THE CRUCIAL ISSUES IN IMPLEMENTING ONE DATA POLICY IN INDONESIA'S HIGHER EDUCATION

Conference Paper · February 2024

CITATIONS
0

READS
6

3 authors, including:

Rahmania Utari
Universitas Negeri Yogyakarta
16 PUBLICATIONS **30** CITATIONS

SEE PROFILE

THE CRUCIAL ISSUES IN IMPLEMENTING ONE DATA POLICY IN INDONESIA'S HIGHER EDUCATION

Rahmania Utari[1], Farida Hanum[2], Cepi Safruddin Abduljabar[3]

[1,2,3] Universitas Negeri Yogyakarta
[1]rahmaniautari.2021@student.uny.ac.id, [2]faridahanum@uny.ac.id, [3]cepi_safruddin@uny.ac.id

Abstract

As accountability, compliance with regulations, and transparency are the cornerstones of the public sector, public higher education institutions have a duty to establish data management to protect data assets and guide data-related procedures in accordance with organizational goals. Several universities in Indonesia have adopted the One Data policy. This paper aims to identify crucial issues in the experiences of three public universities when implementing the One Data policy and the efforts they have made to address the emerging challenges.

This research was conducted at three universities in Indonesia. It used qualitative method with interviews as the primary method, supported by observations and documentation. The research involved 14 informants from the three research sites. Data analysis was conducted through thematic analysis.

The findings revealed that the main issues in implementing the one data policy in universities revolve around data governance. The information system integration was found to be a challenging and time-consuming process. Additionally, the low understanding of staff regarding business processes and data literacy posed obstacles to the implementation of the One Data Policy. Nonetheless, the three universities were relatively capable of addressing these issues through the commitment of their leaders, who provided support in developing structure of data governance, providing budgets, and using data as a basis for decision-making.

Keywords: higher education, data management

1. Introduction

Ownership of high-quality data is a fundamental requirement for an organization to make precise decisions [1]. In this age of digital technology, universities can boost their competitiveness by examining, organizing, and analyzing official statistical data [2]. On the other hand, Indonesian universities continue to grapple with challenges concerning data management [3]. and the adoption of evidence-based decision making [4,5]. Moreoever, since accountability, adherence to regulations, and transparency serve as the foundation of the public sector, public higher education institution is responsible to establish data management to safeguard data assets and direct data-related processes in alignment with organizational objectives [6].

Regarding these situation, several public universities in Indonesia are implementing the Presidential Regulation of the Republic of Indonesia No. 39 of 2019 on One Data Indonesia [7] , The Minister of Education, Culture, Research, and Technology Regulation No. 8 of 2022 on the Electronic-Based Government System [8], and the Ministry of Education and Culture of the Republic of Indonesia Regulation No. 31 of 2022 on One Data for Education, Culture, Research, and Technology [9]. These policies are driven by numerous findings that describe non-standardized data collection methods, data duplication, a lack of data integration, limitations in human resources for data management, insufficient budget allocation for data management in institutions, high sectoral egos in data administration and platforms, and a reluctance to share data among government agencies [10]. The objective of the One Data Indonesia policy is to provide accurate, up-to-date, integrated, accountable, easily accessible, and shareable data, managed meticulously, integrated, and sustainably, in order to achieve integrated planning, implementation, evaluation, and control of development.

The implementation of One Data consists of (a) data planning, (b) data collection, (c) data verification, (d) data dissemination, and (e) monitoring and evaluation of data management [9]. The One Data policy aligns with open data policies, which can enhance accountability and transparency, improve decision-making and policy formulation, achieve data sustainability, and reduce data duplication [11]. Common challenges in open data policies include a closed government culture, privacy concerns, inadequate focus on data quality, limited data usability, accessibility issues, and difficulties for data users in understanding the data.

Before the One Data policy was introduced, the trend of datafication in Indonesian universities had actually been ongoing since the higher education management reform in Indonesia two decades ago, which led to increased campus autonomy. This, in turn, resulted in greater demands for accountability, improved accreditation,

institutional self-assessment, and continuous quality improvement [12]. As a consequence, the need for data became unavoidable. Alongside this, datafication in higher education has progressed in line with the growth of information technology, especially in the areas of MOOC (massively open online courses), data analytics applications, and artificial intelligence [13].

Previous research has identified factors that support the success of the One Data policy at the national level in Indonesia, including data strategy, data procedures and processes, easily adoptable standardization policies, collaboration, data competencies, the definition of data roles and responsibilities, data technologies, and user satisfaction [14]. However, research specifically examining the implementation of the One Data policy in universities is still limited. One relevant study revealed the synchronization of university data through PDDIKTI (Indonesia's Directorat General of Higher Education Research and Technology Database), which was accomplished through metadata management, data governance with a DIKTI's (Directorate General of Higher Education of Indonesia) framework, and business process standardization bisnis [15].

Given the scarce research on data management at the university level, this study intends to investigate the experiences of three public universities in implementing the One Data policy and the efforts they have made to address the emerging challenges.

2. Methods

This study employs a qualitative research design conducted in three universities with their names anonymized as Institute of ABC, University JKL, and University XYZ. These universities are located in the East Java province and have the status of Legal Entity State Universities (PTNBH). Fourteen participants were interviewed, all of whom were leaders and staff involved in One Data management.

Most interviews were conducted individually, with a few conducted in group interviews. Semi-structured interviews were used as the interview technique. Some interviews were conducted in person, while others were done via teleconference using the Zoom application.

Additionally, the researcher observed the work environment of the informants and documented electronic data based on websites and smartphone applications. The initial data analysis was carried out using thematic analysis, starting with open coding, categorization, and theme development. Subsequently, each finding within one case was compared with findings in other case units (cross-case analysis).

3. Results

The One Data initiative at the three universities is implemented through the development of an integrated information system that connects internal and external information systems of the universities, especially by connecting various data domain, from planning, human resources, academic, research, community service, student affairs, finance, facilities, and collaboration. These data domains are organized based on the organizational context, and many of the variables and indicators are developed with consideration for meeting performance reporting standards, both for internal and external purposes. The data is displayed on a website using a dashboard. The dashboard is one of the visualization techniques to make data easier to read and understand [16].

The three universities are making efforts to ensure that all established information systems can be integrated into one place, thus achieving valid and accurate data. The tagline of the One Data Policy at Institute of ABC is the realization of Single Entry Multiple Purposes, while University of JKL has a vision to make their institution implement data-driven decision-making and increase data literacy within its environment. This information is quoted from one of the informants.

“"We are directing ourselves towards advancing into a data-driven organization.” (ER- /B-1-1)

University of XYZ has set the One Data Policy goal to produce single reference data.

To implement the One Data policy, university leaders delegate it to the IT Unit primarily supported by the Planning Unit. At University of JKL, a dedicated ad-hoc task force was formed for the One Data team. At Institute of ABC, the One Data policy led to the establishment of the Big Data Technology Development Sub-Directorate. This is as conveyed by one of the informants:

“The effort of the leadership in establishing the Big Data sub-directorate, I think it's clear that their effort is to implement how the One Data works, right? Well, managing the funds to support the implementation, with the presence of our sub-directorate, means we can create a budget every year, and that budget is sufficient to, what's the term, accelerate the implementation of this." (RPW/A-1-1).

The crucial step in One Data policy by the three higher education institution is related to the integration of information systems. Several interviews conducted at the three institutions indicate similar findings. This is expressed in the following interview quotes:

"Yes, for example, in the academic department, the academic information system (SIAKAD) has its own master program table, and then on the admission website, for instance, it creates a separate program table with different codes from what's in SIAKAD. However, we need to combine the two, and we have to do it manually. When there's a change on one side, we receive no notification, so we might miss it. So, the complexity lies in connecting these systems." (HAT/A-1-2).

"Integration. This is the biggest challenge in all public universities because as I mentioned earlier, the systems were still separate and not integrated. We wanted to use One Data, but everything is still scattered. I can't even imagine how to collect all this data. It took us 10-15 years for integration, only then could it work, only then could we combine everything. It's been more than 10 years. It started in the 2000s, more than 10-15 years. Combining everything. Oh, it's a whole movement. Before we became big data, we had already adopted that methodology. So, I imagine those who are just starting now might be a little confused." (RT/C-1-1). "

University of JKL even explicitly made the integration of information systems a major project at the beginning of the implementation of the One Data system. This decision was based on the strategic effects of integrating information systems. The lack of connectivity between information systems in several faculties or work units with the central IT Unit has resulted in data asynchrony. Synchronizing these information systems takes time because of the differing data management standards between one unit and another. The experience of the three universities shows that they have encountered obstacles not solely from a technological perspective but also from a human resources standpoint.

The fundamental issue that still remains a concern is the low level of understanding among staff and the differences in business processes between various units, both internally and externally within the universities, including Indonesia's Higher Education Directorate. This finding is reflected in interview quotes from three different universities:

"So, making it one... a unified business process. This is what's of concern. In my opinion, the obstacle still lies there." (RPW/A-1-1)

"Coincidentally, I was talking to a friend this afternoon, for example, in the student affairs unit, they handle scholarships. When we asked about the business requirements and created the system accordingly, once it was done, it turned out not to be suitable because there were still manual processes needed, even though everything should have been systematized. So, there's no need for application letters, and so on. It actually reverted to manual processes. What's called digital should ideally streamline manual processes. If it's not there yet, it's still bureaucracy. So, we haven't been able to instill that concept in the users." (SIP/B-1-5).

"...difficulties with data management sometimes occur, which means, for example, data with different standards, it does take time. For example, when it comes to academic data, it's not too difficult. But for tracer studies, it's complex, right? Tracer studies are collected for next year, not this year, but we need it this year, like that. So, it's not just about One Data; it's about when the data's standard can be collected. If the standard for student affairs is different from the academic standard, and especially when the standard is issued by the ministry, it's a bit complicated because the standards differ. The faculties request it annually, but this doesn't match the central policy." (RT/C-1-1).

From the three interviews, it can be concluded that there is a need for a mature business process identification to produce the digitalization of integrated business processes between one working unit and other relevant units. As a result of business processes being partially managed in specific working units, it leads to data inconsistencies between different working units.

Another finding mentioned by the informants is related to the low level of data literacy among both leaders and staff. Data literacy is the ability of an individual to identify, understand, use, reflect upon, and communicate data to achieve their own or organizational goals [17]. This condition is reflected in the interview results as follows:

"Yes, that's true, but the awareness that data is an asset, it should be treated like managing physical assets. It's like that. There should be maintenance and so on. In my opinion, in terms of benefits, they already understand,

this institution, like that. But in terms of it being an asset, they don't quite grasp that yet. The fact that generating data is costly and so on, they don't fully comprehend it, like that. So, it's not quite there yet." (RPW/A-2-1)

"Because when talking about visualization, if people don't understand the data, it won't be of any use." (ED/B-1-1).

"Because our weakness is that the system is created, visual, data, and then what? "You've been given this graph showing the increase in the number of dropped-out students, and "then what?"RT/C-1-1

To address this, one of the efforts undertaken is to create data definitions or a data glossary, so that data management staff themselves understand the meaning of the data. Data definition is sourced, in part, from operational definitions outlined in performance guidelines, including the Strategic Plan that contains performance indicators. In addition, leaders in meetings often present data and give employees the opportunity to interpret it. Apart from getting subordinates used to using data as a basis for decision making, this is also a way for leaders to educate them about how to interpret data.

A finding that has also emerged in the implementation of the One Data policy in universities is the need for institution leaders to be aware of the importance of developing data governance. Data governance involves the allocation of roles, decision-making rights, and accountability related to data [18].

Based on documentary studies, the three universities have established roles and responsibilities for data management. This can be observed on the website of University JKL, which features a data master/data principle. Two explicit role groups emphasized in the data governance structure at University JKL are Data Custodians and data stewards. Data Custodians are responsible for managing, protecting, and ensuring the integrity and usefulness of data. Data stewards, on the other hand, are tasked with implementing data management policies and procedures, including how data is acquired, used, stored, and protected throughout its entire lifecycle from acquisition through disposition. Based on interviews with key informants at the Institute of ABC, this role division is crucial to reduce the complexity of data management. The explanation from the key informant is as follows:.

"In the DPTS or IT, we deal with the data custodian. The custodian means technically how data is stored, how it is retrieved, and how it is secured, that's the role of data custodian... But regarding the data attributes, metadata, and so on, that falls under the realm of data steward. So, a data steward is like a data guardian, if you will. In many regulations, they call it a data guardian. Now, this data guardian sets the standards for what data should look like. Of course, this must be discussed with the data custodian. But the data custodian or IT may not understand what is needed." (RPW/A-1-1).

Initially, the three universities faced difficulties in data management due to the leadership's lack of awareness of the roles and responsibilities of the IT Unit. Before One Data policy was implemented, most leaders assumed that the IT Department was responsible for data entry, updates, and all data-related matters. With the One Data policy in place, the IT Unit gradually but surely began educating the leaders about the IT Unit's role, which is more focused on providing a technological ecosystem or database. The presence of data steward roles helps address operational issues in data management. In addition to task delegation, the researched universities also started to pioneer policies and procedures for data management and data privacy.

In addition to the management structure aspect, the three universities are still in the process of developing data architecture, formulating procedures and policies related to data, and increasing awareness about data and its use as a basis for decision-making. At the moment, the most notable efforts are in data updating and metadata management.

4. Discussion

The One Data Policy in Indonesia has encouraged the three universities to implement more organized data management. Based on the research findings, all issues tend to revolve around the issue of data governance. Data governance refers to the creation of comprehensive policies for authorized data access, management, and utilization. It involves identifying the methods and procedures required for data processing and defining the qualifications of those who can access the data and the conditions under which data access is permitted [19]. One of the data governance frameworks adopted across many sectors is the framework developed by The Global Data Management Community-Dama International [20].

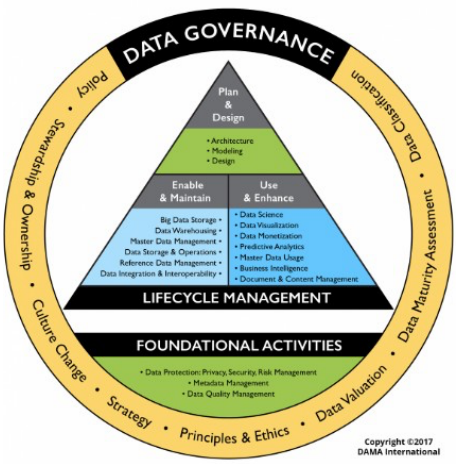

Figure 1. Data Governance Framework by DAMA International

From an organizational perspective, data governance is a component of organizational task design [21]. Establishing the structure and roles is part of organizational governance. Previous research has found that organizational structure plays a significant role in the success of IT projects [22].

The quality of data governance can be assessed through seven elements, which are (a) data governance body, (b) data quality, (c) data access or restriction, (d) data security, (e) data stewardship, ownership, and roles, (f) metadata documentation and organization, (g) business process integration [6]. The three universities have attempted the seven things above, especially data stewardship, ownership and roles. This is a strategic step because this element contains the human element as the executor of organizational governance, although the governance body data and others still need to be clarified and developed formally.

A strong connection exists among the identified challenges, which include issues with integrating information systems and a lack of data literacy and comprehension of business processes. The difficulties related to information systems integration are primarily rooted in non-technical factors rather than technical ones. These non-technical factors encompass technology acceptance, the competence of human resources, behavioral and cultural aspects, leadership, and financial considerations [23]. The integration of information systems should be accompanied by an evaluation of the digitization of current business processes. The integration of information systems should be accompanied by an evaluation of the digitization of current business processes. The integration of business processes is a concurrent procedure that runs in parallel with data processing [6].

A business process is a compilation of numerous interconnected business activities aimed at creating value for a company [24]. A business process can also be described as an organized sequence of actions intended to produce a particular outcome [25]. The introduction of data governance enables the targeted elimination of inaccurate data from business operations, leading to the generation of dependent information for making the best possible decisions [26].

Digitalization of business processes that isolated in only one service unit will usually result in data duplication and also affects in the lacking of congruity data across service units. To address this, universities need to have Business Process Management (BPM). BPM involves the examination, creation, implementation, and ongoing enhancement of organizational processes culture [27]. Initially, the emphasis was on altering individual processes, but current research emphasizes a more comprehensive approach to managing organizational processes. In this context, business process management is viewed as a unified collection of corporate abilities linked to strategic alignment, governance, methodologies, technology, personnel, and culture.

The next issue is the need to enhance data literacy among employees. A prior research has identified a connection between the degree of data literacy and the performance of government institutions [17]. Data literacy has also been proven to have a positive effect on employee productivity [28]. In simpler terms, data literacy means having the ability to "comprehend and communicate through data," to grasp the meaning of data and effectively utilize it, enabling full participation in a society influenced by the widespread availability and ease of access to vast amounts of data [29].

In the modern digital landscape, data literacy is a crucial skill that empowers individuals to comprehend, interact with, and make informed choices using data [30]. Organizations need to allocate budget for training their leaders and staff to ensure they possess sufficient data literacy.

To enhance employee literacy, a training model similar to that implemented by Purdue University can be considered. This training covers a range of skills for their employees, encompassing topics such as lifecycle models, discovery and acquisition, data description and metadata, security and storage, copyright and licensing, sharing, management and documentation, visualizations, and preservation. [31].

Broadly, the recognition of the significance of data management and the commitment of leaders at the three universities significantly promote the development of structured data management in higher education. Financial concerns are relatively minor thanks to the strong awareness and commitment of leaders to implement a One-Data policy in those three universities. Similarly, technology challenges are no more significant than human resources and data governance issues.

5. Conclusion

When data management is a priority and leaders are committed to implementing data policies, it can lead to more effective and organized data management. Financial resources are often a challenge in implementing data management initiative, however this is not the main issue in Indonesia Universities' One Data Policy implementation. Furthermore, it was found that technology issues are no more prominent than human resources and data governance issues. This suggests that the universities have a balanced approach to addressing the challenges associated with data management. It's important to have a well-rounded strategy that considers technology, human resources, and governance aspects, as all of these elements are interconnected and play a role in effective data management.

Even though those universities still have to develop and strenghten data governance body, data quality, data security regulations, metadata, and business process integration, their experiences in implementing One-Data policy can serve as a benchmark for other higher education institutions in structuring data management. In general, they have enormous potential for enhancing their quality of data management. The development of data governance and the improvement of human resources capacity are crucial in addressing the challenges of implementing the One-Data Policy. Additionaly, to streamline the process, universities can embrace a data management framework and set specific milestones for defined time periods.

Acknowledgment

This research was financially supported by Dikti. Therefore, we extend our heartfelt gratitude to Dikti. Similarly, we would like to express our thanks to Yogyakarta State University for assisting us in various stages, including the proposal seminar, progress reports, and the final research seminar.

References

[1] Wang J, Liu Y, Li P, Lin Z, Sindakis S, Aggarwal S. Overview of Data Quality Examining the Dimensions, Antecedents, and Impacts of Data Quality Enhanced Reader.pdf. J Knowl Econ. 2023;(February):1–20.

[2] Tkachuk I, Ostrovska N. Development of competitive advantages of the national higher education system in the digitalization conditions. Int J Comput Sci Netw Secur. 2021;21(October):13–20.

[3] Ikmi F, Barokah Z. Analisis Perubahan [Sistem Keuangan PerguruanTinggi Negeri Berstatus Badan Layanan Umum menjadi Badan Hukum (Studi pada Universitas Pendidikan Indonesia) [Internet]. Universitas Gadjah Mada; 2017. Available from: http://etd.repository.ugm.ac.id/index.php?mod=book_detail&sub=BookDetail&act=view&typ=htmlext&buku_id=128342&obyek_id=4&unitid=&jenis_id=

[4] Alamsyah VU. The Evidence-Based Leadership on Higher Education: A Theorical Review. Int J Soc Manag … [Internet]. 2021;02(02):105–13. Available from: https://ijosmas.org/index.php/ijosmas/article/view/21

[5] Hermanu AI, Sari D, Sondari MC, Dimyati M. Is it necessary to evaluate university research performance instrument? Evidence from Indonesia. Cogent Soc Sci. 2022;8(1).

[6] Jim CK, Chang H-C. The current state of data governance in higher education. In: Proceedings of the Association for Information Science and Technology. 2018.

[7] Pemerintah Republik Indonesia. Peraturan Presiden RI No 39 Tahun 2019 tentang Satu Data Indonesia [Internet]. Peraturan Presiden 2019 p. 1–35. Available from: https://peraturan.bpk.go.id/Home/Details/108813/perpres-no-39-tahun-2019

[8] Kemdikbudristek. Peraturan Menteri Pendidikan, Kebudayaan, Riset dan Teknologi RI No 8 Tahun 2022 tentang Sistem Pemerintahan Berbasis Elektronik Kemdikburistek. 2022.

[9] Menteri Pendidikan, Kebudayaan R dan TR. Peraturan Mendikbudristek RI No 31 Tahun 2022 tentang Satu Data Pendidikan, Kebudayaan, Riset dan Teknologi. 2022.

[10] Oktorialdi. Arah Kebijakan Pelaksanaan Satu Data Indonesia Pengantar Kebijakan Satu Data Indonesia. 2022 p. 1–52.

[11] Nugroho RP. Comparing open data policies and their implementation in developed and developing countries. J Penelit dan Pengemb Komun dan Inform. 2014;4(3):159–72.

[12] Sayidah N, Ady SU, Supriyati J, Sutarmin, Winedar M, Mulyaningtyas A, et al. Quality and university governance in Indonesia. Int J High Educ. 2019;8(4):10–7.

[13] Williamson B. Introduction; Learning machines, digital data and the future of education. In: Big Data in Education: the digital future of learning, policy and practice. 2017.

[14] Factors CS, Islami MJ. Implementasi Satu Data Indonesia: Tantangan dan critical success factors (CSFs). J Komunika. 2021;10:13–23.

[15] Wibowo RP, Nurkasanah I, Hendrawan RA, Yuhana UL, Wibisono A, Lestari NA, et al. Problem identification and intervention in the higher education data synchronization system in Indonesia. In: Procedia Computer Science; Sixth Information Systems International Conference (ISICO 2021) [Internet]. Elsevier B.V.; 2022. p. 484–94. Available from: https://doi.org/10.1016/j.procs.2021.12.165

[16] Lubis M, Dennis F, Andreswari R, Lubis AR. Dashboard information system development as visualization of transaction reports in the application BackInd (backpacker reservation system). In: IOP Conference Series: Materials Science and Engineering. 2020. p. 012145.

[17] Ongena G. Data literacy for improving governmental performance : A competence-based approach and multidimensional operationalization. Digit Bus [Internet]. 2023;3(1):100050. Available from: https://doi.org/10.1016/j.digbus.2022.100050

[18] Addagada T. The impact of data governance on corporate governance and financial performance in firms. 2023.

[19] Yulfitri A, Achmad YF. Analisis Aktivitas Data Governance Pranata Komputer Berdasarkan DAMA-DMBOK 2. J Rekayasa Sist dan Ind. 2020;7(1):1–7.

[20] DAMA International. The Context Diagram [Internet]. MyDAMA >> Downloads. 2017. p. 1–59. Available from: https://www.dama.org/cpages/dmbok-2-image-download

[21] Korhonen JJ, Melleri I, Hiekkanen K, Helenius M. Designing data governance structure: An organizational perspective. J Comput. 2013;4(2):11–8.

[22] Sarif S, Hamidi SR, Mamat B, Ramli R. The Influence of Organizational Factors in the Success of IT Project Management. Indian J Sci Technol. 2016;9(December):1–7.

[23] Khair A, Ishmatul D, Amrozi Y. A problem of information system integration at a University in Indonesia. J Sci Technol. 2022;14(August):9–15.

[24] Pramartha C, Mimba NPSH. Udayana University International Student Management : A Business Process Reengineering Approach. ComTech Comput Math Eng Appl. 2020;11(December):57–64.

[25] Bititci US, Muir D. Business process definition: A bottom-up approach. Int J Oper Prod Manag. 1997;17(1995):365–74.

[26] Wang C, Lin S, Chou T-H, Li B-Y. An Integrated Data Analytics Process to Optimize Data Governance of Non-Profit Organization. Comput Human Behav. 2018;

[27] Brocke R Vom, Rosemann M. Business Process Management. In: Wiley Encyclopedia of Management. 2014.

[28] Bandari V. Impact of Data Democratization and Data Literacy on Employee Productivity. Sage Rcience Rev Educ Technol [Internet]. 2020;3(1):37–48. Available from: https://journals.sagescience.org/index.php/ssret/article/view/42

[29] Smolnikova M. Next Step : Data Literacy Measurement. In: Proceedings ofthe 12th International Joint Conference on Knowledge Discovery, Knowledge Engineering and Knowledge Management. 2020. p. 234–40.

[30] Piriyeva Z. Data Literacy in Organizations. University of Tartu; 2023.

[31] Koltay T. Data governance, data literacy and the management of data quality. Res Data Serv. 2016;2016(1–10).