

Original research paper

EFFECTS OF OPEN DATA IN MACEDONIA

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Abstract

Eight years have passed since the adoption of the Law on the Use of Public Sector Data, which is a sufficient time frame for analyzing its implementation. Namely, in the period in which this law was adopted, the goal was to provide a basis for institutions to publish their data in open format, so that this data can be used for other purposes by the private sector, civil society or any other stakeholders and individuals (who developed applications or researchers). One of the main reasons for the international open data initiative was the economic benefits of using them outside the purpose for which they are created by the institutions, namely the added value generated through their reuse. There is no exact science that can calculate the economic benefits of these, but there are international indicators offered globally by the World Bank. The purpose of the research is to offer information on whether and how many benefits we have after we have introduced an open data policy in the Republic of North Macedonia. This paper will provide an answer to the political effect of open data, ie their impact on transparency and good governance, the economic effect, i.e. whether and how much open data was used by companies and developers and the social effect. The indicators in the research are based on the open data readiness assessment (ODRA) methodology of the World Bank.

Keywords: open data, impact, economic, political and social effects, ODRA

1. Introduction

Eight years have passed since the adoption of the first Law on the Use of Public Sector Data, and this represents an excellent time frame for the analysis of its implementation. In the period in which this law was adopted, the goal was to provide a basis for institutions to publish their data in an open format, so that those data could be used for another purpose by the private sector, the civil sector or any other interested parties and individuals (application developers or researchers). The main tool that was an indicator of the goals of open data was the opendata.gov.mk portal, which later became the data.gov.mk page, where the growth in the number of open data sets is recorded, and through the data sets, an analysis is made of how successfully the law has been implemented by the institutions.

One of the main reasons for the international open data initiative was the economic benefits of their use beyond the purpose for which they were created by

institutions, namely the added value generated through their reuse. Although there is no exact science that can be used to calculate the economic benefit from them, all the examples of the use of open government data by the civil sector and the business community are sufficient indicators. Through them, a picture is obtained of the economic and social effects of the data, and what the real obstacles are in the field and what can be improved.

2. Research methodology

The research on the implementation of the Law on the use of data from the public sector and, in a broader sense, the implementation of the concept of open data in the Republic of North Macedonia is based on version 3.1 of the “Methodology for assessing readiness for open data (ODRA)” from 5/8/2015 prepared by the World Bank Open Government Data Working Group. This methodology preserves comparative experiences and provides an opportunity for measurability and comparability of open data achievements in the Republic of North Macedonia with other countries.

The research is based on desk research and field data collection.

The analytical part of the research consists of records of existing documents that regulate the issue of open data.

To answer the relevant questions in the analysis, gathering feedback from stakeholders through an interview method was provided by:

- Representatives from the Ministry of Information Society and Administration;
- Members of the Working Group for amendments to the Law on the use of data from the public sector;
- Civil organizations with experience in the field of open data;
- Developers and natural persons;
- Business community - Companies working with open data
- Journalists;
- Academy (the technical faculties where this issue is addressed); and
- International expert from the World Bank on open data.

A structured questionnaire was sent to state institutions through the Ministry of Information Society and Administration. The questionnaire was answered by 50 subjects. Another questionnaire was prepared for the business community and 13 companies agreed to provide answers.

3. Political benefits and challenges

The Government of the Republic of Macedonia joined the initiative for the Open Governments Partnership (OGP) and on 01.06.2012 it adopted the first Action Plan, thus becoming a full member. The focus of the Action Plan was Open Government Data, called the “gold” of the 21st century because every day every country reported how much money it saved and how much money the private sector earned through the opening of data that stimulates a number of innovations and business models that

citizens and companies are given the opportunity to earn. In the very beginning, a link-based website openipodtaoci.gov.mk was created, which in 2013 had data from 16 institutions and 33 data sets.

However, despite the Government's efforts to present the information in an open format, to date, some of the institutions still do not publish their data in an open format. According to the latest data from the Openness Index of 2020, for the use of open data, RSM has seen a significant improvement, that is, it has the most open executive authority in the region. On the other hand, if we take into account that the central government has this position with just 52.09% of the openness indicators fulfilled, which is also the highest percentage of fulfillment in the region, then undoubtedly additional efforts are needed in this direction. The central government is significantly more open compared to local and judicial authorities. The Parliament of the Republic of North Macedonia fulfills 65.63% of the openness indicators; The Government of the Republic of North Macedonia (75.86%); Ministry of Information Society and Administration - MISA (76.01%); Ministry of Defense (72.47%) and Ministry of Finance (71.57%). The new survey for the period from 2021 to 2020 has been completed and data is being processed¹. According to the dynamics of data.gov.mk, an increase in the number of data sets at the local level can be observed.

According to the "Open Data Strategy, 2018 – 2020", the open government data has been made available for the creation of new services and for providing a contribution to the creation of public policies, so in that direction, according to the MISA report, it can be said that most of the planned activities in this area for 2020 have been realized².

In a broader context, open data is part of the Open Government Partnership (OGP). It is a successful initiative, one of the most successful in our country. Citizens are fully and continuously involved in all processes, in the creation of the action plan and commitments. The OGP platform allows online monitoring of the implementation of the OGP action plan as progress is regularly updated for each measure on a quarterly basis. In addition, the platform allows holding online meetings of the OGP Council and the CSO network, as well as online consultations on action plans.

In the area of OGP, the Republic of North Macedonia continuously records successful results and recognitions, and the latest is that the Innovative tools that enabled greater transparency and accountability of the municipalities in the country were declared one of the global winners at the Open Government Partnership Summit, which took place from December 15 to 17 2021 was held in Seoul, Republic of Korea³.

¹ Assessment of good governance in North Macedonia and in the region through the Openness Index. 2020. Metamorphosis Foundation. Available at: <https://cutt.ly/PntvNWL>

² Report on the implementation of the Annual Work Plan 2020. Ministry of Information Society and Administration. Available at: <https://cutt.ly/ub8JtiR>

³ Available at <https://www.mioa.gov.mk/?q=mk/node/3740>

As far as open data is concerned, the Republic of North Macedonia has a specific law on open data - Law on the use of data from the public sector since 2014. Also, RSM adopted the International Open Data Declaration in 2018.

The political leadership is in the Ministry of Information Society and Administration. MISA has had senior administrative leadership and capacities since its inception.

But given that the government's priorities have been focused on openness and transparency, open data policy over the years has been absorbed primarily towards promoting openness and transparency, and less towards the economic benefits and innovation of data. And the political leadership had a partial change of focus from the Ministry of Information Society and Administration to the competences of the Minister in charge of Communications, Accountability and Transparency. Strong support for openness and transparency significantly improved published data even from institutions that were not advanced in this concept. This in particular refers to institutions that have received support from certain projects. These commitments were further strengthened in the Transparency Strategy of the RSM Government 2019-2021⁴.

For example, the Ministry of Education and Science (MES) improved its active transparency by as much as 21% in 2022 compared to last year, which ranks it among the institutions with the most progress, according to the latest ranking of the Center for Civic Communications. With the latest ranking, MES moved from the scale of institutions with “good” into the first group of institutions with “very good” active transparency. Thus its last year's 70.8, transparency ranking has increased to 91.9 percentage points this year.” A similar example is available for the Ministry of Health, which published a significant amount of information in response to the obligation to promote transparency and accountability, and in accordance with the Government's decision⁵.

The focus on the publication of data in support of transparency and accountability is also noted in the OGP Action Plans:

- “Open data on the property status of elected and appointed persons” - measure foreseen in priority 4. Prevention of corruption and promotion of good governance
- The Ministry of Health, in cooperation with the Association for Emancipation, Solidarity and Equality of Women in the Republic of Moldova, will prepare a standardized form of reports that will be used to publish data on the realization of funds from the Ministry of Health's budget intended for preventive and curative health programs.

⁴ Strategy on Government Transparency 2019-2021, available at https://vlada.mk/sites/default/files/dokumenti/strategii/strategija_za_transparentnost_mk.pdf

⁵ New documents on the website for greater transparency and accountability, available at <http://zdravstvo.gov.mk/novi-dokumenti-na-veb-stranata-na-ministerstvo-za-zdravstvo-za-pogolema-transparentnost-i-otchetnost/>

- Open data on climate change at the national and local level - The existing database - inventory of greenhouse gases will be updated with new data every 2 years. At the local level, inventories of greenhouse gases have been prepared for 8 municipalities and an inventory is being prepared for the City of Skopje.... these data, apart from being constantly updated, should be understandable and easily accessible in one place - the portal www.klimatskipromeni.mk..., to be in a form that will be comprehensible to the general public and will enable greater citizen participation in the creation of policies, but will also open opportunities for the transfer and application of new technologies and innovations.
- Open finance is a success story for open data. The “Open Finances” portal aims to provide the public with an insight into the data on the realization of transactions of all budget users of the Budget of the Republic of North Macedonia, with which the Treasury of the Ministry of Finance disposes. In the first phase, all transactions of the budgetary institutions of the Budget of the Republic of North Macedonia are published. In the second phase, the transactions of the Local Self-Government Units (LGUs) and their budgetary institutions will be published⁶. The success of the portal is based on: political will, structure in the ministry (in terms of eligible human resources) and data use or control (in the sense that during a certain period when the portal was not updated, there were reactions from the public).

The European Commission’s Open Data Maturity Reports in past years, and in particular the 2021 Report, state that the political indicator takes into account the impact of open data on public sector and citizen engagement and the extent to which countries monitor this type of impact. It focuses on the benefits of open data in three domains: improving government efficiency, improving government effectiveness, and increasing transparency and accountability. In this part, and especially in the context of increasing transparency and responsibility, it can be determined that open data had a significant political impact in our country.

3.1. Institutional readiness as a challenge

The Law on the Use of Public Sector Data leaves the possibility for citizens and companies to use the data created by the institutions for their own needs, beyond the purpose of their initial creation or collection.

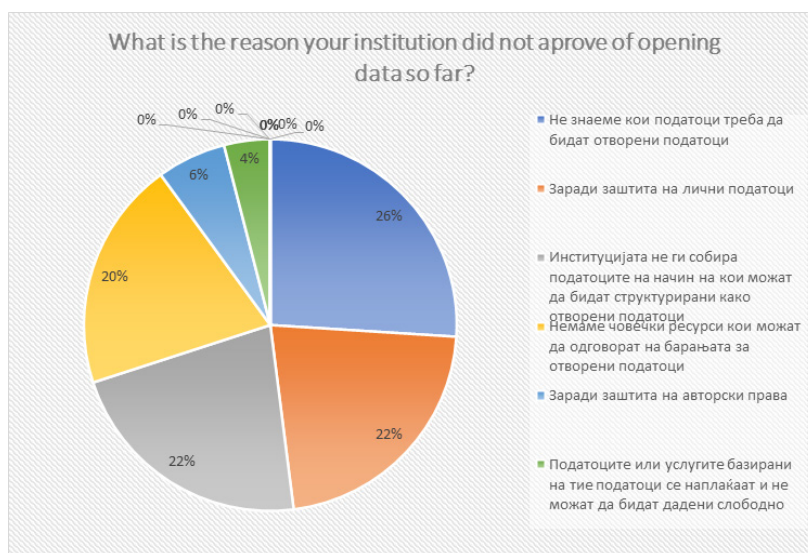
With the way the data is defined in the law itself and in accordance with the relevant EU directives, it is clear and unambiguous for the end user that these are data that are owned by the state, i.e. created by the institutions. In the area of common data standards (for example, the standards in the government’s interoperability framework) for the government as a whole, the adoption of by-laws of the Law on e-governance and e-services was of key importance⁷.

⁶ Portal Open finance ,<https://open.finance.gov.mk/mk/about>

⁷ Rulebook on the method of certification of the information systems used by the bodies for electronic communication, and the Guidelines for the certification of the information systems;

Despite the fact that it can be stated that the legal framework that provides an environment for the development of open data policy has already been established, it is necessary for the persons who are engaged in the institutions of this process to receive professional support in identifying which data are open data, as well as for the protection of personal data and especially its anonymization, but also copyright protection, licensing, etc. This finding is also based on the questionnaire sent to the institutions according to which exactly these were the reasons identified for not opening the data:

We don't know what data should be open data	13
For the protection of personal data	11
The institution does not collect data in a way that can be structured as open data	11
We do not have the human resources to respond to open data requests	10
For copyright protection	3
Data or services based on that data are charged and cannot be freely provided	2



Rulebook on the method and procedure for registration in the list of legal entities that perform checks for interoperability of information systems, the form and content of interoperability certificates, the procedure for issuing an interoperability certificate and the procedures for checking the security and interoperability of information systems Official Gazette of RSM , no. 263 of 20.12.2019;

Rulebook on the standards for interoperability of the Macedonian information highway and the standards and rules for security of information systems for processing data in electronic form and the standards and rules for security of information systems used by the authorities for electronic communication;

Rulebook on the standards and rules for unified nomenclatures in the mutual communication by electronic means between the bodies official gazette of RSM, no. 53 of 28.2.2020;

Rulebook on the minimum technical requirements and standards for the provision of electronic services official gazette of RSM, no. 263 of 20.12.2019

The basic recommendation that emerges is that the persons engaged in the institutions of this process receive professional support in identifying which data are open data and removing the barriers to their publication (guidelines for anonymization, copyright protection, etc.).

At the same time, the technical aspect is also very important. Namely, the Ministry of Information Society and Administration has the role of a central government entity with sufficient political weight to coordinate the Open Data Program throughout the government and ensure the implementation of open data policies. However, in the Republic of North Macedonia, no specific research has been dedicated on the technical capacities of the institutions for implementing the concept of “open data”.

As the closest relevant inventory of the institutions’ technical capacities, an analysis of the situations identified by MISA for the purposes of establishing the interoperability platform can be singled out. As of November 29, 2021, 39 entities have joined the interoperability platform. This review was made in order to analyze the willingness of the institutions to publish their data as open data on data.gov.mk. The survey found that out of the entities that are on the interoperability platform:

- Only 14 institutions have technical readiness in terms of degree of digitization and adequate IT staff;
- 10 institutions partially meet technical conditions, meaning, one of the following situations has been identified: 1. lack of IT staff, but there are technical opportunities provided through a project, or 2. there is a system, but it is outdated, or 3. there is partially staff and partially good system but not completely or sufficiently;
- 9 institutions have no technical conditions at all.

These findings demonstrate that just by the fact that all 39 entities (of which 33 are institutions, the others are private entities) are already on the interoperability platform is not a guarantee of technical capabilities, in itself, because it is evident that certain institutions cannot yet implement such solutions due to their technical limitations. Such indicators, in addition to open data, are even more relevant to interoperability expectations.

The European Commission for this part in the 2021 Report stated that the use of the interoperability system is still difficult due to the lack of communication software in many institutions and the lack of will to fully utilize its potential.

Where there are at least certain technical conditions, significant progress has been achieved through the horizontal implementation of the policy from a central point - MISA with appropriate consultative and operational support given to other institutions. The old portal had about 22 institutions and 150 datasets, while the new portal has 58 institutions and 306 datasets. Of course, statistics are not the most relevant, and it is much more important that now the datasets are of higher quality and a higher level of openness. The figure in this context is an indicator of the number of institutions that were additionally activated to do open data.

4. Economic and social effects of open data

Based on the available evidence and extensive previous analytical work in this area, the European Commission’s open data impact assessment study calculated a baseline value of the total direct economic value of public sector information for the EU28 of €52 billion in 2018. The direct economic value is expected to increase by 2030 to 149 billion euros (+185%).

This development is expected to be activated through various supply and demand side factors. On the supply side, an increasing number of public sector bodies are expected to open up their data due to the Directive, in addition to increasing the reuse and value of data already available for reuse. On the demand side, an increasing number of stakeholders are expected to take advantage of the larger amount of open data in reusable formats and the greater availability of APIs.

As a consequence, it is expected that in the future the amount of data from various sources will be greater than today, and at the same time their quality is expected to increase, which should result in increased use of open data by companies, public authorities and end users such as application developers. In addition, it is expected that the reduction of operational costs for acquiring and processing data and information will enable companies and businesses to develop more and better services based on data and information. This is expected to result in increased economic benefit.

In the EU, in terms of job creation, 64,000 people are employed today based on the reuse of open data. In 2027, the year in which the relative differences in the number of employees in the economy (driven by data) are expected to be the largest among the policy options, the value could increase between 709,000 and 795,000 persons⁸.

Open government data brings a whole range of social benefits that are seen mainly by the end users, i.e. consumers of products and services based on open data. For example, it is estimated that open data has the potential to save 7,000 lives per year thanks to a faster response in the event of a heart attack and 1,425 lives from traffic losses (ie 5.5% of European road deaths).

4.1. Business Community

In the national context of this research, a questionnaire was prepared and shared with the business community, i.e. companies from the IT industry through their chambers, i.e. the ICT chamber at SSKM and MASIT. The questionnaire was answered by 13 companies.

To determine the key problems for using open government data, companies were asked “If you had a need for government data in your business, what reasons

⁸ COMMISSION STAFF WORKING DOCUMENT IMPACT ASSESSMENT Accompanying the document Proposal for a Directive of the European Parliament and of the Council on the re-use of public sector information. 2018. Available at: [https://ec.europa.eu/transparency/documents-register/detail?ref=COM\(2018\)234&lang=en](https://ec.europa.eu/transparency/documents-register/detail?ref=COM(2018)234&lang=en)

would you single out as key for not being able to use it.” Respondents could choose several answers for this question.

According to the answers, the most common reason is that the data they needed is not available or published at all (7 companies) vis-à-vis the opposite, that is, that the necessary data is available for use (2 companies).

The options “Non-functional link” and “The institution that has the data we need does not have the technical ability to publish/export it to make it available for use” were chosen by five companies each.

Three companies chose the option that “The data we needed is published, but it is not in a suitable format to be able to use it” and the same number chose the option “We do not know which institution has the data we need”.

Only one company selected the option “The institution does not collect the data in the way we need it for use”.

Regarding the request for open data, 3 companies requested and did not receive data, 6 requested but partially received the requested data and 4 did not request at all. From this answer it can be concluded that there is still a demand for data in the business sector because 9 out of 13 companies requested certain data, but the responsiveness of the institutions should be increased.

To the question on which data from the institutions is considered to have the greatest business potential and should be opened by the institutions as a priority, the following answers were received:

- Data from the Central Register, completely free final accounts of companies, as well as current conditions of companies (Manager, ownership structure, etc.) - for the sake of the whole economy of credit ratings, market research, labor market, reduction of corruption and a bunch of others works). The final accounts are paid by each company, there is no need for the information not to be publicly and freely available. An example of publicly available free information of this nature is Slovenia;
- Any value and basic information (location and square footage) for real estate sales. Again following the example of Slovenia. (Cadastre/Public Revenue Office/Municipalities);
- System of streets and street numbers (Cadastre) - following the example of all EU countries;
- Data on part number of a building (apartment), owners, its square footage, and then building number, total square footage, address, when it was built, square footage, what connections it has (internet, electricity, water), if and when has a permit for use/technical acceptance;
- Data for all vehicles: vehicle chassis number, make, registration plates, owner’s age, etc. And many more and many more, example: <https://podatki.gov.si>;
- Archival operation and monitoring of documents, availability of registered documents with a certain deadline, receipt and issuance of documents;

- Bases of potential users for advanced e-services;
- Salary calculation via API two-way, to read and write from the Public Revenue Office (PRO), Employment Agency, Pension and Insurance Fund, Health Insurance Fund (HIF) and Central Registry, with appropriate authorization and with all data security measures;
- Synchronization of changes between Pension and Insurance Fund, HIF and Employment Agency;
- Salary data by profile, data on human resources fluctuation, data on professional versus newly registered staff after completed education, data from the PRO on legal entities which are still available only with a submitted request in printed form;
- Data that would be of interest for agribusiness and infrastructure data (transport, etc.).

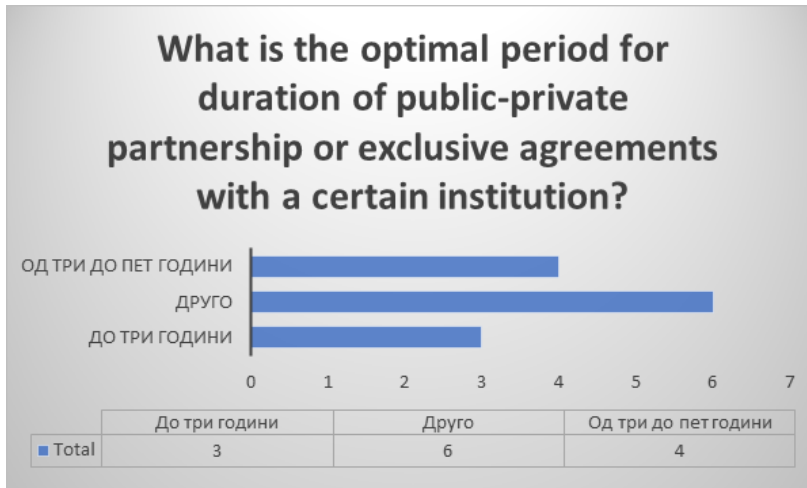
One answer was also received that there should be no limitation, that is, prioritization of certain data, because in that way, equal access to information will not be given to different companies from different sectors, which at a given moment will need different data.

In the answers, there was also a recommendation that a national strategy is needed, which will determine and classify data that is not a state secret and that everything else that is within the scope of the companies' operations should be publicly available through a single register.

Companies were consulted on whether they would be interested in developing a business model or service based on data through a public-private partnership or an exclusive agreement with a specific institution. To this question, 7 companies answered yes, and 6 answered no. This means that although there is a division, consideration of this option should not be neglected. The Open Data Directive itself allows the development of open data through exclusive agreements, especially for those data that the institutions do not intend to digitize themselves. In our national context, it can refer to institutions that do not have the technical readiness or opportunity to digitize their data.

In the case of exclusive contracts (or public-private partnership), only the duration of exclusivity should be taken into account. According to the directive, that period is three years, after which the institutions are obliged to publish the data that was subject to exclusivity.

According to our companies, however, from a return on investment perspective, we received the following responses.



In terms of which institution they would be interested in entering into such type of contract or partnership, the answers were PRO, Pension and Insurance Fund, HIF and Employment Agency; Central Registry, Ministry of Health and MISA.

In one answer it was pointed out that the institutions should open the data and that in public-private partnerships and exclusivities (monopolies) should not be an option due to the need of a market economy.

The companies had the opportunity to give general recommendations if something was not covered by the Questionnaire, to which the following were given:

- Open data should be Open API or Open communication, that is, institutions should be open, with appropriate security measures and for receiving data through API.
- Institutions to make functional sites and contacts
- First of all, a good legal framework and mechanism for achieving this goal should be determined, all in the direction of protecting personal data, manipulating information or using it unethically. The society in which we currently operate does not give hope for the capacity implementation of such ideas
- Archives of public institutions.

4.2. Civil organizations

Among citizen organizations, Metamorphosis is a leader in open data. With the help of Metamorphosis and MISA, it was possible to achieve results both at the central and local level. Of the approximately 290 open data, 99% were from central government. But from then on, every new open data is from the local level. And all this is the result of the trainings and support processes of the municipalities from Metamorphosis. That data is in the process of being linked through the open data portal and is expected to increase the number of open data sets. In the foreseeable

future, the number of open data sets on the portal is expected to be dominated by data from municipalities vis-à-vis data from the central government.

Metamorphosis support received by municipalities is in the form of open data training for open data officers and technical processing of the data set to be opened. Video trainings have been made that can also be placed on the portal.

As an added value of this kind of support, is the competitiveness between municipalities as to which municipality will open more detailed sets. The whole process is on a voluntary basis, and the municipalities themselves apply for this kind of assistance. Through the training, a culture for open data is built and the myth that it is only a technical benefit is dispelled and that greater transparency is more important.

The prioritization process is not easy, but those data that are already digital get priority so that they do not require too much effort in adjustment, as well as data for which the most requests have been received through the free access to information addressed to the municipality.

In order to have comparability between municipalities, as an agreed standard set of data, the following have been determined:

- Council members, party, mandate, contact information for councilors
- Data on the budget and final account
- Data register of religious buildings, monuments and other memorials (due to the specifics of the municipalities).

Common to all municipalities that receive assistance is that they already have an identified catalog of data. Awareness has been raised about the effective power of data in digital format, but the fact that in terms of the level of digitalization - there are big differences from municipality to municipality - should not be overlooked.

In 2020, cooperation with 17 pilot municipalities and the city of Skopje began, and after the evaluation with those municipalities, it was found that they require continuous support. 20 new municipalities applied in the first cycle, and in the second cycle they applied for repeated support.

Regarding the sustainability of the results, experience varies. The duration of the trainings coincided with the local elections, so in some municipalities there was an increased enthusiasm for opening the data, while in others they had a complete retraction, that is, and in others they completely went back.

ZMAI, Strat up-academy – in addition to being implementers of open data, they also appear as end users of data, specifically of open finance.

In these 3-4 years, the base of the MoF has served to finally see what the position is and how much the state supports civil society organizations and how the funding is going. At the moment, work is being done to determine a way to finance primary and secondary education, through open finance, that is, historically it is seen how the financing moved.

When it comes to open finance, it is still at the level of development, where the largest number of requests are who spent, how much and where, that is, fiscal

transparency. The voluminous data that have been searched are mostly from researchers and journalists, and mainly refer to public procurement. Individuals (persons and stakeholders) request data most often if they have an object.

Institute for Democracy “Societas Civilis” Skopje - involvement in open data is exclusively through the Open Government Partnership. The impact has borne fruit in terms of multiple types of published data. One of the key benefits that stands out is that the Bureau of Public Procurement has published data on concluded contracts. As an organization, they are engaged in investigating cases of corruption, but it is done on a case-by-case basis, and raw data is not available to them. In cooperation with the Center for Civil Communications, which especially monitors transparency in public procurement when collecting and comparing the data, they concluded that there is not always a match. They identify the lack of data validation as a problem for this situation. This is particularly important for the integrity of the Public Procurement Bureau’s system.

As a second phenomenon that can be ascertained from their experience is that usually the institutions themselves want to present the data in some context vis-à-vis the possibility of users outside the institutions to do so.

A key institution they cooperate with is the State Commission for the Prevention of Corruption. Their data is usually interesting either for journalists or for the civil sector, but there is no great demand or utilization of it. The next challenge of the Institute for Democracy is opening the data on the real owners of the companies, which is of crucial importance for detecting the owners of profit-making companies in the public procurement process.

Reactor as an organization develops the gender index. They are both data users and data analysts. Reactor are also one of the most active data seekers through the right of free access to public information. The Gender Index is a platform used even by institutions that benefit from this data. One of the biggest benefits that could be qualified as a co-creation is if all these data on which the gender index is based would be originally available in an open format, i.e. it would not be necessary to adapt them from Reactor. It would be one of the more successful examples of an end product based on open government data.

4.3. Applications developed by civil society organizations

A green humane city, through the Mojgrad portal, is an application through which an identified problem is posed and a solution and result is provided. Prioritization of the problems that should be solved immediately is done through voting. The top 3 most voted proposals are sent to the councilors of the municipality, the councilors submit them as items on the agenda for discussion by the other councillors.

The oldest application that has been used as an example for years is Moj Vozduh. It works on multiple levels because the data that is downloaded is then converted into our internal unique system from where the application itself pulls it. Unfortunately,

due to this intervention of an intermediary, even this application cannot say that it is based on open government data. All institutions should open the data in the same format, using the same structure.

In the business community the opinion on whether as a society we have a culture of using applications, the answers are divided, that is, 6 companies answered with no, and 7 with yes. However, the companies believe that in RSM there is a potential for building the Apps Economy, because 10 companies answered this question positively, and 3 companies answered negatively.

4.4. Academia

Open data at FINKI is taught as a subject of master's studies in several courses⁹. It is also offered in the group of optional courses¹⁰. One of the pilot projects for open data of FINKI was crime map¹¹. The app works. Unfortunately, it cannot be qualified as an application based on open data because it is based on a daily bulletin of the Ministry of the Interior that is published in a narrative format, and then the creators of the application adapt this data in the appropriate format required for it. Open data as an optional subject is offered in the programs of several faculties within the University of St. Apostle Paul¹². A group of students created an application for the needs of the State Statistics Office, but it is not based on open data.

5. Conclusions and recommendations:

In addition to having the potential to significantly increase government efficiency through better policy-making, open data helps bridge the gap between government and citizens in terms of access to information and generates significant benefits in the areas of social inclusion and civic participation. Political will is key to improving the situation. The following stand out as specific recommendations from this research:

- To provide professional support to the officials who are engaged in the institutions in this process in identifying which data are open data and to remove the barriers to their publication (guidelines for anonymization, copyright protection, etc.);
- To invest in the institutions' technical resources and human capacities;
- To invest in software solutions for digitization at the institution level so that the data and their updating and extraction will not be manual as at present but with appropriate technical support in order not to perceive open data as an additional burden for officials;
- To strengthen the institutional culture for open data;
- To promote the data.gov.mk portal and available open data through the use of

⁹ Courses available at <https://finki.ukim.mk/sites/default/files/master/PPS/Отворени%20и%20поврзани%20податоци.pdf>

¹⁰ Courses available at <https://finki.ukim.mk/mk/content/паметни-поврзани-системи-311>

¹¹ Crime map app, <http://crimemap.finki.ukim.mk/home/mk>

¹² Course available at: <https://uist.edu.mk/wp-content/uploads/2018/07/UIST-CNS-4-years-240-ECTS-from-2018-19.pdf>

- social media, events, organizing meetings;
- To improve the responsiveness of the institutions and pay more attention to the accuracy and timeliness of the data, the functioning of the institution’s website, the functioning of the links
- To prioritize the opening of data according to the needs and requirements of the civil sector, developers and the business community as end users of open data.

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