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ISSUES RELATING TO PUBLIC SECTOR DATA ASSETS AND REUSE

(PhD thesis' main statements)

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1. Background to the research

1.1. Reasons for the choice of topic

Infocommunications developments in the 2010s stemmed from government efforts that were prioritized in order to comply with international—primarily European Union—programs and action plans. Public sector information is an important raw material for digital content products and services and has become an increasingly important source of content with the development of digital content services. With the development of artificial intelligence, the expansion of the use and reuse of digital data is becoming increasingly urgent for the economy. I wrote about this in one of my studies.

In information and knowledge-based societies, institutions performing public tasks produce a significant part of the national data assets. In the course of their operations, these organizations produce or manage large amounts of data, which appear in various data repositories and registers in written, electronic, and audio form. For most public institutions, various laws and regulations require the collection and management of data for specific purposes. The size and informational value of the resulting national data assets justify treating these assets with due care and well-founded decisions, with a view to increasing economic competitiveness. Data assets are primarily economic assets and business assets, rather than IT assets, so it is the business side that should lead the creation, implementation, and ongoing review of the data strategy. The development of the strategy is therefore primarily the task of economists, but of course legal experts, IT specialists, and data analysts are also needed.

The OECD conducted a study in 2015[1] which showed that almost all of the countries participating in the research are using targeted strategies to increase access to and use of public data, and that none of the countries had any problems securing the necessary resources to switch to free distribution and access to data. Hungary did not participate in the survey, probably because the white paper[2] on which the government strategy was based was completed in September 2015. The government's intention to reuse public data is also

[1] OECD: *Assessing goverment initiatves on public sector information*. OECD Publishing, Paris. (2015) Online: http://www.oecd-ilibrary.org/science-and-technology/assessing-government-initiatives-on-public-sector-information_5js04dr9l47j-en (Download: 2016.01.18.)

[2] Nemzeti Hírközlési és Informatikai Tanács: *Fehér könyv a nemzeti adatpolitikáról*. (2016) Online: https://www.magyary.hu/wp-content/uploads/2019/09/Adatpolitikai_feher_konyv_201608.pdf (Download:2019.05.12.)

reflected in the Digital Welfare Program, as Government Decision 2012/2015. (XII. 29.) on the program defines the comprehensive survey of public data assets and the preparation of a public data register as a task. In line with European efforts, a process has also been launched in Hungary with the aim of enabling businesses and government organizations to reap the benefits of the data economy in accordance with European data policy. As one of the steps in this process, the National Data Asset Agency (NAVÜ) was established at the end of 2021. *Act XCI of 2021 on national data assets* (Natv.) and its implementing decree, Government Decree 607/2021. (XI. 5.) on certain detailed rules relating to the utilization of national data assets, define the data analysis, data provision and information service tasks of the National Data Asset Agency. The principal objective of Act CI of 2023 on the system for the utilization of national data assets and individual services is to ensure the domestic, statutory applicability of the EU Data Governance Regulation (Regulation (EU) 2022/868 of the European Parliament and of the Council of 30 May 2022 868 of the European Parliament and of the Council of 30 May 2022) at the national level. At the same time, it repealed its predecessor, Act XCI of 2021 on national data assets and Act LXIII of 2012 on the reuse of public data. The law aims to summarize the existing rules for the reuse of national data assets in a transparent and uniform manner for applicants as a service system. Act CIII of 2023 on the digital state and certain rules for the provision of digital services aims to create a new statutory regulation for the implementation of the National Digital Citizenship Program, which lays down basic rules related to the provision and use of services available in the digital space through state digitization the provision of services available in the digital space, and the use of services, with a view to providing simple, convenient, and efficient online services to citizens. The primary purpose of the law is to facilitate interaction between citizens and the government. As a provision of principle, the law stipulates that digital citizenship is based on data managed in state registers. Within the framework of digital citizenship, all state registers and specialized systems cooperate in a coordinated manner and in accordance with the provisions of the draft law.

This will enable the creation of a service system that supports uniform data utilization, thereby ensuring the standard interconnectivity and interoperability of individual services. The framework has thus been established, but the question remains whether Hungarian data policy, which lags behind in almost every area in international comparison (based on the analyses in the following chapters) – including awareness, standardization, interoperability, data provision, meeting data needs, data reuse, etc. – when will it be able to take advantage of the opportunities offered by the data market?

I consider this topic to be particularly relevant because national data assets only represent economic value for the country if we manage them properly. As with any asset, management involves cost-effective, value-preserving, value-enhancing operation and utilization, and reuse, even if the data assets have special characteristics. Data assets are primarily economic assets, business assets, not IT assets, so the business side must manage the implementation and ongoing review of the data strategy. Data management is important in many data-driven use cases, including end-to-end business process execution, regulatory compliance, accurate analytics and artificial intelligence, data migration, and digital transformation. This could also play a significant role in public administration. In the future, it would definitely be advisable to focus on data management and data asset management.

1.2. Aim and hypotheses of the research

In Hungary, access to and pricing of public data is regulated by law. The Open Data Directive and related legislation allow public authorities to make open data available to users free of charge. However, Hungarian legislation stipulates that certain types of data, such as those with significant economic value, can only be accessed for a license fee. This is particularly true in cases where the data is used for commercial purposes, such as by companies processing economic, transport, or health data. Accordingly, based on my preliminary expectations:

H1: The accessibility of public data largely depends on the pricing technique determined by the data owner/data controller organization.

Public sector information is an important raw material for digital content products and services and has become an increasingly important source of content with the development of digital content services. The use of public sector data is possible under different regulatory frameworks, whether we consider US, European, or Asian regulations. The data market is also expanding at an accelerating pace, with increasing competition between nations and data market players. Looking at developments in Hungary, although the COVID-19 pandemic has accelerated digitization processes and thus the functioning of e-government, Hungary lags behind in international comparison. My hypothesis is as follows:

H2: Digitalization efforts supporting e-government in Hungary lag behind the average performance of OECD countries, but significant progress has been made in developing a data-centric public administration and increasing its performance.

The benefits of open data have been a topic of discussion among society, economic experts, and researchers for years. Public sector information is characterized by its non-rivalrous nature, its unique cost structure (high initial costs, very low marginal costs), its high potential for use and reuse, and finally, the duality of its owners and maintainers. Based on my expectations:

H3: The pricing model for public goods can be applied to the pricing of public data, and the pricing characteristics of digital public goods can be applied to the digital portion of public data.

2. Methodological notes

Digitization, data collection, processing, and storage are constantly occupying scientific circles, and the background literature on these topics is constantly expanding. The spread of digital technologies has also significantly transformed the functioning of public administration. This change is evidenced, for example, by the continuous development of e-government, the spread of electronic procedures, and the development of electronic public services, but this thesis does not examine these issues.

Public data permeates our everyday lives, so examining it requires an interdisciplinary approach. I mainly use (administrative) legal and economic analyses, but when processing the literature, I also rely on technical, IT, and statistical sources. In addition, for international comparisons, I also use the results and publications of international organizations and research institutes. I do not examine the origin of the data used in the thesis (primarily OECD data) or the methodology used to collect it. I consider the indices compiled by the OECD as a starting point for comparing data and do not examine their methodological shortcomings. I attempt to express and determine trends and changes using simple statistical analysis of time series. I was unable to verify the data, so a critical analysis cannot be fully guaranteed. I drew extensively on international literature, using studies by European, American, and Asian authors. In examining the conceptual framework, I used a dogmatic and normative method, in which I sought to provide a critical analysis in addition to a descriptive one. Other disciplines also play a decisive role, but this dissertation examines this area from the

perspective of political science and law, so it is not my goal to research all possible questions from all disciplines. Furthermore, I do not examine the external economic and social impacts of artificial intelligence and social media, as these significantly exceed the scope of this dissertation.

Domestic processes cannot be interpreted in isolation; it is necessary to take into account the European Union and its regulatory environment. However, the research does not focus on a detailed examination of the legal systems and public administration of individual EU member states. At the same time, related member state and international practices and achievements have been analyzed to such an extent that Hungarian results can be evaluated in this regard. My aim was to review the current Hungarian regulations using a detailed legal method, given that a group of public data is widely regulated in numerous legal acts due to the provisions of the GDPR.

The main methodological tools of the thesis are critical literature review and comparison. I formulated my conclusions based on the analyses, comparisons and trends. In addition to studies and books related to the main topic of the thesis, the sources reviewed also include the programmes and strategies of certain international organizations (in particular: the European Union, the Organisation for Economic Co-operation and Development (OECD) programs, strategies, and specific reports and rankings examining digital public administration. In examining the data, data sets and trends, I used secondary data analysis methods, mainly looking at the data sets collected by the aforementioned organizations.

3. Structure and content of the doctoral thesis

3.1. The first structural unit

In the first chapter of my dissertation, I present the purpose and methodology of the research as outlined above. This structural unit presents the reasons (logic) for the structure of the dissertation and also formulates the research hypotheses.

3.2. The second structural unit

In the second chapter, primarily with the aim of delimiting the research area, the conceptual framework of the public sector data assets is presented, in which I define the elements of the

public sector, their relationship, the concepts of data, information, public data, data assets and their relationship system with regard to the data assets they generate. All this by reviewing the relevant literature and taking into account the legal environment. During the conceptual delimitation, I use the relevant literature of the literature and my research results on the topic.

3.3. The third structural unit

In the third chapter, I will review the types and characteristics of public data, with the aim of highlighting the potential for their reuse, according to their place of origin and area of use, and their method of use. These definitions lead to new digital concepts, the clarification of which is also relevant for the study: linked and open data, e-public administration, e-governance, e-government.

The current Hungarian data management practice does not reflect the idea that multiple additional benefits can be achieved through indirect knowledge acquisition, nor does it consider the loss that arises from preventing further use. Open linked data is a growing movement that aims to publish data in the most transparent and efficient way. The online publication of thousands of data sets creates added value by linking different data describing the same phenomenon from different perspectives. The opening of government data is also a global trend. In the case of reusing public data, we can largely speak of linked open government data, but the scope of data is broader than this, as it also includes public, non-open or unlinked data.

3.4. The fourth structural unit

In the fourth chapter, I analyze the legal conditions for the reuse of public data in the European Union, including Germany and Hungary. As an overview, I examine the regulatory principles and main aspirations of the United States. I refrain from a detailed legal comparison, but I take into account the characteristics of the regulation of individual areas and discuss the possible advantages and disadvantages associated with them. As a result of the comparison, I highlight the different development paths that result from different conceptual relationships and market operating and regulatory principles. Both European countries and the United States quickly recognized the benefits of reusing open government data. Although with different emphasis, they realized that open government means a cultural

change in the relationship between citizens and the state, which can lead to greater transparency, greater participation and more intensive cooperation. Open access data is part of the process of opening up government and is a necessary prerequisite for open government. In terms of use and reuse, the most reasonable solution would be to assign commercial activities to truly commercial organizations independent of the government and to promote an open access policy that facilitates the flow of data. Data-driven innovation positively influences value through the generation of new knowledge, new processes, services and products, and new businesses. The re-discovery of public sector data is facilitated by joint digitalization efforts, the success of which is reflected in the DGI index developed by the OECD. Based on the analysis of the index, I found that Hungary is significantly lagging behind in terms of digital public administration in 2023 in international comparison, based on OECD studies. All six factors: digital design; data-centric public administration; government as a platform; open government by default, user-driven government and proactive government. It performed best in the dimension of data-centric public administration. It is important to note, however, that the DGI inedx does not measure the level of digitalization of individual government processes and services, nor the extent to which users use these services. I have not reviewed the methodology and data developed by the OECD, as I did not have the opportunity to do so.

The EU aims to create a single, integrated digital market (Digital Single Market) across Member States, where goods, services and data can flow freely, and where high-speed broadband and 5G connectivity are available to all, thus bridging the digital divide and promoting digital inclusion and accessibility. Recognising the value of data in driving innovation and economic growth, the EU aims to promote the responsible and secure use of data and is committed to protecting individuals' digital rights, while ensuring transparency, accountability and ethical standards in the use of digital technologies, including artificial intelligence. I have reviewed the main directives and regulations (DMA, DSA, DGA, DA) adopted to achieve this aim, regulating the processing and flow of digital data. I have found that the EU aims to create a safer digital space where users' fundamental rights are protected and to create a level playing field to foster innovation, growth and competitiveness in the European digital ecosystem. The Data Governance Act[3], adopted in 2022, aims to facilitate

[3] REGULATION (EU) 2022/868 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 30 May 2022 on European data governance and amending Regulation (EU) 2018/1724 (Data Governance Act)

and support voluntary data sharing in different situations. The Data Act (2023)[4], enshrines data-related rights, in particular the right to access and use data. Data governance is critical to the EU's efforts to increase trust in data sharing.

3.5. The fifth structural unit

In the fifth chapter, I examine the reuse of public data from the perspective of data protection. Based on the conceptual system and the regulations described in the previous chapters, it is also necessary to examine the relevant literature on data protection. In the previous chapter, it was clarified that public data may also include personal data, the access and management of which falls under the scope of the GDPR and the Infotv. In our country, the right to access and disseminate public interest data, as well as the fact that the enforcement of the right to access public interest data is monitored by an independent authority established by a cardinal law, the NAIH (National Data Protection and Freedom of Information Authority). In the chapter, I review the changes in the role and tasks of the Authority, which also determine compliance with the new challenges arising from the management of public data.
The fundamental purpose of this chapter was to present, by reviewing the development of data protection regulations, how data protection regulations limit and influence the reuse of public data.

3.6. The sixth structural unit

In the sixth chapter, I examine the creation of market value that can be achieved by reusing public data, its role in the value chain, and its business models. I review the best practices and strategies, which are supported by the experiences gathered from the literature. It is clear that there is no single best model, the chosen business models depend on the motivations and relationships of market participants. In the rest of the chapter, I present the economic benefits that can be achieved by reusing public data, the economic value of the data, primarily from an economic perspective, i.e. by reviewing the available benefits and the pricing methods for data reuse. The data taken from the literature were prepared based on a one-time research methodology, especially for scenario studies, and I did not have the

[4] REGULATION (EU) 2023/2854 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 December 2023 on harmonised rules on fair access to and use of data and amending Regulation (EU) 2017/2394 and Directive (EU) 2020/1828 (Data Act)

opportunity to examine their fulfillment, because no further analyses were made with this methodology. In addition, I examined the determination of the costs incurred and the relevant regulatory requirements. International practice and domestic practice differ significantly, although the recycling of public data has a regulatory framework in place (primarily due to mandatory legal compliance) in Hungary, it is still significantly lagging behind in exploiting the opportunities of the data market. Determining the value of public data and measuring the benefits from recycling is difficult and requires further research, especially to facilitate the regulation of the data economy.

3.7. The seventh structural unit

The seventh chapter presents, after clarifying the basic concepts of this field (data asset management, data asset management), its role in public administration beyond the delimitation of the activity. Based on the literature, I outlined the conditions of the public administration data management model and assessed its relevant effects. The concept of data asset management does not appear explicitly in legislation, but it is recorded as a government expectation in IT strategic documents. I found that the extent, frequency and general quality of the publication of public administration data largely depend on the data management capability of the public administration. Hungary is a leader in international comparison in terms of the searchability and availability of public administration data. Proper data asset management enhances business intelligence, promotes ethical data use, and protects stakeholders from possible data breaches or abuses. Currently, the domestic regulatory environment is still developing, and the conditions for administrative data management are not yet available for regular data sharing, publication, and distribution of data.

4. Research findings and further research opportunities

4.1. Testing the preliminary hypotheses

The subject of the thesis is the examination of the possibilities and conditions for the reuse of national data assets, public data. My main goal is to explore the legal and economic processes that determine the reuse of public sector data, and to identify business models and good practices that are aimed at exploiting the positive opportunities inherent in the data.

During the research, I examined the factors that determine the reuse of public data in Hungary in international comparison, and revealed the current situation.

During the research, I drew several conclusions that can be considered a starting point, but are necessary for further investigations. These findings may not be sufficient to critically verify or refute a hypothesis, but in any case they have identified new research directions.

Act CXII of 2011 on the right to information self-determination and freedom of information regulates the requests for access to data of public interest and data made public in the public interest as defined by the law and the exercise of the right to disseminate them. Act CI of 2023 on the system of utilization of national data assets and on certain services provides for the accessibility of non-personal and non-protected data belonging to the national data assets. Section 35 defines the conditions under which public data can be requested. The domestic legal environment thus establishes the publicity of the accessible part of the national data assets. Legal harmonization ensures that anyone has access to the accessible part of the national data assets in the legal regulations. However, whether this option is used depends on several factors. A significant difference between the accessibility of classic and research data is that the legal environment does not explicitly support access to the latter. Given that this is predominantly individual, personal data in its original form, the risks of its use are all the more obvious. The data management habits and interests of individual data providers can fundamentally influence how they relate to the public.

In the case of classic public interest data, the costs of data access do not only refer to the monetary cost, but also to the cost of all resources required to obtain it. Different data requests have different costs and, consequently, different problems. Citizen data requests are often hampered by the fact that data requesters do not know from whom and how they can obtain the desired data. The benefit of accessing such data typically stems from the fact that the consumer saves time, but there may also be financial savings. In the case of data requested from public institutions, the fulfillment of data requests is most often determined by the effort required to fulfill them and the production of the desired data in the appropriate format.

H1: The accessibility of public data largely depends on the pricing technique determined by the data owner/data controller organization.

When we think about the use of public interest data, the most common example that comes to mind is when someone requests a fact of public interest from a government organization and makes a decision after learning about it. The data is free for users to retrieve, but service providers provide different levels of access for different one-time access

fees. The unit price corresponds to the marginal cost of providing data, and the different fixed access fees serve the purpose of separating consumers with different usage habits. I examined the benefits and costs of reuse in Chapters 6.3 and 6.4, where I discussed the conditions and consequences in detail. The focus of reuse is on exploiting the economic value of public information. Public sector information serves as a "raw material" that can be used to develop new products and services. Open government data is one of the best examples of reuse. However, several factors hinder reuse. The main barriers to the use of open government data are the lack of functionality and support, which can be best addressed through user-centered design and user experience solutions, as well as user education. Legal institutions also have an impact on the reuse of public data. In the following, I have examined legal institutions and practices in Europe and the United States. The primary platform in the USA is Data.gov, which hosts nearly 300,000 datasets from more than 100 organizations. This platform aims to increase transparency, stimulate innovation, and support decision-making by providing easy access to a wide range of data. Another significant resource is Data USA, which aggregates public data from different sources and presents it in an easy-to-use format. It offers tools for creating visualizations and custom reports, making it easier to understand and use the data. However, the legislation, recommendations, and strategic documents adopted by the European Union are not yet sufficient for the free flow of open government data. The lack of awareness among data providers, the development of legal requirements and recommendations, is a significant obstacle to the reuse of open data. Data quality and the suitability for data sharing were quickly identified as obstacles. The key issue is interoperability. (Wieczorkowski, (2019))

The benefits of reusing open government data have been recognized by both European countries and the United States. Although with different emphases, they have come to understand that open government represents a cultural change in the relationship between citizens and the state, leading to greater transparency, greater participation and more intensive collaboration. Open access data is part of the process of opening up government and is a necessary prerequisite for open government. The most sensible solution in terms of use and reuse would be to assign commercial activities to truly commercial organizations independent of government and to promote open access policies that facilitate the flow of data. Whether we consider the open government data policies of the United States or the European Union in terms of reusing public data, the strategic goals are the same: to encourage data reuse, to establish sound data governance frameworks, and to promote efficient data use in the government sector.

Market models for the use of public data support the growth of the data economy, especially for technology companies and innovation startups that develop new products and services based on open data. In this type of economic model, data is treated as a fundamental resource, the use of which provides new opportunities, for example, for the development of applications or predictive analytics. When examining market models, I identified different development paths by examining international regulations. In the United States, open and unrestricted access to public sector information resulted in the rapid growth of information-intensive industries, while similar growth did not occur in Europe due to restrictive government information practices.

Europe has also recognized that open access to government information is critical to the information society, scientific endeavors, and economic growth. Given the magnitude of the opportunities and the accelerating pace of technological change, the United States and the EU must commit to jointly moving forward with the necessary practical steps to establish an internationally harmonized data policy for all public sector information.

Data-driven innovation positively impacts value through the generation of new knowledge, new processes, services and products, and new businesses. The re-discovery of public sector data is being facilitated by joint digitalization efforts, the success of which is reflected in the OECD's Digital Government Index (DGI). The DGI measures the level of maturity of digital government strategies in OECD member and partner countries. Governments have made progress in the strategic and effective use of digital technologies. The aim of e-government development was to achieve greater sectoral efficiency by introducing digital technologies, making existing procedures and public services more cost-effective and time-efficient. The European Union needed to create a complex indicator (DGI index) that takes into account the factors of digital transformation together and that gives a relatively correct picture of the transformation process. I used this indicator to assess Hungary's position in international comparison. The European Union's digitalization efforts greatly strengthen the development of e-government, and outstanding performance in the field of digital governance requires a combination of all six dimensions defined by the DGI index, rather than focusing on one or two strong dimensions. My initial expectations were not very positive, because the processes in Hungary slowed down and there was no other driving force for change besides the government's intention. This expectation was confirmed by the analysis of the data.

H2: Digitalization efforts supporting e-government in Hungary lag behind the average performance of OECD countries, but significant progress has been made in developing a data-centric public administration and increasing its performance.

All six factors examined by the DGI index: digital design; data-centric public administration; government as a platform; open government by default, user-driven government and proactive government, digital government needs to be developed. It was best in the data-centric public administration dimension. However, it is also important to note when comparing that the DGI index does not measure the level of digitalization of individual government processes and services, nor the extent to which users use these services. I did not examine the methodology of data collection, and I had no way to verify the data. However, the results obtained are suitable for outlining trends and showing the development of processes. However, they require caution when drawing further, far-reaching conclusions.

The Data Governance Act, adopted in 2022, aims to facilitate and support voluntary data sharing in various situations. The Data Act 2023, adopted in 2023, sets out data rights in various situations, in particular the right to access and use data. Data governance is critical to the EU's efforts to increase trust in data sharing. The DGA is based on the premise that actors – both individuals and businesses – do not engage in data sharing as much as they could or would like to, for fear of losing control over their data, which undermines their trust and enthusiasm.

The flexible design of certain elements of the current European data protection system - by establishing liability systems for certain data processing - aims to create a balance that creates safe conditions for individuals and, through them, economic and social actors to develop further. One of the positive benefits of the official transformation and operation, as well as the active international role, is that when the new EU data protection regulation was adopted, it was not necessary to suddenly establish a new administrative body in Hungary, and in 2018, the NAIH was able to start fulfilling its obligations under the GDPR while already having significant official experience. The work of the official law enforcement has continuously developed, the conduct of official procedures has become increasingly precise through the experience accumulated from case to case, and the knowledge of procedural law and the experience in court litigation have also been expanding.

The economic characteristics of digital content are in some respects radically different from those of traditional goods. All digital content is non-rival in nature, meaning that the enjoyment value provided by its consumption is not affected by how many people consume

it at the same time, and the fact that more and more people consume it does not cause congestion or limit the consumption of others. Since data cannot be exhausted, multiple parties can use it without the individual utility resulting from consumption decreasing. From an economic perspective, this property is advantageous, as it highlights that data is not a scarce resource. Therefore, existing data should be used by as many consumers as possible, since from a social welfare perspective, any net benefit from data consumption increases social welfare. On the other hand, the cost of production is specific, meaning that while the cost of creating the first copy may be exceptionally high, the cost of creating and providing each additional copy is close to zero. This often induces zero marginal cost. Since in competitive markets the price approaches marginal cost, in the case of zero marginal cost the price must also be zero, which raises serious dilemmas. Thirdly, the network effect, which can be called a kind of positive externality, but is also often called demand-side economies of scale, is extremely common in the digital goods market. Public sector information is characterized by its non-rivalrous nature, its specific cost structure (high initial costs, very low marginal costs), its high potential for use and reuse, and finally the duality of the owners and maintainers of the information. Based on these, I have justified my following hypothesis.

H3: The pricing model of public goods can be applied to the pricing of public data, and the pricing characteristics of digital public goods are true for the part of them that appears in digital form.

The methods for pricing public data follow the commercial business models that describe the relationships between companies operating in the data market. More and more services and data portals are emerging on the domestic market that build on the utilization of public data. However, the market use of Hungarian public data is still developing and faces several challenges, including compliance with data protection rules, improving data quality and access to data. International statistics measure the value of international trade in data services, where data is the main subject of the transaction. However, they do not include the value of data that is bought and sold as part of international transactions related to goods or other services. There is no specific research on how data is shared between economic actors and what impact the comparison of quantities and prices observed in the market has on their value. The economic impact and market-based assessment of the reuse of open data and public sector information is not uniform, and its assessment is influenced by the type of data market, the sale of data and data-intensive services, the applied business model, and capital allocation.

There are many levels and dimensions of data asset management, including the internal use of data within the organization, the transfer and sharing of data to external organizations, and the organization's broader national and international use. All organizations, especially those operating in the public sector, should prioritize strict data protection regulations, such as compliance with the GDPR. Currently, a long-term data asset strategic regulatory system for state data assets is being developed. When sharing data externally, companies should consider confidentiality agreements, data encryption methods, and potential risks related to third-party access. Collaboration with external organizations requires clear guidelines and governance frameworks to protect sensitive information while fostering innovation and transparency. A sound data management strategy and data asset management enable organizations to leverage their data as a valuable resource, driving growth and maintaining trust among customers, partners and regulators. Currently, the domestic regulatory environment is evolving, and the conditions for public administration data management are not yet in place for regular data sharing, publication and distribution.
This stage of the research highlights the need for further studies. This provides an opportunity to define additional tasks for data policy to exploit the economic potential of public data.

Overall, my hypotheses were supported, but hypothesis H1 raises further questions regarding the examination of other influencing factors, hypothesis H2 calls for cautious conclusions partly due to the lack of control of the relevant data and the unknown collection methodology, and in the case of hypothesis H3, the effect of individual circumstances may also be limiting due to the model-like derivation.

4.2. Further findings and research opportunities

Based on the findings of the thesis, several questions arise that require further investigation.

- Large international comparative reports on the reuse of open data focus on digital presence, which is usually accompanied by an online presence, and which only reflects a part of the development of digital public administration.
  It would also be advisable to examine the recycling of offline digital content.

- Research on prioritizing barriers to open data access and flow is scarce. Existing categorization and prioritization of barriers to open data are often either conceptual or based on a limited number of cases. They are generally not based on large-scale, real-world quantitative analyses. It is currently unclear whether the limited number of cases examined in previous research is representative of the larger population and whether the identified barriers are supported at a larger scale. This could be another avenue for research to address barriers.

- Determining the value of public data and measuring the benefits of recycling is difficult and requires further research. It would be advisable to determine the factors influencing the value, their order and priority, which can be influenced through regulation..

- Public administration data asset management is a topic that has been researched in a limited number of circles, and further research is needed to provide appropriate recommendations to assist public sector organizations in data asset management..

Data science is a rapidly changing field today, which could support data asset management with its development.

5. Author's research-related publications

5.1. Publications in English

Public data in the digital data market. Part 2. – The role of open government data in the transformation of society and the economy – Infokommunikáció és jog, (2024) 82(1) pp. 17-21. Online: https://infojog.hu/fodorne-zagyi-orsolya-public-data-in-the-digital-data-market-part-2-the-role-of-open-government-data-in-the-transforming-of-society-and-the-economy-2024-1-82-17-21-o/

Public data in the digital data market. Part 1 - Measuring the value of digital data and data flows in a macroeconomic approach – Infokommunikáció és jog, (2023) 81(2) pp. 15-20. Online: https://infojog.hu/fodorne-zagyi-orsolya-public-data-in-the-digital-data-market-part-2-the-role-of-open-government-data-in-the-transforming-of-society-and-the-economy-2024-1-82-17-21-o/

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