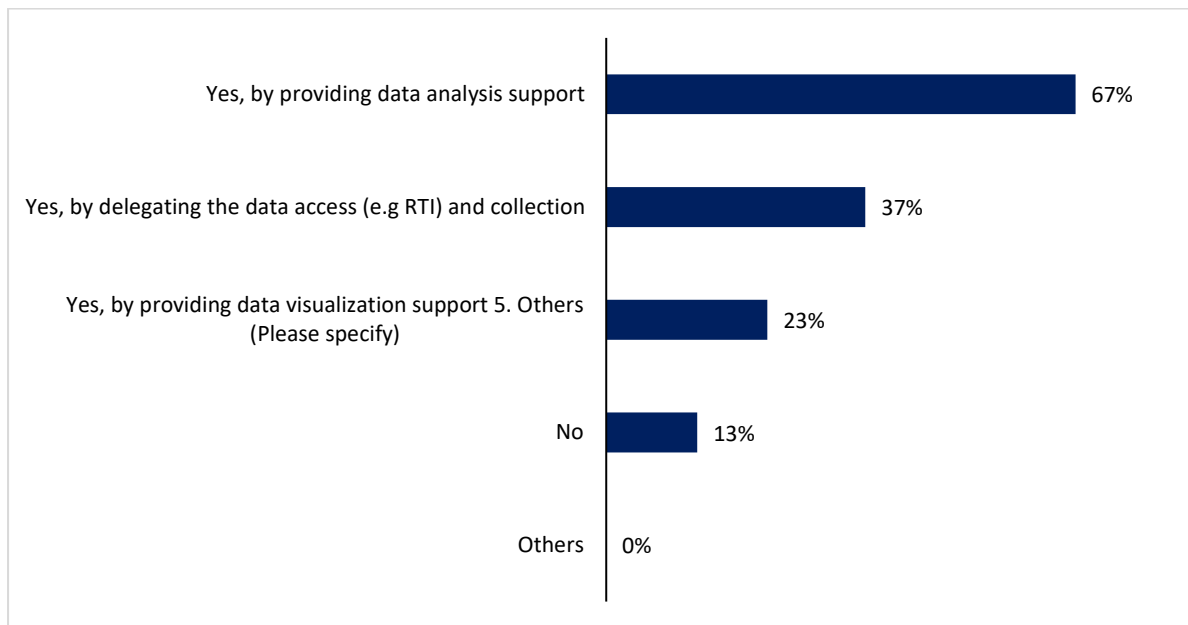
As skills training program were identified as the most important component (Figure 4.19), we tried to find the specific skills training journalists were interested in or thought were important (Figure 4.20). All the specific skills that were presented to journalists were deemed more or less equally important.

Figure 4.21 Preference of Training Modality



As journalists expressed interest in skills training, we wanted to find out how journalists would prefer to avail these training sessions. Around 50 percent have stated that a hybrid approach featuring a hand on and in-person interaction with peers and mentors, and online training is the best approach. 22 percent believe that an onsite training would be ideal rather than MOOCs or online trainings. Similar thoughts were also reflected in a study where even though MOOCs in data journalism have gotten favourable reviews, it was not enough (1).

Figure 4.22 Need help from Private Institutions?



Journalists were asked if private institutions – other than their own in house teams – could assist them in any way. We notice that around 70 percent said that they would welcome data analysis support.

## Chapter 5 Way Forward

### 5.1 Action Agendas for overcoming gaps and challenges (Supply Side)

#### **Ensuring Data Availability**

There is already a big reliance on open data released by government agencies. Almost all journalists, in our context business and finance journalists, have underscored the importance of these open data in their reporting activities. Even though the open government data strategy does not identify any end-user specifically, it would make sense for the government to at least consider the data release strategy from the point of view of the journalists, considering journalists make up the biggest percentage of end users.

The right to information act is also an important element of ensuring data availability considering that stakeholders consider this as the “last resort” as one journalist puts it. Journalists were unanimous in their views that the RTI requests are very inefficient, slow and often unsuccessful leading to even less usage. Considering the right to information is a right that can be exercised by citizens to collect data, it would make sense to reconsider the data collection strategies – time and red tape - outlined through which citizens can obtain data.

#### **Ensuring Data is Updated**

Participants have expressed a need for data to be updated more frequently and regularly. However, journalists and media houses have remained mum on these issues. It is imperative that journalists and media houses engage the government through the help of civil society organizations. Many media houses themselves have expressed that a joint initiative of media houses could bring to attention the problems they face pertaining to open data.

#### **Promoting a bottom-up approach through mass publicity**

Our findings show that the open data initiative is mostly a top-down approach in Bangladesh with the demand side being mostly passive. Open data is where to stay (5), however the interest in the OGD initiative could wane if the demand side is not engaged. This was the result in Kenya where the interest in open data waned off among the populace despite the initial fanfare (5).

As such government should take initiatives to encourage the uptake of open data and publicize the usefulness of it and its connection to the SDGs. While it is understandable that journalists may require fast paced or timely data for the purpose of journalism, they are not the sole end users. Civic hackers and data analytics agencies may not need fast paced data for their respective work, and hence the government could look into such stakeholders to encourage the uptake of more open data.

Considering the government takes note of the interest of the public, as highlighted in the open government data strategy, more uptake of open data by other stakeholders could result in more publicity and demand, leading to more datasets being made public and updated.

## Improving the Usability of Open Data Portals and Websites

Participants have expressed the need for open data portals and websites to be more user friendly. One participant shared that the provision of data in pdf formats cause users to lose interest in data driven reporting. The time required to scrap data from such formats are lengthy and may not always be feasible. Furthermore, data is often presented without context which includes a summary and a dashboard/visual. Such usability challenges may hamper the uptake of data journalism or data driven reporting and hence formats such as csv and xls should be the standard.

## Cross country collaboration

The US remains the torch bearer of open government data with many countries such as the UK following suit (5,29). With India performing relatively well – in Asia - on the Open Data Barometer Assessment, the Government of Bangladesh may encourage more cross-country collaboration in this department. This does not only particularly apply to Open Data at the national level, but also in the realm of data journalism too. A few participants during our KIIs expressed admiration for the data-driven or data journalism reports of India, especially pointing out to how Indian data journalists have crafted data stories that resonate with the general masses.

## Engaging with Media houses

As OGD is a precursor to the SDG goals and their targets, it makes sense for the government to not only implement it but to also ensure that users are benefitting from it through its usage. As mentioned earlier, journalists – hence media houses – form the bulk of the end users. Thus, it is imperative that the government engage the media houses in their discussions and implementation plans for more uptake and usage of open data.

Additionally, the government should specifically focus on the needs of media houses. Media houses feel that the government has the capability to ensure more open data uptake and promote data journalism. More specifically, media houses have asked for more funding in the aforementioned areas. Media houses reckon that the provision of funds will serve as a motivation and they will feel a sense of responsibility to reciprocate through increased data journalism activities and more open data uptake.

Figure 5.1 Role of Supply Side (GOV)

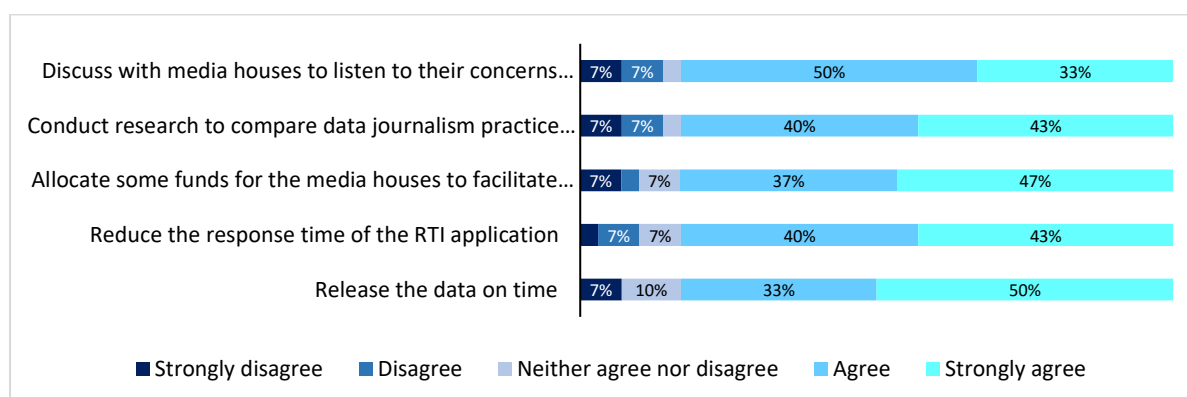


Figure 5.1 above summarizes what the supply side needs to do according to the journalists.

## 5.2 Action Agendas for overcoming gaps and challenges (Demand Side)

### **Contrasting between Data Journalism and Traditional Journalism**

The very first necessary approach that has to be taken is to make sure journalists, who are often accustomed to the traditional ways of reporting, are well acquainted about what makes data journalism different from the traditional one. Based on the interviews and subsequent findings, there is a general consensus among us that data journalism – although cannot be strictly defined – is not being practiced in accordance to its definition despite journalists believing they do.

The mainstay of “data journalism” in Bangladesh is the reporting on the existence of problems through summary statistics being made available. This contrasts highly with what is expected from data journalism which is to uncover patterns from large datasets.

It is imperative that media houses acquaint journalists about these differences through practical demonstrations and workshops, preferably conducted by organizations/media houses that prioritize data journalism in their objectives or works.

### **Increasing Awareness about the Benefits of Data journalism**

Like the government, media houses have a role to play in raising awareness regarding the benefits of data journalism to its journalists. The majority of the editors and journalists that were interviewed agreed that awareness regarding data journalism is staggeringly low – in most institutions including theirs. Our discussions and observations lead us to believe that this lack of awareness is a result of the ubiquity of traditional journalism within media houses, thereby effectively insulating the journalists from the rapid pace of changes taking place outside the traditional journalism realm.

### **Training in quantitative and reasoning skills**

Based on the discussions, we surmise that journalists are not adequately trained in quantitative and reasoning skills leading to less participation in data journalism. This could be attributed to “math anxiety” which has been found to be a major roadblock of data journalism (30,31). Furthermore, there have been reports of mathematical errors in data journalism (32). As such, it is ideal that trainings in quantitative and reasoning skills be conducted.

### **Exert “Positive Pressure” on the government**

Journalists and editors agree that it is not only the duty of media houses to promote data journalism. A feat such as this remains a difficult task and requires the active support of the government and civil societies. There were concerns that the government and the civil societies are not doing enough to promote such data journalistic practices. As such, one participant mentioned the need to put “positive pressure” on the government to engage them in this regard.

Figure 5.2 How can Media houses mitigate the gaps and challenges?

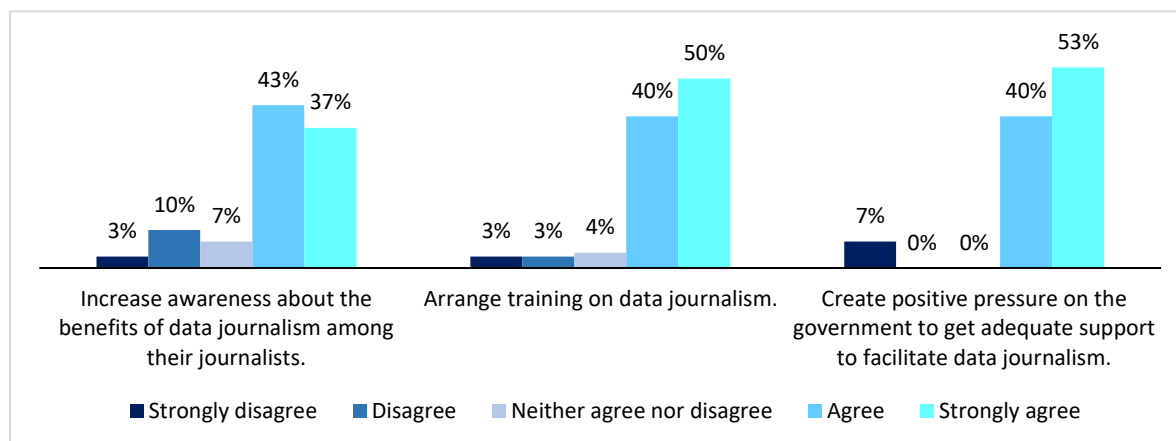
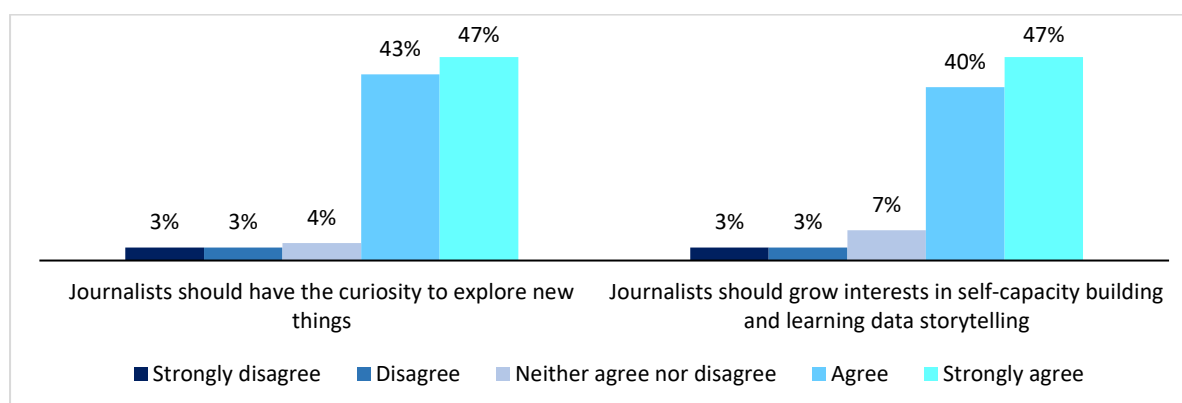


Figure 5.2 above shows that more than 90 percent of journalists either agree or strongly agree about putting “positive pressure” on the government. Media houses and journalist believe that to bring about changes in the open data and data journalism ecosystem, it is imperative that all media houses come under an umbrella to exert “positive pressure” on the government to get adequate support to facilitate data journalism. No single media house has the capability to engage with government and thus it makes sense for all of them to put forward their demands.

### Self Initiatives and self capacity building

Journalists and media houses have underscored the importance of self initiatives and self-capacity building. As discussed earlier, journalists often cite the lack of time as a factor for not being able to engage in data journalism activities within the media houses. However, journalists should at least take the initiatives to learn from online sources or MOOCs if it is not possible to practice data journalism during work hours. We surmise that once journalists educate media houses about the benefits of data journalism, especially through their personal projects, media houses will be more interested to allocate time to data journalism activities within the institutions.

Figure 5.3 Necessary Traits of Journalists to engage in Data Journalism



Based on the surveys, around 90 percent of the journalists agree or strongly agree that journalists should have curiosity to explore new things and engage in self capacity building.

## References

- (1) Howard AB. (Internet). The Art and Science of Data-Driven Journalism. 2014 (cited 2021Mar28). Available from:  
<https://www.internews.org/sites/default/files/resources/Tow-Center-Data-Driven-Journalism.pdf>
- (2) Weber W, Engebretsen M, Kennedy H. Data stories. Rethinking journalistic storytelling in the context of data journalism. *Studies in Communication Sciences*. 2018;18(1).
- (3) Hamilton JT. *Democracy's Detectives*. 2016;
- (4) Rinsdorf L, Boers R. The need to reflect: Data journalism as an aspect of disrupted practice in digital journalism and in journalism education. In *Promoting understanding of statistics about society. Proceedings of the roundtable conference of the International Association of Statistics Education (IASE)*. Berlin: ISI/IASE 2016 Jul.
- (5) Stoneman J. Does open data need journalism?.
- (6) Talukder MS, Shen L, Talukder MF, Bao Y. Determinants of user acceptance and use of open government data (OGD): An empirical investigation in Bangladesh. *Technology in Society*. 2019 Feb 1;56:147-56.
- (7) Zuiderwijk A, Janssen M, Dwivedi YK. Acceptance and use predictors of open data technologies: Drawing upon the unified theory of acceptance and use of technology. *Government information quarterly*. 2015 Oct 1;32(4):429-40.
- (8) Weerakkody V, Irani Z, Kapoor K, Sivarajah U, Dwivedi YK. Open data and its usability: an empirical view from the Citizen's perspective. *Information Systems Frontiers*. 2017 Apr 1;19(2):285-300.
- (9) Wright G, Abraham S, Shah N. Open government data study: India. Available at SSRN 2071605. 2012 Jun 1.
- (10) Davies, Tim. *Open Data in Developing Countries*.
- (11) Bangladesh Open Government Data Portal for A2i [Internet]. LightCastle Partners. 2019 [cited 2021Mar29]. Available from: <https://www.lightcastlebd.com/cases/data-for-all>
- (12) Foulonneau M, Martin S, Turki S. How open data are turned into services?. In *International Conference on Exploring services science 2014 Feb 5* (pp. 31-39). Springer, Cham.
- (13) Open Government Data Strategy. [cited 2021Mar29]. Available from:  
[https://sid.portal.gov.bd/sites/default/files/files/sid.portal.gov.bd/notices/e1531b3c\\_460d\\_49a6\\_82bf\\_36b9b61b8b1d/Open%20Government%20Data\(OGD\)%20Strategy%202016.pdf](https://sid.portal.gov.bd/sites/default/files/files/sid.portal.gov.bd/notices/e1531b3c_460d_49a6_82bf_36b9b61b8b1d/Open%20Government%20Data(OGD)%20Strategy%202016.pdf)
- (14) World Bank. *Bangladesh Right To Information Survey 2019*.



- (15) Genilo JW, Haq F, Mahmud S. [Internet]. Journalism education in Bangladesh. 2019 Oct [cited 2021Mar29]. Available from: <https://www.dw.com/downloads/51296724/dw-akademiejournalism-education-in-bangladesh.pdf+&cd=3&hl=en&ct=clnk&gl=bd#11>
- (16) National e-Government Network. [cited 2021Mar29]. Available from: [https://bcc.portal.gov.bd/sites/default/files/files/bcc.portal.gov.bd/page/fe563588\\_44c4\\_4730\\_af26\\_ad4151fba82c/1.%20Introduction.pdf](https://bcc.portal.gov.bd/sites/default/files/files/bcc.portal.gov.bd/page/fe563588_44c4_4730_af26_ad4151fba82c/1.%20Introduction.pdf)
- (17) 3 ISP. [Internet]. ইনফো-সরকার ৩য় পর্যায় প্রকল্প - ইনফো-সরকার ৩য় পর্যায় প্রকল্প. [cited 2021Mar29]. Available from: <http://infosarker3.bcc.gov.bd/>
- (18) Inclusive digital opportunities open [Internet]. Independent. [cited 2021Mar29]. Available from: <http://m.theindependentbd.com/home/printnews/222209>
- (19) e-Governance Horizon Scan Report. Available from: <https://a2i.gov.bd/wp-content/uploads/2017/11/12-e-Governance-Horizon-Scan-Report-2007.pdf>
- (20) E-governance is the way forward [Internet]. a2i. [cited 2021Mar29]. Available from: <https://a2i.gov.bd/newspaper/e-governance/>
- (21) Data 2 Policy [Internet]. a2i. [cited 2021Mar29]. Available from: <https://a2i.gov.bd/data-for-development/>
- (22) <http://data.gov.bd/about-us>
- (23) Data 2 Policy. Available from: <https://a2i.gov.bd/wp-content/uploads/2019/03/Data-2-Policy.pdf>
- (24) Open Government Data for Sustainable Development. [cited 2021Mar29]. Available from: <https://unstats.un.org/capacity-building/meetings/UNSD-DFID-SDG-Open-Data-Bangladesh/documents/Day%203%20ODG-a2i.pdf>
- (25) Bangladesh RTI ACT, 2009: Present Status and Scope [Internet]. Bangladesh RTI ACT, 2009: Present Status and Scope - Right2Info.org. [cited 2021Mar29]. Available from: <https://www.right2info.org/recent/bangladesh-rti-act-2009-present-status-and-scope>
- (26) Weiss AS, Retis J. 'I Don't Like Maths, That's Why I am in Journalism': Journalism Student Perceptions and Myths about Data Journalism. Asia Pacific Media Educator. 2018 Jun;28(1):1-5.
- (27) Berret, C., Phillips, C. Teaching data and computational journalism. 2016.
- (28) Griffin RJ, Dunwoody S. Chair support, faculty entrepreneurship, and the teaching of statistical reasoning to journalism undergraduates in the United States. Journalism. 2016 Jan;17(1):97-118.
- (29) Hewett J. Collaborative learning: from CAR to data journalism and Hacks/Hackers.

- (30) Curtin PA, Maier SR. Numbers in the newsroom: A qualitative examination of a quantitative challenge. *Journalism & Mass Communication Quarterly*. 2001 Dec;78(4):720-38.
- (31) Maier SR. Numeracy in the newsroom: A case study of mathematical competence and confidence. *Journalism & Mass Communication Quarterly*. 2003 Dec;80(4):921-36.
- (32) Maier SR. Numbers in the news: A mathematics audit of a daily newspaper. *Journalism studies*. 2002 Jan 1;3(4):507-19.