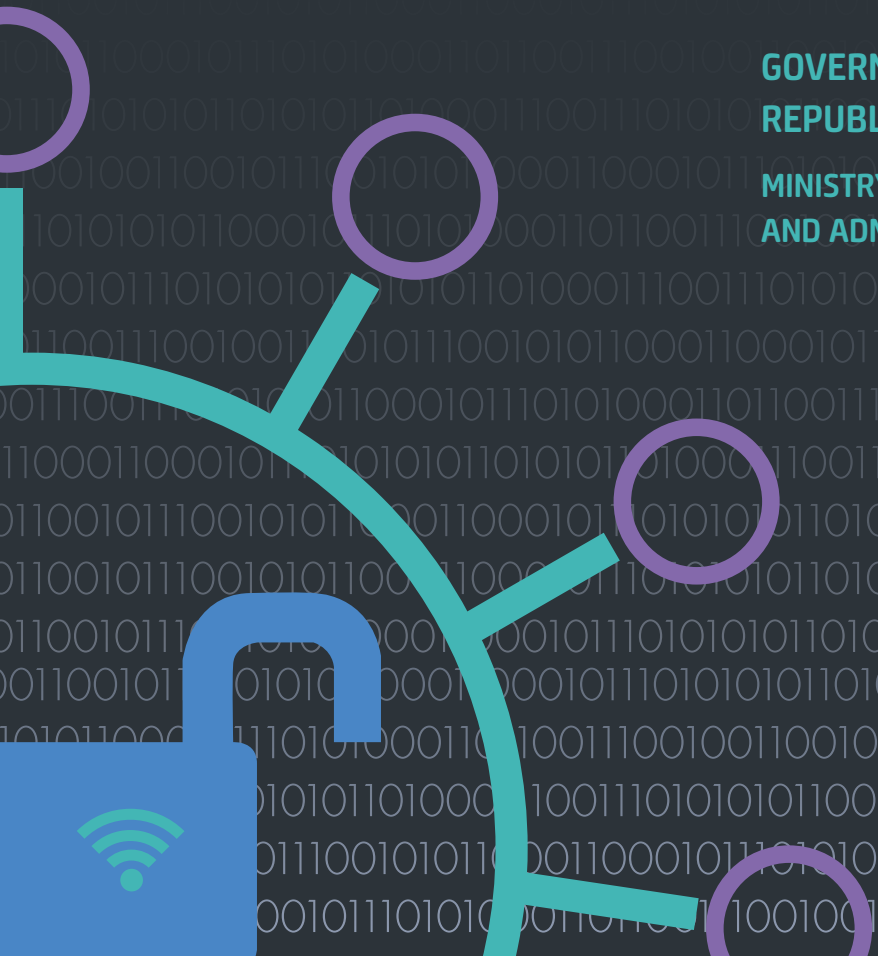
data.gov.mk

Република Македонија
Министерство за Информатичко
Општество и Администрација

OPEN DATA STRATEGY (2018-2020)

GOVERNMENT OF THE REPUBLIC OF MACEDONIA

MINISTRY OF INFORMATION SOCIETY AND ADMINISTRATION



OPEN DATA STRATEGY (2018-2020)

GOVERNMENT OF THE REPUBLIC OF MACEDONIA

MINISTRY OF INFORMATION SOCIETY AND ADMINISTRATION

Publisher: Ministry of Information Society and Administration in cooperation with Center for Change Management
Translation: Gordan Tanaskov
Design: Koma Design Studio

Република Македонија
Министерство за Информатичко Општество и Администрација

Центар за Управување со Промени

Funded by UK Government

The Open Data Strategy is prepared within the project "Support to Public Administration Reform Process", implemented by the Center for Change Management, funded by the UK Government with the support of the British Embassy Skopje. The content of this publication does not necessarily reflect the position or the opinions of the UK Government.

CONTENTS

LIST OF ACRONYMS

API	Application program interface
CC	Creative Commons
CSV	Comma Separated Value
DCAT	Data Catalogue vocabulary
DCAT-AP	DCAT Application profile for data portals in Europe
ETL	Extract, Transform, Load
GeoJSON	Geographic JavaScript Object Notation
GIS	Geographic information system
HTTP	HyperText Transfer Protocol
ICO	Information Commissioner's Office
JPEG	Joint Photographic Experts Group
JSON	JavaScript Object Notation
KML	Keyhole Markup Language
PNG	Portable Network Graphics
RDF	Resource Description Framework
SVG	Scalable Vector Graphics
URL	Uniform Resource Locator
XML	Extensive Markup Language
W3C	World Wide Web Consortium

OPEN DATA STRATEGY

1. Introduction

The Government of Macedonia recognizes that open data can be a powerful incitement for social and economic development and that it can also be used to improve public governance by enhancing transparency, openness, integrity and public participation at the central and local levels of government.

The Open Data Strategy sets forth measures to be undertaken for encouraging the release and use of public data and to implement them broadly in order to contribute in raising transparency and accountability of state institutions, improve the quality of services they offer and at the same time stimulate innovation, thus contributing to the development of Macedonia's society and economy as a whole.

The Open Data Strategy aims to encourage the promotion and use of open data with the understanding that data produced by governmental and public sector bodies are an asset of the citizens of Macedonia. Many reports[1,2] identified open data as an effective tool for innovation, growth and transparent governance. Their use can contribute to a more open and trustworthy government, a more vibrant business sector and an active civil society, contributing to the development of Macedonia's society and economy as a whole.

The Strategy envisages to deploy a central government open data portal, develop a methodology for data inventory and conduct an inventory in state institutions, introduce a licensing model for data, establish a management structure and guidelines to facilitate the release of datasets; along with raising awareness and fostering the creation of public value through collaboration and partnerships with stakeholders from within and outside the public sector.

Macedonia's open data strategy aims to develop a dynamic open data ecosystem in which data are produced, opened enriched and reused by multiple actors from the public and private sector, civil society and

1 http://www.worldbank.org/content/dam/Worldbank/document/Open-Data-for-Economic-Growth.pdf
2 https://www.europeandataportal.eu/sites/default/files/edp_landscaping_insight_report_n3_2017.pdf

academia. As a result, it will lead to improved public service delivery and public sector efficiency, increased public engagement, support efforts to combat corruption and contribute to the creation of an innovative climate that delivers new economic opportunities for the business sector.

This strategy will also contribute to ensure that Macedonia meets EU requirements on government transparency and accountability, and most specifically the goals set with the Reuse of Public Sector Information directive and other measures supporting the opening up of public sector information.

2. Vision, mission and specific objectives

Vision: Transparent and inclusive society where decisions and policies are developed by using open public data. Citizens are acknowledging and using economic, social and democratic potential of open data.

Mission: To develop and sustain an open government concept by publishing the open data by the state institutions.

The following specific objectives will be met with the implementation of the strategy and its action plan:

SO1 An enabling environment is set for opening data by state institutions, including enhanced legislative framework, established organizational mechanism and set technical layer.

SO2. Institutions open up the data within a defined methodological approach, based on needs of data by the community.

SO3. The community's awareness of open data, thus increasing the need for open data for purposes of adding value to society..

3.

Definition and Benefits of open data

Having a clear and commonly agreed definition for what open data represent is important so that there are no incompatibilities between open data projects, at the same time it helps realizing the full benefits of data openness.

Open data is data that is freely available in machine-readable format and can be used, shared and built-on by anyone, anywhere.

There are two main aspects defining data openness, the first is that data should be technically open and the second is that it should be legally open. Technically open means that there are no technical barriers to using data, making them easily accessible and available in a machine-readable standard format, and consequently data can be retrieved and meaningfully processed by anyone interested. Legally open means that data is explicitly licensed in a way that permits commercial and non-commercial use and re-use without restrictions and is free for all users (without any restrictions and free of charge). It can't be isolated only to be used for a specific purpose or be licensed in a way that prevents one person from sharing it with another.

There are two main aspects defining data openness,

Open data can be produced and released from different sources and be about different subjects. Any institution can make the data they produce freely available for use to the public so that anyone can benefit. Although this strategy focusses only on government and public sector bodies releasing open data, it is important to mention that any organization can open information (businesses, universities, media, NGOs and individuals), within the frames of their abilities

3.1. Transparency and Confidence

Transparency means that the government is open to citizens and makes available not only its information but also the decision making process and actions. To achieve transparency, information needs to be managed and published so it is relevant, accessible, timely and accurate to the citizens (users). Open data facilitates and foster independent analysis of government information and policies by the NGOs, businesses, media and individuals.

Citizens will have increased and facilitated access to information about the performance of the state institutions and the transparency will lead to an increased efficiency and accountability in the decision-making process contributing to strengthening the relationship between citizens and state institutions and building confidence. Opening data will create new opportunities for increased understanding of the released data by combining the available datasets, to provide more value and facts, that will lead towards improvement of the services for the citizens.

Citizens will have increased and facilitated access to information about the performance of the state institutions and the transparency will lead to an increased efficiency and accountability

On both national and local level, various state institutions provide many services to the community that often go overlooked, undervalued or are poorly represented. By increasing visibility and transparency through open-data initiatives, institutions will earn respect from citizens who will better understand and recognize the value and quality that institutions are bringing to their life. Moreover, making data and information available to citizens will contribute to a more focused and informed political and community discourse about issues that are the most relevant to citizens.

The Government will promote awareness of open data and contribute to the creation of an environment where stakeholders from various sectors engage with state institutions to identify datasets that can be leveraged to

deliver benefit and value and demonstrate concrete use made of such released datasets.

3.2. Public Participation and Collaboration between the Public and other Sectors

Making state institutions data open and accessible will foster better coordination, creativity and efficiency in relations between the public, business and civil society sectors in Macedonia. The Government will engage with a wide community of stakeholders including business, civil society and citizens, media, research and academics, and all others to promote and encourage use of open data.

The use of open data by a wide range of entities and the sharing of data between the public and the other sectors will stimulate the provision of public services and also support the creation of private services/applications using the data provided by the government. This will contribute to more efficient provision of diverse and innovative public services and appropriate responses to the various challenges that the country is facing, including the economic conditions, a variety of needs and values in different fields, and advancing information and communications technologies.

Opening data will facilitate the scaling-up the cooperation of the public sector with the business and civil society sector and will contribute to a more constructive interchange between them. This cooperation will also increase public participation and improve the quality of the data the government will publish; at the same time, it will impact the improvement of the quality of its policies.

3.3. Economic Incentive

Economic development through Open Data is a goal for the long run. Data leads to better decisions, and so leads to greater efficiency and productivity. State institutions hold a multitude of information and content ranging from demographic, meteorological, financial, health and education to art, historical documents and books.

The extensive use of digital technologies by the population in Macedonia makes this content an increasingly valuable resource for the production of innovative value-added products and services and a major source of educational and cultural knowledge for the entire country.

The first and most tangible way to stimulate the economy is new business. Making the open data available to the business sector will enable the transformation of open data into new products and services. It's availability in formats that will allow further free use will lead to the creation of new businesses or new services and products by existing businesses.

3.4. Higher Efficiency in Government

Besides providing economic incentive, by opening up data the government of Macedonia aims to enhance internal efficiency and to provide opportunities for other stakeholders (businesses, NGOs, media, etc.) to create new services, analyses using open data, reports, initiate data-driven advocacy initiative and other open data products using the released data. Furthermore, proactive publishing of data will decrease the requests for free access to public information. In this manner, open data will contribute to an effective and efficient government by diminishing the costs of services and prevention of erroneous decision-making, waste, fraud and poorly chosen investments.

4.
Open Data Principles

The general principles in this strategy follow those articulated in the International Open Data Charter[3] with references to other more specific principles.

4.1. Open by Default (IODC 1(a)

The Open by default principle means that the state institutions will aim for maximum disclosure. In practice this means that data and information created or received by a state institution when performing a public task should be considered open. The open data will be made available proactively and that they'll be freely available to the public online, with low or no restrictions for its reuse.

4.2. Timely, complete and granular

The Timely principle means that data will be made available in a timely manner to preserve its value. Whenever possible, the open data held by state institutions will be released as soon as it is processed and created. The timely release of data is very often the crucial factor that determines the interest of potential users. Particular attention will be given to data whose usefulness is time sensitive and the frequency of release should be planned and defined accordingly. Where relevant, real-time data updates should be available to maximise the value to users.

Particular attention will be given to data whose usefulness is time sensitive and the frequency of release should be planned and defined accordingly

The principle of completeness means that datasets released by the state institutions will be as complete as possible, reflecting the entirety of what is recorded in primary form about a particular topic (raw data) with the

3 https://opendatacharter.net/principles/

exception of data that fall within the categories defined above in the list of valid exemptions from the open by default principle.

The principle of granularity means that the open data will be released and available at the finest possible level of granularity or detail, or the level that they are internally kept in the institution. Where possible, it is recommended that data should be gender-divided, supporting policies of gender equality.

4.3. Licensing

A clear statement of rights is necessary to help data users to understand the potential for re-use of a published datasets, and any obligations that may incur through using the data. Thus, a dataset must be associated with a licence. Data that doesn't explicitly have an open licence is not considered open data.

The institutions in Macedonia will adopt and use a standard open licencing policy that will place very few restrictions on what users can do with the data/ data sets that is being licensed. The licence will confirm the responsibility of the public sector institutions for the accuracy of their published data and confirm that users of the can use the data for their needs. In addition users will be required to give attribution to the source of the content or data and, where necessary, an indication of whether they have modified the data or are republishing it unchanged.

4.4. Non-discriminatory

This principle refers to who and how anyone can access data. In practice, non-discriminatory access to data means that anyone interested can access the data at any time without having to register and identify him/herself or provide any justification for accessing the data.

Data released by state institutions in Macedonia will be available to anyone through free download from the open data portal. It will not be necessary to give notice, to say how it is intended to use the data, or to justify the request. There will be no requirement of registration, except where strictly necessary for technical reasons for Application Programming Interfaces, and in such exceptional cases only to the extent strictly required to protect the availability of services towards other users.

In addition, there will be no requirements in terms of the use of specific software or any other application in order to access the datasets released by state institutions. The data will be available in open formats.

5. Situation analysis

The Government of the Republic of Macedonia has joined the Open Government Partnership in 2011, pledging to promote open, transparent and efficient institutions. In June 2012, the Government adopted the initial Action Plan for Open Government Partnership, after which it has developed the second Action plan for the period 2014-2016. The third (current) Action plan is for the period 2016-2018, and the fourth consecutive Action plan is being prepared. The Action plans cover several relevant areas that promote the values, such as transparency and participative policy making.

The Open Government Partnership initiative strongly focuses on open data as a means of usage of modern technologies to facilitate transparency of government institutions, and as such is one of the main pillars of the Macedonian OGP charter.

5.1. Regulatory perspective

In February 2014, the Parliament adopted the Law on Use of Public Sector Data[4], which was result of transposition of the EU Directive on the re-use of public sector information[5]. The law defines the obligation of the government institutions to publish data (in open format) which they create, in order to enable usage of data by individuals and legal entities for creation of new information, content, applications and services. Under this law, all institutions are obligated to continuously publish public data in open format if they have technical possibility to do so.

The law prescribes that the MISA manages a central catalogue of the state institutions data which is published on a central portal. Institutions are obligated to prepare and submit data sets catalogue to the MISA, including the update frequency and link where the data is located.

4 Official Gazette no. 27 of 05.02.2014

5 http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013L0037&from=FR

The bylaw for the minimal technical possibilities of the public institutions to publish data and the technical aspects of the data format and the manner of their publishing[6] prescribes the ways data are published on the central portal for open data.

Licensing of the data was not introduced, and it is not defined in the Law on Use of Public Sector Data, and the Law only defines that the use of public sector data is free.

In 2014, a Law was introduced on National spatial data infrastructure in Macedonia, which transposes the EU INSPIRE Directive 2007/2/EC regulating establishment and implementation of the Macedonian spatial data infrastructure. The INSPIRE Directive recommendations regulate accessibility, exchange, use and sharing of the standardised spatial data and services in interoperable manner. Although it is focused on the spatial data, it provides framework conformant to the Open Data principles.

5.2. Organisational perspective

The coordination of the open data policies is being conducted by the Ministry of Information Society and Administration. Its main role is to manage the central open data portal where the central data catalogue is being managed, and to coordinate with the state institutions whose aim is to publish open data.

Having in mind that in the past period the concept of open data was relatively new, institutions were not able to easily identify the datasets which can be published as open data. One of the reasons was that the registries and databases are being maintained in different departments in the institutions and often there is insufficient coordination between the departments regarding the data that is being collected. Furthermore, it was difficult for institutions to identify which datasets can be opened to the

6 Rulebook for the minimal technical possibilities of the public institutions to publish data and the technical aspects of the data format and the manner of their publishing

public, especially that some datasets include personal or classified data, and usually combination of open character data and sensitive data.

In that respect, a clear methodological approach is needed to guide the institutions in identifying datasets, developing a catalogue of datasets and prioritising datasets for publishing.

According to the Law on Use of Public Sector Data, the public sector institutions are required, in accordance with their technical capabilities, to publish data they create in the course of implementation of their mandate, except the data excluded from the Law on Free Access, the data access to which is limited according to law, the data not created by the public sector institution, the data on which third parties have intellectual property right, the data belonging to the public broadcasting services the data belonging to institutions doing research work and the data belonging to institutions in the area of culture, except the libraries, archives and museums.

Furthermore, one can acknowledge that large portion of the current datasets is rather obsolete since updated data is not published. The practice shows that institutions are generally pushed to publish open data following decisions on government sessions where institutions are obligated on the highest level to publish certain data. Afterwards, the process of publishing open data dramatically decreases, since there is no established coordination mechanism that will steer this process and provide high level support.

Several trainings have been conducted by the MISA for the personnel from the institutions for the requirements of the law and the bylaw, and moreover on the process of publishing open data on the portal.

Additionally, the awareness of the open data concept and its benefits by the general public and even by the state institutions is very low. The MISA organized several raising awareness campaigns, including one Hackathon in 2014 with cooperation of the business and academia. Even though

promotional activities have been conducted, the average number of visits on the portal is only 700 per month. The usage of the current published open data is also relatively low, because of absence of promotional activities and low value of the datasets for the users, including the lower awareness of all stakeholders in terms of the potential the open data and the benefits of their re-use haveThe most downloaded dataset is a directory of kindergartens in Macedonia. Following is the national budget with 146 downloads. There are total of only 7 datasets which have more than 100 downloads.

Furthermore, following the low awareness of open data, and the quality of provided datasets, there have been only three applications that are claimed to be using open data..

5.3. Semantic perspective

The MISA has developed Semantic Interoperability guidelines within the Macedonian Interoperability Framework[7]. The document proposes that shared vocabulary or semantic assets be used by the involved organisations, based on a methodology for identifying, specifying and using semantic assets. This framework also provides initial guidelines on how to provide metadata description of datasets for open government data.

A Macedonian metadata standard is being developed

A Macedonian metadata standard for Macedonia is being developed. The standard is based on the DCAT Application profile for data portals in Europe (DCAT-AP)[8], which is a specification based on Data Catalogue vocabulary (DCAT) for describing public sector datasets, in order to achieve cross-data portal search and higher visibility of datasets. The DCAT-AP specification, and in that terms the Macedonian metadata standard defines the mandatory, recommended, optional and specific information for classes (Catalogue, Dataset, Distribution, Agent, Vocabularies) and properties. The document

7 http://mioa.gov.mk/files/pdf/InteroperabilitySemantic_v2.0_mk.pdf

8 https://joinup.ec.europa.eu/release/dcat-application-profile-data-portals-europe-final

proposes that the metadata should be expressed in RDF/XML representation, in order for automatic harvesting from the European Open Data portal and other open data portals.

Currently, the published datasets on the central open data portal do not contain metadata.

Standards for data quality of information systems of the state institutions[9] have been also drafted by the MISA. This (draft) document determines the criteria for data quality, and defines a process for creating and maintaining quality data. The standards contain guidelines that should be followed when developing new registries by the institutions, and be also followed to upgrade the current registries.

5.4. Technical perspective

The MISA, as a coordinator for development and implementation of open data policies, has developed the initial national open data portal in 2012, which offered only links to web sites of the individual institutions where data and information was published electronically. In 2014, the MISA has introduced a new open data portal[10] where data from the public sector are being published and stored centrally. Currently[11] there are 154 datasets published on the portal from 24 institutions. Most used data are the ones from the Ministry of Labour and Social Policy, Ministry of Health, Ministry of Finance, Agency for Electronic Communications and Ministry of Culture, and these mainly pertain to directories of public institutions. Individuals or legal entities can submit requests via the open data portal for opening datasets which are of their interest.

Following the business analysis within the specific institution for identifying datasets which should be published on the portal, and the analysis of the software and hardware readiness of the institution, a mechanism for sending data by the institutions is being defined. The current national open

9 Standards for data quality of information systems of the state institutions (draft)
10 http://www.otvorenipodatoci.gov.mk/
11 Пристапено на 10.01.2018 г.

data platform provides a data catalogue of published datasets of state institutions. This portal was built under the existing platform in order to provide several alternatives of sending data based on the current state of availability of digital databases and quality data. This approach also allows for manual data entry of paper data and providing Excel files which are most common for storing data by the institutions.

The data provided by the institutions to this portal is being stored centrally. The rationale behind this solution was not to depend more on the IT resources of the other institutions and in that way to provide higher quality of the open data and services provided.

The current open data portal provides a feature for mashing up data of maximum three datasets published on the portal. This feature is rather interesting, but prerequisite for use of the same is the existence of particular logic in the cross-tabulation of the data sets. There is no evidence of the level of usage of this feature.

The portal does not provide a possibility for publishing metadata of the datasets and publishing licenses, and it further limits automatic harvesting of datasets by other portals.

On the other hand, referring to technical capacities, generally there is a need for additional IT personnel in the government institutions have deficit of IT resources, in order to respond to the growing challenges in terms of using information – communication technologies. This certainly reflects to the area of open data as well. Not all institutions have state-of-the-art IT systems where data is being stored and managed digitally in databases. Generally, institutions store data in paper registries or in spreadsheets software (mainly Microsoft Excel). This poses an important issue regarding the need for digitalization, and moreover on automatic publishing of real-time data where this is relevant.

6. Release Strategy

6.1 Identification of data

For an open data Strategy to have a strong foundation, governmental institutions must conduct and keep an up to date inventory of the data and the data sets the creation and/or collection of which is prescribed by law.

This inventory should be used for datasets prioritization for the process of opening data. Each organization should have an individual in charge with oversight of this inventory to ensure its ongoing maintenance and accuracy.

An inventory process is a significant step in setting the stage for meaningful public discussions around dataset release. However, the process of creating an inventory should not pose an obstacle for opening data by institutions, since these two processes can be delivered in parallel.

The Guide for identification of datasets and creating data inventory is given in **Annex A.**

6.2. Assessment of data

6.2.1. Quality of data

The key measure of data quality is its fitness for reuse of the open data by data consumers. While public sector institutions may also use other criteria for internal purposes, the value of data is in its use and therefore its fitness for reuse is key. Some of the main open data quality dimensions are given into **Annex B.**

The objective is the Government and all public sector institutions to publish open data of a high quality. – accurate, relevant and consistent. However, a lack of high quality at the present time will not be a justifiable reason not to publish the data. Instead the data should be published with the quality

assessment and with a statement of the steps that the public sector institution intends to take to improve the quality of that data. The public sector institution should engage with the users of its data to determine their priorities for data improvement and should prioritise its actions and resources according to the needs of its users.

6.3. Open Data Cataloguing

Besides all data available at each public sector institutions are inventoried, the open datasets will be catalogued and institutions will publish a complete catalogue of all open character datasets on the central open data portal.

All datasets will be described by metadata according to an internationally recognized vocabulary of metadata such as DCAT-AP.[12] Commonly defined fields for any metadata standard not only provide helpful context about the data's creation, quality and uses, but also help automate discovery mechanisms at the granular level, serving the public discovery process.

6.4. Publication of Open Data

6.4.1. Prioritization

Public organizations produce a lot of data and datasets that have open character and potential for re-use.

The prioritization model for opening data owned by the public sector institutions is combined supply-demand driven.

The detailed prioritization model for opening data is provided in **Annex C.**

6.4.2. Publication Format

Data will be normally be released in structured and internationally recognized open-standardized formats to support traceability and effective reuse.

12 https://joinup.ec.europa.eu/solution/dcat-application-profile-data-portals-europe/releases (7.1.2018).

This Strategy accepts the universally recognized five-star model for Open Government Data suggested by Tim Berners-Lee:[13] A description of 5-star model for OGD and set of open standard formats are given in Annex D. Publication will normally be at 3-star level or higher, and data will normally be published in one or more of the following machine readable open formats (the format(s) depending on the type and context of the data): CSV, JSON, XML, RDF, GeoJSON, KML, WMS, WFS, JPEG 2000, PNG, SVG.

Exceptionally, where it is not possible to publish data immediately in a 3-star format it may be published initially in a 2-star format (such as Excel) by agreement between the public sector institution concerned and MISA. Only in exceptional circumstances, when the institutions have no technical possibilities, the open data can be published in a 1-star format (such as PDF).

6.4.3. Updating of published datasets

Once published for the first time, open data should be regularly updated

Once published for the first time, open data should be regularly updated. The frequency of update will depend on the specific data and the frequency of updates within the public sector institution, but in general data should be updated with the same frequency as its temporal granularity: therefore annual data would normally be updated annually, monthly data would normally be updated monthly and so on.

If the data is changed very frequently or in real time, standard updating of the dataset on the portal might be excessively burdensome. In these cases there should be possibility for opening of the data through a RESTful API .

6.4.4. Exemptions for sensitive data (privacy, security or other)

All data produced and/or collected by the public sector institutions are suitable for publishing as open data. However, in some cases, certain data cannot

13 KDZ, (2016). Open Government Implementation Model – Implementation of Open Government, Ver. 3.0, KDZ – Centre for Public Administration Research, p.28

14 Law on Use Public Sector Data, Article 3, Official Gazette of Republic of Macedonia, no. 27/2014.

be released. Those data should be protected and thus, access restricted:[14]

- data excluded by the Law on free access to public information ;
- data to which the access is restricted by law;
- data under the intellectual property considerations by third parties;
- personal data the disclosure of which would constitute a clearly unwarranted invasion of personal privacy.
- trade secrets and commercial or financial information obtained from a person and privileged or confidential.
- data that is not suitable for publishing based on a formal risk assessment (not an arbitrary decision) that disclosure to the public may threaten the safety of a person or harm the security of any property, institution or any other system.

Where institution hold datasets which contain personal and/or commercially sensitive data it may be possible for them to either anonymize the data or to release parts of the data which are not personal and/or not commercially sensitive. This Strategy suggests that when issues arises with anonymization techniques and the status of anonymized data, the institutions governance procedure should consult and provide compliance with the ICO's "Managing data protection risk code of practice".[15]

In all cases of exemption from publication, the principle of minimum redaction will apply; only the sensitive elements (columns or rows) will be removed from the dataset, and the rest of the dataset will be published with no sensitive records. Attention is to be paid on the relevancy of the dataset following removal of specific data from the same, that is the data set is to retain its relevancy.

15 ICO (2012), *Anonymization: managing data protection risk code of practice,* Information Commissioner's Office..

6.4.5. Extract – Transform - Load Cycle (ETL)

Before datasets are to be published, data should be unlocked. This means that data needs to be extracted from source systems (documents, databases, applications, datasets) in much the same way as it's done for data warehouses.

That way the institutions will reuse most of the existing data by using techniques to extract data/information from source systems or databases, to (partially) structure it, to make it consistent and to publish it, through a process called ETL (Extract, Transform, Load). Possible scenarios for opening up source data are given in **Annex E.**

7.

Open data portal

State institutions in Macedonia will continue to make their open datasets available electronically at no cost to the public through a central government open data portal. This provides the users with a single point access to all open public data.

The data portal facilitates the distribution of open data by providing an easy-to-access, searchable hub for multiple data sets. It will allow users easily to find, visualise and download data. The portal will also be used by the Government to go into details about issues and policies related to its commitment to openness and transparency.

An effort will be made on enhancing the current portal solution to a new platform, which will be beneficial for several reasons:

- to implement best case data platform which is being used by many open data global leaders;
- to provide diverse open and machine-readable formats;
- to decentralise data management to institutions which are responsible for their data;
- to provide visibility of the published datasets by enabling automatic harvesting of the datasets by other data portals;
- to provide licensing of datasets;
- to publish metadata for the datasets;
- to provide additional tools on the platform that will enhance data usability;
- to enhance community engagement.

Each public sector institution will be responsible for its own data published on the Open Data Portal, including compliance with the Open Data policy,

the removal of sensitive data elements before publication, the conversion to open formats, the supply of high-quality metadata and the regular checking and updating of the data once published.

Beyond the open data portal, public sector institutions may additionally publish their datasets on their own websites if they wish, although they are encouraged to link to their data on the Open Data Portal rather than have to manage multiple copies.

8. Demand and Engagement

Deriving from the third principle of the International Open Data Chapter - Accessible and Usable, the Macedonian Government needs to ensure that data can be accessed and used effectively by the widest range of users. This will require the creation of initiatives to raise awareness of open data, promote data literacy, build capacity for effective use of open data, and ensure citizen, community, and civil society and private sector representatives have the tools and resources they need to effectively understand how public resources are used.

8.1. Raising awareness

For making the most from open data, raising awareness is a crucial step, which requires preparatory and inclusive measures that would help the open data community and public institutions in their work aimed at implementing this open data strategy.

It is of high importance to identify, organize and enhance capacities of open data managers in the relevant institutions - especially Ministries that work regularly with big amounts of data.

The importance and benefits of open data should be promoted by running a well-planned promotional media campaign for the general public. Regular promotional events should be organized for presenting best practices for open data and promoting opened data by the institutions.

8.2. Improving capacities of stakeholders

In order to improve the capacities of the stakeholders, special attention must be given to enhancing the levels of “data literacy” in Macedonian society in general, with emphasis on open data. What it means is that the number of Macedonian society representatives that knows how to recognize machine

readable data, how to acquire it, how to use it, analyse it and how to read presented data, must be increased.

Therefore, open data literacy boot camps that would include journalists, representatives of the civil society organizations, academia and businesses is an approach that would stimulate advanced use of open data.

8.3. Consultations with stakeholders

This Strategy favours the demand driven-supply model when the decision about what dataset to be open with higher priority should be made. Only by becoming more demand driven and publishing data sets that will actually be used, can governments succeed in creating impact. This requires good cooperation with companies and citizens, aligning datasets to defined needs.

To facilitate open data use, public sector institutions should actively communicate with various open data stakeholders – other government institutions, businesses and citizens. This communication should incorporate also a proactive approach by providing information about future plans and activities regarding opening up data. This helps potential users know when certain datasets will become available. Also public sector institutions should listen to environment when stakeholders describe their data needs; this will help trigger creation and delivery of relevant open datasets.

Consultations with stakeholders whenever the predicted data structures are changed will increase consistency and ensure a transparent methodology of publishing data by state institutions and agencies. .

8.4. Inclusive development and innovation

One of the main goals of this strategy is to reach a point where the state institutions, but also the civil society, media, businesses and academics are determined to open up data gathered and stored by their organizations in an open and machine readable format.

The potential partnerships, or co-creations of data sets, web and mobile applications and data visualizations between open data stakeholders should be vastly supported and encouraged.

Support should be provided to start-up companies that base their business ideas on open data.

The educational system should also be included in the development of a higher level of 'data literacy' which requires the cooperation with the educational sector in order to find ways to include 'data literacy' in their curriculum.

The impact of open data on the country's economic development as well as the impact on the society in general will be measured by analyzing the levels of engagement over time of the public with the published data sets; measurement of the data based decisions taken by members of society or specific groups in the society; and measurement of general open data awareness in the country.

Promoting international cooperation is needed, especially in the region, for sharing know-how and expertise and developing common initiatives (such as regional hackathons).

9. Strategic priorities and measures

The strategic measures that need to achieve the goals of the Open Data Strategy are grouped into three strategic priorities that reflect the specific objectives of the Strategy. The implementation of these measures will establish a legal, organizational and technical foundation on which the process of opening the data of the state institutions will be facilitated and accelerated, and the stakeholders will be supported to use the open data in order to create new values for the society as a whole.

9.1. Enabling environment for open data

M1. Adopting the international open data charter

The Open Data Charter was founded in 2015 as a result of collaboration among governments and experts in open data. It sets six principles of how governments should publish open data. Macedonia should join the community of more than 70 countries who have signed the initiative, and in that manner, proclaim its own pledge towards transparency and accountability by open data.

M2. Adoption of new Law on Open Data

An analysis will be conducted on the current Law on Use of Public Sector Data and the bylaws and, if required, amendments to the legislation will be proposed. This analysis will be primarily based on the EU Directive on the Re-use of Public Sector Information because of additional harmonization with the same Additionally, the analysis would eventually also provide recommendations whether other legislation should be also amended, if it provides obstacles for opening up data by certain institutions.

M3. Improvement of the quality and usability of the data sets

A licencing model for open data will be adopted, under which state institutions will be publishing the open data.

A Macedonian standard for metadata will be established based on the DCAT-AP specification for describing datasets from the European public sector, thus providing discoverability and enhancing usage of the open datasets.

M4. Upgrade of the national open data portal

The current national open data portal will be modernised, facilitating the process of publishing datasets by the institutions, and providing for the datasets to be harvested by other data portals in the region and beyond. Metadata will be contained for each dataset, and a licencing model will be introduced for them.

The web portal will be moved to a new web location: data.gov.mk, in line with national open data portals of other countries.

M5. Enhancing capacities of MISA for open data

A structure in MISA will be established, in charge of coordination and implementation of open data policies. This unit will take part on an advanced training programme in order to enhance the capacities in the area of open data.

M6. Developing organisational mechanism for opening data of state institutions

So as to overcome the challenge of institutions not being willing to open up their data, or not regularly updating their data, a high level organisational mechanism will be set.

A Task Force for open data will be established that will coordinate the opening of the data by the institutions, including their updating on regular basis. This Task Force will be managed by the MISA. The open data Task Force will develop a plan for operation of the organizational mechanism (manner of cooperate, exchange of information, recommendations) and, in the frames of its mandate, will also develop the job description for the open data manager position.

M7. Enhancing capacities of open data managers in the state administration bodies

Open data "nodes" from the institutions will be identified, working as data managers within their institutions.

Advanced training will be delivered to open data managers for the process of identifying and prioritisation of data, and publishing data on the national portal.

M8. Adopting a methodology for identification, catalogization and prioritization of datasets

The process of identification, catalogization and prioritization of datasets will be delivered as a methodology for identification, catalogization and prioritization of the datasets. This will define the terms of how to identify all datasets in an institution, how to develop a catalogue of datasets and then make a priority list of datasets which will be given priority in the opening based on the set criteria.

9.2. Institutions open up their data

M9. Developing catalogue of datasets of the Ministries

All Ministries will be obligated to develop its own catalogue of datasets according to the methodology for identification, catalogization and prioritization of datasets. The catalogues will be published on the national open data portal.

M10. Conducting research on the needs for data by stakeholders

A comprehensive research will be conducted where information will be gathered from the NGOs, businesses, academia and the general public on their needs of public data from the state institutions. The research will serve as an input for prioritisation of data with the highest value for its users.

M11. Identifying registries which contain open data for digitalisation and development of state-of-the-art IT systems

The process of identification of datasets and its prioritisation for publishing will result in forming a picture of the datasets which have the most value when being published. For some of them, data may not have been collected, were in paper form, or it is not in an advanced IT system which allows for real-time data extraction. Thus, registries with open data will be determined for digitalization and development of state-of-the-art IT systems.

The analysis should provide recommendations for the new systems/ registries which contain public data to be designed in order to ensure quick and easy opening of the data ("open by design").

M12. Stage-by-stage process of opening data by the Ministries

State institutions will publish data in several stages, depending mainly on the value of their data and the readiness of the institution for opening up data. The state-by-stage process will be developed and coordinated by the MISA.

9.3. Increased usage of open data

M13. Conducting training on open data for the Ministries

Open data as a separate module will be included in the national training program for the administrative servants. The goal will be to raise the awareness and basic knowledge of open data for the employees in the state institutions.

M14. Organizing national conferences on open data

Annual national conferences on open data will be organized with participants from the state institutions, the NGOs, the business sector and the academia, on diverse topics related to open data. The conferences will contribute towards awareness raising on the open data among all stakeholders in the process of opening and re-use of the open data.

M15. Increasing public awareness and informing about the benefits of the open data

A well planned media promotional campaign will be delivered via the on conventional and social media. The goal is to raise the awareness of the public of the benefits of open data in terms of enhancing transparency, boosting the economy and improving the efficiency of the public sector.

M16. Promotion of the functionalities of the national open data portal

The national open data portal and its functionalities will be promoted in the traditional and social media.

M17. Delivering workshops on data literacy

Relevant stakeholders, such as journalists, representatives of the civil society sector and the academia, will be invited to "data literacy" workshops, where basic and advanced sessions will be delivered. The topics of the sessions will include the fundaments of open data, processing of data, visualisations of data, and furthermore on advanced issues such as, for example, building apps on the basis of open data.

M18. Organizing Hackathons

Regular annual Hackathons will be organized where app developers can compete with their applications using available open data on the national portal. The purpose is for the hackathons to attract mainly IT students and start-ups. The developed apps will serve as a showcase of the potential of open data.

A regional Hackathon will be organized, chaired by the MISA, with cooperation of the relevant government institutions from the region. App developers will be invited from the countries in the region, to compete with their applications. Applications that use data from several sources in the region will be valued more, thus showing the potential of cross-tabulation of data.

M19. Providing support to start-ups that base their business on open data

The Fund for Innovations and Technology Development will provide grants to start-ups which will develop technical solutions with open data and found their business on top of it.

M20. Including data literacy in the educational system

The Ministry of Education and Science will be involved to make analysis of how data literacy can be included in the curricula in the national education system.

10.

Managing, monitoring and reporting

10.1. Management

In order to implement this Strategy and establish an open data culture in the public sector institutions a strong political leadership in open data has to be developed to arm decision-makers with the understanding and necessary skills to lead and manage open data implementation plans at their institutions.

Responsibility for open data management should be delegated across the defined structure of the public sector institutions, from the data creators, collectors and/or producers, up to the Open Data Managers. The Open Data Manager of each state institution together with its top management should provide incentives to the public sector institution's staff to ease the publishing of open data.

The transformation to open data is not an easy one. Wherever it has been successfully achieved, the transformation requires cultural change: a) moving from Close by Default to Open by Default principle, b) a shift from documents-based to data-centric thinking.

A culture of openness should not be established only through legal and institutional measures, but also through training and information programs, tools, guidelines and communication strategies in order to make government, civil society and private sector representatives aware of the benefits of open data.

10.1.1. Coordination mechanism for data publication

This Strategy proposes the management structure for open data based on the functional model, as described below.

Coordination of the implementation of the Strategy at the highest level will be carried out by the Council for ICT[16]. The National Council for ICT will hold regular semi-annual meetings regarding the implementation of the Strategy.

The implementation of the Strategy at the operational level will be coordinated by the established open data structure in the MISA, in cooperation with the Task Force and the involved entities for the implementation of the measures in accordance with the Action Plan.

1. **The National Council for ICT** is responsible for:
    1. Providing high-level support for the implementation of the National Open Data Strategy and Action Plan.
2. **Ministry of Information Society and Administration** is responsible for:
    1. Coordination and implementation of the National Open Data Strategy and Action Plan.
    2. Reviewing the National Open Data Strategy and Action Plan.
    3. Coordinating the Task Force for Open Data.
    4. Management and maintenance of the National Open Data Portal.
    5. Developing and implementing adequate procedures and training programs to ensure on-going compliance with the National Open Data Strategy and Action Plan.
    6. Measuring the adoption of the ODSAP and PSI's ODIP across all public sector institutions.

16 Resolution for Establishment of National Council for ICT.

7. Measuring the impact of the publication of open data from the public sector institutions.
8. Handling of appeals about non-releasing datasets requested by the users. .

3. **Task Force for Open Data** (constituted from all open data stakeholders: MISA, other Ministries, ZELS, Universities, Business Sector, Research community, Civil Sector) is responsible for:
    1. Monitoring the progress of the National Open Data Strategy and Action Plan Implementation.
    2. Identifying and proposing projects pertaining to open data and other initiatives to raise awareness and informing, promote their usage in order to ensure sustainability of Open Data activities.
    3. Providing support, advice and guidance to public sector institutions and data users in Open Data Strategy implementation activities.
4. **Open Data Manager** (in each public sector institution, and this role could be taken by the responsible manager for free access to public information) is responsible for:
    1. Implementation of the National Open Data Strategy and Action Plan (ODSAP) in its own institution.
    2. Creating and implementing Open Data Implementation Plan (ODIP) for its own institution, and publishing ODIP on the central open data portal.
    3. Managing the publication of open data.
    4. Reporting to the Ministry of Information Society and Administration on the progress and implementation of the National Open Data Strategy and Action Plan.

5. Communicating and advising managers of sectors and/or departments and the staff of the public sector institution on the implementation of the Open Data Implementation Plan.
6. Communicating and providing feedback to the public on open data topics.
7. Cooperation with the users of the institution's open data.
8. Experience sharing with open data managers from other institutions and MISA for the process of publishing data..

5. **Public sector institution's managers** of sectors and/or departments are responsible for::
   1. Implementing the ODSAP and public sector institution's ODIP within his/her sector and/or department.
   2. Organizing of the management with, and preparation of, the records of data/ datasets they have available, that they create and collect in accordance with the ODSAP and ODIP.
   3. Raising awareness, understanding and informing of the staff in their sectors and/or departments are aware of, understand, and are trained regarding the implementation of the ODIP. .
6. **PSI's staff** is responsible for:
   1. Complying with the terms of the ODSAP and public sector institution's ODIP.

10.2. Monitoring the implementation of the Strategy and reporting

The Open Data Strategy will be implemented in the period of 2018 till 2020. The Action Plan for implementation is part of the Strategy, defining the measures and activities, responsible organizations, time period for

implementation, budget and sources of financing, indicators and sources of verification.

MISA will collect information on the implementation of the Strategy from the involved entities through regular meetings, established communication, and through official letters asking for reports on the implementation of the measures.

MISA maintains a central portal for open data, from where it will directly receive information on how many institutions publish open data, how much the portal is visited, how much data sets are downloaded from users, what data users are searching for, etc.

MISA will also conduct activities for measuring the influence of society on the release of open data, especially in cooperation with the civil society sector.

The established structure for open data in the MISA will submit monthly reports to the Minister of Information Society and Administration, as well as semi-annual reports to the National Council for ICT on the status of the implementation of the Action Plan, informing about the problems and challenges that need to be overcome.

The evaluation of the implementation of the Strategy and the achievement of the foreseen objectives will be carried out by independent experts, once in a mid-section and once after the envisaged period of the Strategy.

Expert team for drafting the Open Data Strategy

Martin Todevski	Center for Change Management
Bardhyl Jashari	Foundation Metamorphosis
Goran Rizaov	Foundation Metamorphosis
Zoran Janevski	Economic Institute Skopje
Andrew Stott	International expert

Working group for drafting t he Open Data Strategy

Gordana Gapikj Dimitrovska	Ministry of Information Society and Administration
Nadica Josifovski	Ministry of Information Society and Administration
Filip Manevski	Ministry of Information Society and Administration
Ilija Zhupanoski	Cabinet of the Prime Minister
Marjan Zabrchanec	Cabinet of the Prime Minister
Zhaklina Chagoroska	Ministry of Health
Goran Galevski	Ministry of Education and Science
Igor Krstevski	Ministry of Education and Science
Tanche Gjorgjievski	Ministry of Transport and Communications
Slobodan Janevski	Ministry of Finance

Zoran Jordanoski	Direction of Personal Data Protection
Oliver Serafimovski	Commission for Free Access to Public Information
Vladimir Naumovski	Central Register of RM
Ljupco Vangelski	MASIT
Misha Popovikj	Institute for Democracy Societas Civilis
Goce Mitevski	Free Software Macedonia
Nikola Kovachevski	Free Software Macedonia
German Filkov	Center for Civil Communications
Neda Maleska Sachmaroska	Center for Change Management
Adrijan Besimi	South East European University
Milosh Jovanovikj	Faculty of Computer Science and Engineering

ANNEXES
Open Data Strategy

Annex A.

Guide for identification of datasets

Inventory of datasets

When public sector organization make data inventory and identify data and datasets that they collect and/or produce the following definition of data and dataset must have in mind:

- Data – are things known or assumed as basic values or facts, making the basis of reasoning or calculation.[1] According to the Law on Use of Public Sector Data, data are a qualitative or quantitative value, or a separate part of an information.[2] Data become information when analysed to extract meaning and to provide context. The meaning of data can vary, depending on its context.
- Dataset - any organized collection of data.[3] The most basic representation of a dataset is the combination of data elements presented in tabular form. Each column represents a particular variable and each row corresponds to a given value of that column's variable. A dataset may also present information in a variety of nontabular formats, such as an extended markup language (XML) file, a geospatial data file, an image file, etc.
- Metadata – are (descriptive) data that explain the meaning of data.4

1 https://en.oxforddictionaries.com/definition/data (29.12.2017).
2 Law on Public Sector Data Use (2014), Official Gazette of Republic of Macedonia, no. 27. 3.2.2014. p.2
3 https://stats.oecd.org/glossary/detail.asp?ID=542 (30.12.2017).

Metadata provide relevant description about the data and datasets, such as: responsible access coordinator, associated laws and regulations (if any), structure, data elements, interrelationships with other data and/or datasets, and other characteristics of data/dataset such as: its creation, disposition, access and handling controls, formats, content, and context, as well as related audit trails.

The creation of dataset inventory is an iterative process and has the following four steps:[5]

1. Analysis of laws and regulation related to the work of public sector organization with focus on data/datasets production and/or collection.
2. Identification of all data sources.
3. Identification of all datasets from all data sources.
4. Creation of dataset inventory.

4 Ibid..
5 http://open-data-manual.readthedocs.io/en/latest/inventory.html (2.1.2018)

Step 1:

Analysis of laws and regulation with focus on data/datasets

An analysis of the laws, bylaws and other regulation related to the work of the public sector organization should be done with aim to identify all data/databases/datasets/registers/records that the organization is obliged to produce and/or collect. The analysis should also provide the datasets structure if it is prescribed by any regulation. For example, in the Law on Health Care, in the Article 9-a it is written that the public healthcare institutions are obliged to keep records of the medical equipment they have and with which they perform the healthcare activity. The records of the medical equipment shall contain in particular data on: type of equipment, description of the equipment, medical specialty or subspecialty in which the equipment is used, whether the use of equipment requires scheduling through the electronic list of scheduled examinations and interventions, the year of production, the name of the manufacturer, the year of purchase, the date of conclusion of the procurement contract, i.e. the contract for donation and the archival number under which the contract is registered, the purchase price of the medical equipment, the date of signing the contract for maintenance of the medical equipment and the archival number under which the contract is entered, depreciation rate, number of repairs carried out, parts replaced and degree of utilization.

The following words/terms/phrases could help to identify the data/datasets that should be produced and/or collected by public sector organization according to some regulation: date, data, list, electronic list, lists, network, registry, registries, record, system for electronic records, records, notifications, report.

Step 2:

Identification of all data sources

Some of identified datasets might already exist (in analogue/paper or digital/computer form), and some of them have yet to be established. Both existing and non-existing (but prescribed by the law), in digital or analogue form should be listed in the inventory.

Existing data may be housed in a variety of places from inside information systems or databases stored on individual and/or shared drives and folders, or in paper form in some registrars, registers or other records. This step is about identifying the major data sources in the public sector organizations.

The following questions could be used as a guide how to identify data sources in each public sector organization (including all sectors and departments):

1. What paper-form registrars, registers or other records does the organization use?
2. What information systems does the organization use?
3. What databases does the organization use?
4. What applications capture information or are used in organization's business processes?
5. Are some data resources kept in spreadsheets (on shared or individual drives)?
6. What data and/or information do the organization already publish? Where did that data/information come from?

Step 3:

Identification of all datasets from all data sources

Some of organization's data/information sources may be fairly straightforward. Some frequently generated reports or spreadsheets would be good examples of a dataset.

The following questions could be used as a guide how to identify datasets in each public sector organization (including all sectors and departments):

1. What datasets are used for reports?
2. What datasets are publicly available online or elsewhere?
3. What datasets are used internally?
4. What data/information is published as a performance metric?
5. What data is reported to other public service organizations?
6. What data do other departments ask for?

Step 4:

Creation of dataset inventory

Each dataset identified in Step 3, should be added to the dataset inventory. The dataset inventory will contain basic information about each dataset.

More precisely, the dataset inventory must have the following data about each dataset:

1. Unique Identifier - A unique identifier for the dataset.
2. Title – The name of the dataset. Should be in plain Macedonian and include sufficient detail to facilitate search and discovery.
3. Description – Description (e.g., an abstract) with sufficient detail to enable a user to quickly understand whether the dataset is of interest.
4. Contact Email - Contact person's email for the dataset.
5. Format - What is the primary state or file format for containing this dataset? (i.e. paper, database, excel, CSV, JSON, other).
6. Keyword – Keyword or tag that describe the dataset
7. Public sector organization's name – The formal name of the organizations that release the dataset.
8. Theme – Main thematic category of the dataset.
9. Documentation - URL to the documentation describing the data set (if it is published).
10. Frequency - The frequency with which dataset is published.
11. Landing page - URL where the dataset is located (if it is published).
12. Language – The language of the dataset.
13. Spatial - The range of spatial applicability of a dataset. Could include a spatial region like a bounding box or a named place.

14. Temporal coverage - The range of temporal applicability of a dataset (i.e., a start and end date of applicability for the data).
15. License - The license with which the dataset has been published. .

For the users of open data, it is very helpful if every dataset inventory is accompanied with the dataset structure for each dataset with the following data:

1. Unique Identifier - A unique identifier for the dataset.
2. Title – The name of the dataset. Should be in plain Macedonian and include sufficient detail to facilitate search and discovery.
3. Name - Human-readable name of the column.
4. Column description - Human-readable description of the column's contents.

An individual or group should be charged with oversight of the inventory to ensure its ongoing maintenance and accuracy.

Annex B.

Main data quality dimensions

There are several different dimensions for obtaining and improving open data quality:[5,6]

- **Accuracy** – is the extent to which it correctly represents the characteristics of the real-world objects, situation or event.
- **Availability** – is the extent to which it can be accessed. This also includes the long-term existence of data.

➔ EXAMPLE:

- A dataset that is identified by a certain URL that resolves persistently to the right resource (and does not give back 404 Not found).

RECOMMENDATION:

- Responsibility for the maintenance of data should be clearly assigned in the organization..

COMPLETENESS – is the extent to which it includes the data items or data points that are necessary to support the application for which it is intended

➔ EXAMPLE:

- A dataset that includes spending data for all ministries enables a complete overview of government spending..

5 PwC (2014). Open Data & Metadata Quality – Training Module 2.2, EC, Open Data Support.

6 https://www.w3.org/2013/share-psi/bp/eqa/ (8.2.2018)

RECOMMENDATION:

- In order to include all the necessary data points a capture and publication process should be designed and detailed procedures should be developed that will check if completeness is fulfilled.

CONFORMANCE - is the extent to which it follows a set of explicit rules or standards for capture, publication and description..

➔ EXAMPLE:

- A description of a dataset (metadata) according to the DCAT-AP standard.
- Publishing open data based on W3C standards..

RECOMMENDATION::

- The most relevant and most used standards in the domain should be applied. .

CONSISTENCY - is the extent to which it does not contain contradictions that would make its use difficult or impossible.

➔ EXAMPLE:

- A description of a dataset where the data of last modification is not before the creation date..
- Dataset that contains data on the name of a municipality which is entered as free text with a possibility of a mistake while entering the name. Thus, some records will contain the exact name of the municipality (Skopje), while others will contain misspellings (Skojpe).

RECOMMENDATION:

- All data should be processed before publication to identify all possible conflicting statements and other errors (in particular if data is collected and aggregated from different sources)

CREDIBILITY - is the extent to which it is based on trustworthy sources or delivered by trusted organizations..

➔ EXAMPLEИ:

- A dataset that contains data from processes that can be independently verified, e.g. election results or parliamentary proceedings.

RECOMMENDATION:

- Data should be based on sources that can be trusted.

PROCESSABILITY - is the extent to which it can be understood and handled by automated processes..

➔ EXAMPLES:

- A dataset that contains coded information based on publicly available controlled vocabularies and code lists.
- A description of a dataset that expresses dates in W3C Date and Time Format (e.g. 2013-06-01) rather than as text (e.g. 1 June 2013).

RECOMMENDATION:

- To apply recommendations for syntax of data given in common standards and application profiles.
- To Identify the source of terminology and codes used in the data in machine-readable manner.

RELEVANCE - is the extent to which it contains the necessary information to support the application..

➔ EXAMPLEИ:

- A Dataset that contains temperature measurements rounded to degrees Celsius for climate calculations; a dataset with precision of a thousandth of a degree for chemical reactions.

RECOMMENDATION:

- To match coverage and granularity of data to its intended use within constraints of available time and money
- However, potential future usage of data should be also considered.

TIMELINESS - is the extent to which it correctly reflects the current state of the entity or event and the extent to which the data (in its latest version) is made available without unnecessary delay.

➔ EXAMPLEИ:

- A dataset that contains real-time traffic data that is refreshed every few minutes.

RECOMMENDATION:

- To adapt the update frequency of data to the nature of the data and its intended use
- To make sure that processes and tools are in place to support the updating.

Annex C.

Prioritization model for opening data

Prioritization will be made according to the following set of criteria:

- Institutions will open up data that is already in an open format.
- Institutions will open up datasets that are already publicly available, not in open, but in some other format.
- Institutions will open up data that is updated, well-structured and of high quality.
- Institutions will open up data that require minimal input of resources to prepare for opening.
- Institutions will open up the datasets for which there is a request for opening made by potential users (private sector, civil sector, other government institutions, etc.).
- Institutions will open up datasets that appeared to be useful given usage elsewhere (Open Data Index, Open Data Barometer).

Each of these criteria priority has equal weight in determining the final grade for and gets a value of 1 for each fulfilled criterion. The final grade is the sum of the individual grades of all 6 criteria. The highest priority for opening will have those datasets that will have the highest rating of all the

criteria that the institution is having (the maximum possible score is 6). By completing the publication of the datasets with a priority score of 6, the process continues with the opening up the datasets with the grade 5 for priority, etc., until the last sets with priority grade of 1 are exhausted.

By creating new datasets due to new legislation or due to the need itself, the practice in the functioning of the institution should be given priority for their opening according to this model. Gradually (after 2-3 years from the beginning of the publication of open data on the national open data portal) the criterion for the requests from the users will get a bigger weight factor and will become increasingly dominant in determining the priority for the opening.

Annex D.

The 5-star model for OGD and set of open standards

Datasets will be published according to the 5-star model for Open Government Data as a minimum 2-star level, where:[7]

- **0 star** – data is not available with an open licence.
- **1 star** – data with documented metadata are available online with open license permitting re-use.

➔ EXAMPLE:

- PDF file containing table presented as a scanned image table with data for temperature forecast for Skopje: day, lowest temperature, highest temperature.

BENEFITS FOR THE USERS AND PUBLISHERS:

- User can look at the data, print it, store it locally, can enter the data into any other system, can change the data, and share them with anyone
- For the public sector institution, it is simple to publish.

2 stars – data with documented metadata are available online in a machine readable format with open license permitting re-use.

7 KDZ, (2016). Open Government Implementation Model – Implementation of Open Government, Ver. 3.0, KDZ – Centre for Public Administration Research, p.28

➔ EXAMPLE:

- Excel (.xlsx) file instead of image scan table with data (in rows and columns) for temperature forecast for Skopje: day, lowest temperature, highest temperature..

O BENEFITS FOR THE USERS AND PUBLISHERS:

- The users can do all as 1-star data and in addition they can directly process the data with some proprietary software to aggregate it, perform calculations, to make charts and diagrams, etc.
- For the public sector institution, it is simple to publish

3 STARS - data with documented metadata are available online, in non-propriety machine readable format, with open license permitting re-use.

➔ EXAMPLE:

- Data for temperature forecast for Skopje in CSV format instead of Excel format..

O BENEFITS FOR THE USERS AND PUBLISHERS:

- The users can do all as 2-stars data and in addition they can manipulate the data in any way they like, without any need to have any proprietary software
- Publishers might need converters or plug-ins to export the data from the proprietary format.

4 STARS - data are available online, in non-propriety machine readable format, with open license permitting re-use. Data are described in a standard way and uses unique reference indicators (URIs) to identify things, so that people can point to the data.

➔ EXAMPLE:

- Data for temperature forecast for Skopje in RDF format (Resource Description Framework). On one hand there are information where a resource can be found. On the other hand, there the first steps to a semantic approach. It defined what is to be talked of.

○ BENEFITS FOR THE USERS AND PUBLISHERS:

- The users can do all as 3-stars data and in addition it can link to it from any other place, can bookmark it, can re-use part of the data, can combine the data safely with other data, URIs are a global scheme so if two things have the same URI then it's intentional, and if so that's well on it is way to being 5-star data.
- Publishers have fine-granular control over the data items and can optimize their access (load balancing, caching, etc.), the publishers can link to other publisher's data – upgrade it to a 5-star rate, need to assign URLs to data items and think about how to represent the data.

5 STARS – data are available online, in non-propriety machine readable format, with open license permitting re-use. Data uses unique references and links to other data to provide context.

➔ EXAMPLE:

- data for temperature forecast for Skopje in RDF format (data provided by the National Hydro-meteorological Service - Republic of Macedonia) and linked data for air quality in Skopje (data provided by the Ministry of environment and physical planning – Republic of Macedonia)

BENEFITS FOR THE USERS AND PUBLISHERS:

- The users can do all as 4-stars data and in addition they can discover more related data while consuming the open data, they can directly learn about the open schema.
- Publishers can make their own data discoverable, can increase the value of their data, and their institution will gain the same benefits from the links as the users, but they will need to invest resources to link their data to other data on the web, and might need to repair broken or incorrect links.

Annex E.

Possible scenarios for opening up source data by ETL (Extract, Transform, Load)

ETL (Extract, Transform, Load)

All public sector institutions will open up and publish their data according to a set of best practices to maximize re-usability e.g. the 5-star model and as a minimum **2-star level.**

Four different scenarios are possible for opening up data:[8]

1. **Opening up data from existing publications/documents**

The public sector institutions collect data from an existing publication/ document (graphs or tables in PDF or DOCX file) and publish them as open data. Here the data source from which the raw data are collected and processed in order to be included in a publication should be found. In this scenario, there is no extraction and transformation steps, only metadata for the dataset should be collected and the dataset should be published as open data.

8 Government of Flanders in Belgium (2014). Open Data Manual: Practice-oriented manual for the publication and management of Open Data using the Flemish Open Data Platform, p.16-27.

2. **Opening up data from an existing dataset..**

The public sector institutions already publish data and information on their web sites in a format such as XLSX available via download or viewer. Here, in the existing process, the IT department will extract (if the data from the publication do not satisfy the open data criteria), transform and publish the data in an open data format. Extraction will isolate data and filter them from the database in a uniform dataset. Transformation encompasses a thorough quality check of the data, as is the case in every dataset environment. For instance, using uniform names for fields and content - no cryptic abbreviations, storing addresses in a consistent manner, writing names in full and in the same format, etc. All this will be done only for the datasets with the highest priority to be open up. As final step metadata for the dataset should be collected and the dataset should be published as open data.

3. **Opening up data from a database.**

In many cases the core data are in a database that has been created for an application to support a business process for the public sector institutions. The basis of this scenario is that the data must be extracted by the IT department from the application database first, before they are prepared for publication as Open Dataset. The assumption in this scenario is that application is developed internally on one of the existing internal environments (for instance, built in Java, .NET or other) and the database is one of the standard used by the public sector institutions (like Oracle, SQLServer, PostGre, etc.). Extraction will be done using the standard techniques for reading out tables from the database systems, and making them available as flat files.9 For the more frequently changed data, more suitable is to read out the data through ODBC or JDBC drivers.

9 The method for extraction is to write SELECT queries that extract just the data needed into a flat, CSV file..

Transformation encompasses a thorough quality check of the data, as is the case in every dataset environment. For instance, using uniform names for fields and content - no cryptic abbreviations, storing addresses in a consistent manner, writing names in full and in the same format, etc. As final step metadata for the dataset should be collected and the dataset should be published as open data.

4. **Opening up data from an existing source system or package.**

Public sector institutions often use a commercial package that has its own database. These data can often not be accessed directly or they may be stored in a proprietary format that is determined by the supplier. In this scenario techniques are used for extracting these data from the package, transforming them and publishing them as Open Data. The difference with Scenario 3 is that packages often require the data to be opened up through other channels (like API or package-specific tools).

Action Plan of the Open Data Strategy (2018-2020)

GOVERNMENT OF THE REPUBLIC OF MACEDONIA

MINISTRY OF INFORMATION SOCIETY AND ADMINISTRATION

STRATEGIC PRIORITY 1:

ENABLING ENVIRONMENT FOR OPEN DATA

Indicator of strategic priority 1:
Number of datasets published on the central open data portal

ID	Measures / Activities	Responsible organization	Involved organizations	Timeline	Budget (MKD)	Sources of financing	Indicators	Sources of verification
M1	Adopting the international open data charter	Government	MISA, MFA, KPVRM	01.08.2018 – 30.09.2018	/	/	Signed declaration for adoption of the open data charter by a high Government official	International open data charter
A1.1	Signing an adoption statement of the open data charter	Government	MISA, MFA, KPVRM	01.08.2018 – 30.09.2018	/	/	Signed adoption statement of the open data charter by a high government official	International open data charter
M2	Adoption of new Law on Open Data	SRM	MISA, Government	01.01.2019 – 30.06.2019	/	/	New Law adopted	Offical Gazette of the Republic of Macedonia
A2.1	Analysis of the current Law on Use of Public Sector Data for compliance with the EU directive on the re-use of public sector information	MISA	ODTF, NGOs	01.01.2019 – 30.04.2019	/	Potential donor assistance	PVR Report and corresponding tables	Official Gazette of the Republic of Macedonia

ID	Measures / Activities	Responsible organization	Involved organizations	Timeline	Budget (MKD)	Sources of financing	Indicators	Sources of verification
A2.2	Analysis of the bylaw on the minimal technical possibilities of the public institutions to publish data and the technical aspects of the data format and the manner of their publishing	MISA	ODTF, NGOs	01.04.2019 – 01.09.2019	/	Потенцијална донаторска помош	Измени на подзаконскиот акт	Official website of MISA
M3	Improving the quality and usability of the datasets	MISA	Government	01.07.2018 – 31.08.2018	/	/	Adopted licensing model for open data	Central open data portal
A3.1	Choosing a licensing model for open data and incorporating it in the open data portal	MISA	Government	01.07.2018 – 31.08.2018	/	/	Adopted licensing model for open data	Central open data portal
A3.2	Developing a national standard for meta data	MISA	Government	01.07.2018 – 31.08.2018	/	/	Drafted national standard for open data	Central portal for open data data.gov.mk
A3.3	Adoption of the licensed model and the national medadata standard by the Government	MISA	Government	01.09.2018 – 30.09.2018	/	/	Adopted national standard for metadata and licensed model	Central portal for open data data.gov.mk
M4	Upgrade of the national open data portal	MISA	CCM, state institutions	01.06.2018 – 31.08.2018	3.877.000,00	Donors	Active portal for open data	Central open data portal data.gov.mk
A4.1.	Implementation of the new open data platform	MISA	CCM, state institutions	01.06.2018 – 31.08.2018	3.877.000,00	Donors	Published new open data portal data.gov.mk	Central open data portal data.gov.mk
M5	Enhancing capacities of MISA for open data	MISA	International experts	01.06.2018 – 31.12.2020	1.200.000,00	MISA / international experts	Percentage of employees in the MISA in charge for open data	Resolution on established structure

ID	Measures / Activities	Responsible organization	Involved organizations	Timeline	Budget (MKD)	Sources of financing	Indicators	Sources of verification
A5.1	Establishing structure for open data in the MISA	MISA	/	01.07.2018 – 31.08.2018	/	/	Number of persons working in the structure for open data	Resolution on established structure
A5.2	Organizing advanced trainings for the MISA team on open data	MISA	International experts	01.09.2018 – 31.12.2020	1.200.000,00	MISA / donors	Number of conducted advanced trainings; Received certificates	Reports from conducted trainings
M6	Developing organisational mechanism for opening data of state institutions	MISA	CICT, ODTF	01.07.2018 – 31.10.2018	/	/	Organizational mechanism for open data by the state institutions is established	Number of meetings of the task force
A6.1	Forming the Open Data Task Force (ODTF)	MISA	State institutions, private sector, academia, civil society	01.07.2018 – 01.09.2018	/	/	Open Data Task force established	Resolution on establishment of task force
A6.2	Developing ToR for open data managers	MISA	CBPM, MCTA, ODTF, State institutions	01.08.2018 – 30.09.2018	/	/	Defined responsibilities of open data managers	ToR for the operational mechanism of opening data in state institutions defined
A6.3	Developing work plan for the organizational mechanism (manner of cooperation, exchange of information, recommendations)	MISA	CBPM, ODTF,	01.08.2018 – 31.10.2018	/	/	Developed work plan	Developed work plan
M7	Enhancing capacities of open data managers in the state institutions	MISA	State institutions	01.06.2018 – 31.12.2020	1.500.000,00	MISA / donors	Percentage of open data managers with acquired at least 2 certificates per year	Training reports

ID	Measures / Activities	Responsible organization	Involved organizations	Timeline	Budget (MKD)	Sources of financing	Indicators	Sources of verification
A7.1	Nominating open data managers in the institutions	State Institutions	MISA	01.08.2018 – 30.09.2018	/	/	Number of open data managers from institutions	Nominations from institutions
A7.2	Developing curricula for training of open data managers	MISA	ODTF, State institutions	01.09.2018 – 31.10.2018	300.000,00	MISA / donors	Curricula developed	Training curricula
A7.3	Conducting training to open data managers on open data	MISA	ODTF, State institutions	01.11.2018 – 31.12.2020	1.200.000,00	MISA / donors	Attendance percentage on the trainings	Training reports

ID	Measures / Activities	Responsible organization	Involved organizations	Timeline	Budget (MKD)	Sources of financing	Indicators	Sources of verification
M8	Adopting a methodology for identification, catalogization and prioritization of datasets	MISA	ODTF, State institutions, CCM, NGOs, NICTC	01.09.2018 – 30.11.2018	105.000,00	Донатор	Процент на офицери за отворени податоци кои знаат да ги идентификуваат, катало-гизираат и приоритизираат податочните сетови	Службен весник на РМ
A8.1	Developing the methodology in the part for identification of datasets	ODTF	MISA, CICT, State institutions, CCM, NGOs	01.09.2018 – 30.09.2018	35.000,00	Donor	Draft version of part of the methodology	Draft version of the Methodology
A8.2	Developing the methodology in the part for catalogization of datasets	ODTF	MISA, CICT, State institutions, CCM, NGOs	01.10.2018 – 31.10.2018	35.000,00	Donor	Draft version of part of the methodology	Draft of the Methodology
A8.3	Developing the methodology in the part for prioritization of datasets	ODTF	MISA, CICT, State institutions, CCM, NGOs	01.10.2018 – 31.10.2018	35.000,00	Donor	Draft version of part of the methodology	Methodology Proposal

STRATEGIC PRIORITY 2:

INSTITUTIONS OPEN UP THEIR DATA

Indicator of strategic priority 2:
Position of Macedonia
on the Global Open data index

ID	Measures / Activities	Responsible organization	Involved organizations	Timeline	Budget (MKD)	Sources of financing	Indicators	Sources of verification
M9	**Developing catalogue of datasets of the state institutions**	**Ministries**	**MISA, ODTF**	**01.09.2018 – 31.12.2020**	**1.200.000,00**	**MISA / donors**	**Percentage of Ministries with published open dataset catalogues**	**Central open data portal data.gov.mk**
A9.1	Developing datasets catalogue of the Ministries	Ministries	MISA, ODTF	01.09.2018 – 31.12.2020	1.200.000,00	MISA / donors	Percentage of public sector institutions with developed catalogues	List of institutions with developed catalogues
A9.2	Publishing dataset catalogues of the Minitries on the national open data portal	Ministries	MISA, ODTF	01.09.2018 – 31.12.2020	/	MISA	Catalogue published on the national open data portal	Central open data portal data.gov.mk
M10	**Conducting research on the needs for open data by stakeholders**	**MISA**	**State institutions, NGOS, private sector, academia, general public**	**01.10.2018 – 31.12.2018**	**600.000,00**	**MISA / donors**	**Number of datasets identified as valuable to the community**	**Report from the research on the needs of data**
A10.1	Consultations with the expert public on the open data through meetings and round tables	MISA	State institutions, NGOS, ODTF, private sector, academia, general public	01.10.2018 – 30.11.2018	300.000,00	MISA / donors	Number of roundtables and meetings, and experts involved	List of participants, roundtables and meetings

ID	Measures / Activities	Responsible organization	Involved organizations	Timeline	Budget (MKD)	Sources of financing	Indicators	Sources of verification
A10.2	Conducting public opinion survey on needs for open data	MISA	State institutions, NGOS, private sector, academia general public	01.12.2018 – 31.12.2018	300.000,00	Donors	Number of respondents	Survey results
A10.3	Summarizing of the results from the open data needs survey	MISA	NGOs, ODTF	15.01.2019- 15.02.2019	/	/	Report	Data.gov.mk
M11	**Identifying key registries which contain public data for digitalisation and development of state-of-the-art IT systems**	**MISA**	**State institutions**	**01.09.2018 – 01.03.2019**	**300.000,00**	**MISA / donors**	**Number of registries that need to be digitalized**	**Analysis on key registries**
A11.1	Analysis of the open data registries that need to be digitalized in the Ministries	MISA	State institutions	01.09.2018 – 01.03.2019	300.000,00	MISA / donors	Подготовка на нацрт анализа	Анализа на клучните регистри
M12	**Stage-by-stage process of opening data by state institutions**	**MISA**	**ODTF, State institutions**	**01.09.2018 – 31.12.2020**	**12.000.000,00**	**Budget of RM / donors**	**Number of open datasets**	**Central open data portal**
A12.1	Defining a stage-by-stage process of opening data by state institutions	MISA	ODTF, State institutions	01.09.2018 – 31.12.2018	/	/	Number of state institutions to open data by phases	Roadmap of opening data
A12.2	Opening data of state institutions in the defined phases	State institutions	CICT, MISA	01.01.2019 – 31.12.2020	12.000.000,00	Budget of RM / donors	Number of open datasets	Central open data portal

STRATEGIC PRIORITY 3:

INCREASED USAGE OF OPEN DATA

Indicator of strategic priority 3:
ransparency index of the country;
Rate of economic development based on open data

ID	Measures / Activities	Responsible organization	Involved organizations	Timeline	Budget (MKD)	Sources of financing	Indicators	Sources of verification
M13	Conducting training on open data for the state institutions	MISA	State institutions	01.01.2019 – 01.03.2020	1.050.000,00	MISA / donors	Percentage of administrative servants with fundamental knowledge for open data	Survey on open data awareness in the administration
A13.1	Developing curricula for training on open data for administrative servants	MISA	State institutions	01.01.2019 – 28.02.2019	150.000,00	MISA / donors	Developed curricula for training on open data	Curricula for training on open data
A13.2	Incorporating open data training in the generic training program for administrative servants	MISA	/	01.02.2019 – 31.03.2019	/	/	Open data training included in the generic training program	Generic training program for the administrative servants

ID	Measures / Activities	Responsible organization	Involved organizations	Timeline	Budget (MKD)	Sources of financing	Indicators	Sources of verification
A13.3	Developing modules for electronic training	MISA	/	01.03.2019 – 01.09.2019	300.000,00	MISA / donors	Developed modules for the LMS system and micro-learning; Number of developed modules for electronic training;	LMS system; Micro-learning system
A13.4	Providing trainings on open data for administrative servants	MISA	State institutions	01.03.2019 -31.12.2020	600.000,00	MISA / donors	Number of administrative servants that received training	Report on implementation of the generic training program
M14	Organizing national conferences on open data	MISA	State institutions, NGOs, media, Academia	01.01.2019 -01.04.2020	600.000,00	MISA / donors	Number of participants	Reports in media
A14.1	Organizing the First Annual Open Data Conference	MISA	State institutions, NGOs, media, Academia	03.03.2019	300.000,00	MISA / donors	Number of participants	Reports in media
A14.2	Organizing the Second Annual Open Data Conference	MISA	State institutions, NGOs, media, Academia	03.03.2020	300.000,00	MISA / donors	Number of participants	Reports in media

ID	Measures / Activities	Responsible organization	Involved organizations	Timeline	Budget (MKD)	Sources of financing	Indicators	Sources of verification
M15	Increasing of public awareness and informing of the benefits of open data	MISA	NGOs/ donors	30.09.2018 -30.06.2020	1.600.000,00	Donors	Number of stakeholders reached through the promotional campaign	Report from the promotional campaign implemented
A15.1	Public events for awareness raising among open data stakeholders (NGOs, private sector, academia and general public) for the concept and benefits from open data	MISA	State institutions, NGOS, private sector, academia, general public	01.09.2018 – 31.10.2018	1.000.000,00	MISA / donors	Results from the survey on the open data perception	Communication plan and final survey report
A15.2	Promotional campaign for increasing public awareness and informing of the benefits of open data in the traditional and social media	MISA	NGOs/ donors	30.06.2018 -30.06.2020	600.000,00	MISA / donors	Promotional campaign in the traditional and social media	Promotional campaign
M16	Promotion of the functionalities of the national open data portal	MISA	MISA	01.09.2018 - 28.02.2019	100.000,00	MISA / donors	Engagement with the portal's functionalities	Administrator reports from the open data portal
A16.1	Promotion of the functionalities of the national open data portal on social media	MISA	MISA	01.09.2018 - 28.02.2019	40.000,00	MISA / donors	Number of posts on the social networks and number of readers	Social networks of the MISA
A16.2	Promotion of the functionalities of the national open data portal on traditional media	MISA	MISA	01.09.2018 - 28.02.2019	60.000,00	MISA / donors	Number of publishing in the traditional media	TV and radio articles

ID	Measures / Activities	Responsible organization	Involved organizations	Timeline	Budget (MKD)	Sources of financing	Indicators	Sources of verification
M17	Delivering workshops on data literacy	MISA	NGOs, media, Academia	01.01.2019 -02.03.2020	750.000,00	MISA / donors	Number of civil society representatives, journalists and academics with fundamental knowledge for open data	Online promotion for data driven analysis and visualizations published by NGOs and journalists
A17.1	Developing curricula for 'data literacy' workshops for NGO representatives, academia and journalists	MISA	NGOs, media, Academia	01.01.2019 - 28.02.2019	150.000,00	MISA / donors	Developed curricula for 'data literacy' workshops	Curricula for 'data literacy' workshops
A17.2	First Open Data Bootcamp	MISA	State institutions, NGOs, media, Academia	01.03.2019 -02.03.2019	300.000,00	MISA / donors	Number of participants, number of produced data driven research, investigations, visualizations	Published data driven research, investigations, visualizations
A17.3	Second Open Data Bootcamp	MISA	SMEs, startups, Academia	01.03.2020 -02.03.2020	300.000,00	MISA / donors	Number of participants, number of produced data driven research, investigations, visualizations	Published data driven research, investigations, visualizations

ID	Measures / Activities	Responsible organization	Involved organizations	Timeline	Budget (MKD)	Sources of financing	Indicators	Sources of verification
M18	Organizing Hackathons	MISA	SMEs, start-ups, , Academia	01.10.2019 -31.06.2020	3.330.000,00	MISA / donors	Number of participants at the hackatons	Developed ideas for mobile and web-applications
A18.1	Open call for Hackaton participation	MISA	SMEs, start-ups,, Academia	01.01.2019 -28.02.2019	30.000,00	MISA / donors	Number of applications at the open call	
A18.2	First annual Hackaton	MISA	SMEs, start-ups,, Academia	16.03.2019	600.000,00	MISA / donors	Open data based applications developed	Announcement for organization of a Hackathon published at the MISA and data. gov.mk
A18.3	Open call for regional Hackaton	MISA	SMEs, start-ups,, Academia	01.12.2019 -28.02.2020	300.000,00	MISA / donors	Number of applications at the open call	Announcement about the open call
A18.4	Regional Hackaton	MISA	SMEs, start-ups,, Academia	14.03.2020	2.400.000,00	MISA / donors	Open data based applications developed	Announcement for organization of a Hackathon published at the MISA and data. gov.mk

ID	Measures / Activities	Responsible organization	Involved organizations	Timeline	Budget (MKD)	Sources of financing	Indicators	Sources of verification
M19	Providing support to start-ups that base their business on open data	ФИТР	РГОП	31.01.2019 -03.03.2020	3.660.000,00	Fund for Innovations	Number of grants for start-up companies	Number of developed data driven applications by supported start-up companies
A19.1	Publishing First Open Call for Data Driven Start-up Grants	ФИТР	РГОП	01.01.2019 – 31.03.2019	30.000,00	Fund for Innovations	Number of applications	Number of applications
A19.2	Providing first round of three Grants for Data Driven Start-up Companies in Macedonia	ФИТР	РГОП	01.04.2019 – 31.05.2019	1.800.000,00	Fund for Innovations	Number and size of grant contracts	Grant contracts
A19.3	Publishing second Open Call for Data Driven Start-up Grants	ФИТР	РГОП	01.01.2020 – 31.03.2020	30.000,00	Fund for Innovations	Number of applications	Number of applications
A19.4	Providing second round of three grants for Data Driven Start-up Company in Macedonia	ФИТР	РГОП	01.04.2020 – 31.05.2020	1.800.000,00	Fund for Innovations	Number and size of grant contracts	Grant contracts

ID	Measures / Activities	Responsible organization	Involved organizations	Timeline	Budget (MKD)	Sources of financing	Indicators	Sources of verification
M20	Вклучување на податочната писменост во образовниот систем	MES	ODTF, MISA	01.01.2020 -30.04.2020	120.000,00	MES	Number of educational institutions providing data literacy in their curricula	Report from MES
A20.1	Анализа за вклучување на податочната писменост во образовниот систем	MES	ODTF, MISA	01.01.2020 -30.04.2020	120.000,00	MES	Drafted analysis	Drafted analysis
A20.2	Имплементирање на препораките од анализата за вклучување на податочната писменост во образовниот систем	MES	ODTF, MISA	01.04.2020 – 30.08.2020	/	/	Number of recommendations implemented	Извештај за имплементацијата на препораките


data.gov.mk