Open Data Determinants in Local Government

A Case Study of Municipalities in Twente Region

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Abstract

Open data is an increasingly relevant topic, which is studied in a variety of ways. In the Netherlands, there is a lack of research at the local level, while that is the level at which open data is best understood. This thesis aims to fill that knowledge gap, by exploring determinants of open data provision in municipalities in Twente, a region in the Netherlands. Therefore, the following research question was posed: *What is the distribution of determinants of open data provision in municipalities in Twente region as of May 2024?* Guided by the TOE framework, different characteristics and determinants of open data provision were researched in a cross-sectional case study. Using content analysis on the websites and data platforms of the municipalities, it was found that almost all municipalities in Twente region have started providing open data to some extent. This data provision is still in the early stages, and consists mostly of administrative documents in a non-transferable format. The main determinant identified by the analysis is government legislation and policy, which all municipalities indicate as their reason to provide open data.

Contents

1. Introduction

In 2011, Obama started the Open Government Partnership (OGP) together with six partners. Their aim is to encourage public organisations to "promote transparency, empower citizens, fight corruption, and harness new technologies to strengthen governance" (Schnell & Jo, 2019, p. 944). Currently, the partnership has 75 members. One of the implementation tools of open government is open data (Janowski, 2015).

With the rise of open government data (OGD), research on open government and open data has become increasingly popular and the way researchers have discussed this topic varies a lot. When open data was a novel concept, researchers focussed on its implementation, possibilities and impact (Conradie & Choenni, 2014; Tai, 2021). Papers were conceptual, they discussed uses of open data and the systems and technology needed for it (Janssen et al., 2012). Many studied transparency and participation, which are seen as the main reasons for implementing OGD policy (Conradie & Choenni, 2014; Muñoz et al., 2022; Tai, 2021). Additionally, researchers looked at user-related issues such as accessibility and privacy (Conradie & Choenni, 2014). Later, as the number of open data policies was growing, research shifted to comparing, analysing and evaluating those policies (Muñoz et al., 2022; Yang et al., 2015). At the same time, researchers discussed theories that could explain the implementation or impact of open data. Others studied barriers of OGD implementation, and later also determinants (Conradie & Choenni, 2014; Janssen et al., 2012; Khurshid et al., 2020; Tai, 2021). This thesis focusses on the determinants of open data provision.

Also in the Netherlands, open data is an increasingly relevant topic. The Netherlands joined the OGP in 2011 and since then, the government has published multiple policy documents regarding OGD, as well as launching a centralised platform (https://data.overheid.nl/) (Mol, 2016). From the research papers on open data determinants in the Netherlands, some are conceptual (Ingrams, 2019) or literature reviews (Matheus & Janssen, 2019) and many are on national or provincial level (e.g. Donker & Van Loenen, 2016; Janssen et al., 2012; Ruijer & Meijer, 2019). There is a lack of research on a local level, while that is the level at which "open data as a concept is best understood" (Conradie & Choenni, 2014, p. S11). This study aims to fill that knowledge gap, by exploring determinants of open data provision in municipalities in Twente, a region in the Netherlands.

Therefore, the following research question is formulated:

RQ: What is the distribution of determinants of open data provision in municipalities in Twente region as of May 2024?

To be able to answer this explorative question, the main research question is split into sub-questions:

1) Which possible determinants of open data provision can be found in existing academic literature?

2) What is the current state of open data provision by municipalities in Twente region?

3) Which determinants of open data provision are present in municipalities in Twente region?

The first question is theoretical and will be answered by examining existing literature. Sub-question two and three are empirical questions that will be answered by conducting an explorative case study.

This research has both scientific and societal relevance. It is scientifically relevant, because it adds to the existing body of research on open data and its determinants. By studying the current state and determinants of open data provision by municipalities in Twente region, it partly fills the knowledge gap discussed before. The societal relevance lies in the fact that exploring determinants may lead to the improvement of open data provision. OGD increases government transparency, it allows citizens to be more informed (Tai, 2021). In addition, OGD can strengthen democratic accountability. Moreover, open data can increase citizen participation and public engagement (Janssen et al, 2012). This makes governing more democratic (Mol, 2016).

The rest of this paper is structured as follows. First, theoretical findings from previous literature are discussed in chapter two, before being used to answer the first sub-question. Then, chapter three explains the methodology of the research. Next, the results of the analysis and the answers to the other sub-questions are presented in chapter four. Chapter five concludes this paper and answers the main research question. At the end, the references can be found, followed by the appendix.

2. Theory

The previous chapter introduced the topic of this research and presented the research question and sub questions. In this chapter, the theoretical findings are discussed. First, there is a section on the definition and characteristics of open data provision. Then, different theoretical perspectives are presented and the choice for using one framework is explained. Next, the findings regarding possible determinants are discussed. After, the first sub-question is answered. The chapter ends with a conceptual model that summarises the findings.

2.1 Definitions and characteristics of open data provision

When discussing open data, it is first necessary to define the concept. Many studies give different definitions for open data. What most studies agree on is that data is open when it is made public online in a special repository to be used, re-used or shared for any purpose. The data should be freely available for anyone without any legal or technical barriers and should be provided in a structured and standardised format in order to be machine-readable (Haini, 2020; Kassen, 2018; Mol, 2016).

When it comes to OGD specifically, there are also studies that use a more structured definition. One commonly used include the eight principles of OGD, which are that "OGD needs to be complete, primary, timely, accessible, machine-processable, non-discriminatory, non-proprietary and license-free" (Chen et al., 2018, p. 609). Another used scheme is the five-star rating, which evaluates whether data is "available online, in structured formats, usable in open software packages, with Web addresses or other uniform resource identifiers to enable users to locate data, and linked to other data to develop applications" (Chen et al., 2018, p. 609). The variety of open data definitions gives insight in the diverse characteristics of open data provision. These characteristics can be used to indicate or assess the current state of open data provision of an organisation. Between the different definitions some characteristics overlap and others diverge, but they mainly include online availability, accessibility, machine-readability, completeness, originality, and timeliness. Here follows a more detailed examination of these characteristics.

First, data is open when it is **available online** in a special repository. A special repository can be defined as a shared database of information with a long-term archiving capability (Mol, 2016). It is important that data is provided in a dedicated place, for it to be recognised as open data. This repository can be in many locations, for example on the organisation's own website or on a

separate data platform. The location of the special repository can impact the findability of the data, which is important for the availability. Findability can be increased by publishing in a well-known location, and also by providing metadata. As Donker & Van Loenen (2016) discuss, it is important that datasets are recognisable and available through a simple search.

Next, open data must be **accessible** for everyone, without technical or legal barriers. Open data should be free to use, re-use and share without limitations, which means that the data must be free of things such as licenses, copyright and trademarks. Restrictions could also include accessing fees. Here, some of the eight OGD principles are tied in together. In order to use open data, it must be **machine-readable**. This is linked to the format in which the data is provided. Data files in more structured and standardised formats, such as CSV, are easier to process than for example PDF files and therefore more usable (Muñoz, 2022).

Then the **completeness** of open data. Organisations should publish all the data they produce, given there are no issues such as privacy and national security. One way of assessing this in governmental organisations, is by looking at policy domains. Mol (2016) states that open data is more complete when a municipality makes data available on the whole range of policy domains that they work on. Others, such as Muñoz et al. (2022) also use information type to indicate data completeness. **Originality** means that the data is primary. In other words, data "as they are obtained from the source and not aggregated or modified" (Fan & Zhao, 2017, p. 398). Finally, open data should be **timely**, which means that they are published as soon as possible, and updated when necessary. Besides these characteristics, Kassen (2018) mentions organisational policy as an indicator of open data provision. When an organisation has its own open data policy separate from or additional to national government, this can indicate an active stance on open data provision.

2.2 Theoretical perspectives of open data provision

Research on determinants of open data has been conducted for many years, be it using different terms such as barriers, drivers, and influential factors. An example is Janssen et al. (2012), who explored the benefits, barriers and myths surrounding open data and open government. They looked at open data and open government through the lens of system theory and institutional theory. Subsequently, Conradie & Choenni (2014) researched the barriers of open data release more thoroughly by studying the underlying processes. Yang et al. (2015) studied the complexity of open data initiatives in Taiwan, and explored "influential factors and their impacts on open data initiatives" (Yang et al., 2015, p. 596). Some studies are done with quantitative methods (e.g. Fan

& Zhao, 2017; Khurshid, 2019; Wang & Lo, 2016; Yang & Wu, 2016), others use qualitative methods (e.g. Donker & van Loenen, 2016; Ingrams, 2019; Zhang et al., 2017). Research on open data determinants is performed on different levels, such as national (e.g. Chatfield & Reddick, 2018; Mustapa et al., 2019; Schnell & Jo, 2019) and local (e.g. Haini et al., 2019; Mol, 2016; Muñoz, 2022).

Previous studies have used many different theories and frameworks to identify determinants of open data. By reviewing existing literature, Khurshid et al. (2020) found that three of them are dominant: diffusion of innovation (DOI); institutional theory; and the Technology-Organisation-Environment (TOE) framework. DOI is a theory by Rogers that explains how innovations diffuse through populations or social systems over time. The key idea is that an "individual's perception that the idea, behaviour, or product is new or innovative" decides whether it gets adopted (Chatfield & Reddick, 2018, p. 125). According to DOI, individuals adopt innovations at different speeds. Therefore, five categories of adopters are suggested. Additionally, the theory identifies five influencing factors of innovation adaption and diffusion: "relative advantage, compatibility, complexity, trialability, and observability" (Chatfield & Reddick, 2018, p.125). DOI is widely used in literature to identify determinants of open data. Some studies see open data as a technological innovation and use DOI from that perspective, others look through a policy innovation lens and use DOI accordingly. Studies are done both on individual and organisational level (Khurshid et al., 2019). While a lot of researchers use this theory, Chatfield and Reddick (2018) argue that a downside of DOI is that it does not take into account resources and external factors.

Institutional theory is another theory used in the study of open data determinants. Contrary to DOI, this theory does take into account external factors and considers organisations strongly tied to their institutional environment. The theory states that organisations are driven by a motivation to obtain and maintain stability, legitimacy and survival prospects. They do so by introducing institutional structures, or by responding and adapting to their environment (Janssen et al., 2012; Yang & Wu, 2016). This environment brings many external pressures from different actors such as "higher-level authority and policy makers, the expectation from mass media and open data users, and the influence from peer organizations" (Yang & Wu, 2016, p. 381). Many studies use institutional theory to identify open data determinants. For example, Janssen et al. (2012) use the theory to argue that organisations use open data to reinforce structures that increase stability.

Meanwhile, Yang and Wu (2016) reason that external pressures may drive organisations to adopt open data policies.

The TOE framework, introduced by Tornaztky and Fleischer (Haini et al., 2019; Mustapa et al., 2019), is a framework broadly used to study the adaptation of technological innovations at organisational level. In the framework, determinants of innovation adoption are grouped into three categories or contexts: technological, organisational and environmental (Haini et al., 2019; Mustapa et al., 2019; Wang & Lo, 2016; Zhang et al., 2017). The technological context includes all technologies that are available to an organisation, whether they are presently used, or can be obtained from the market. The organisational context refers to the characteristics of an organisation, such as its size, structures, capabilities and resources. Finally, the environmental context focusses on the external factors influencing the organisation. These include key actors, policies and regulations (Chen et al., 2018; Mustapa et al., 2019; Wang & Lo, 2016; Zhang et al., 2017). TOE is a popular framework, used as a theoretical base in open data determinants research, regarding open data as a technological innovation (Mustapa et al., 2019). From the three theories and frameworks discussed, TOE is the most used (Khurshid et al., 2020). Previous literature, which used the TOE framework, found that factors from technological, organisational and environmental contexts have a direct influence on innovation adoption (Mustapa et al, 2019). Conversely, many determinants found in existing literature on open data determinants can be categorised as technological, organisational or environmental (Khurshid et al., 2020).

Haini et al. state that the TOE framework "is the most extensive approaches adopted" in studies of technological innovation adaption determinants (Haini et al., 2019, p. 194). The framework is considered useful in this research area, because it is comprehensive, including both internal and external factors on top of technological ones (Zhang et al., 2017). Moreover, the framework is considered specifically suitable at the organisational level (Wang & Lo, 2016). For those reasons, this study used TOE as a guiding framework to identify possible open data determinants. However, the framework is highly generalised and does not provide specific variables, which makes it "adaptable and broadly applicable" (Wang & Lo, 2016, p. 82). Therefore, it first needs to be extended with details, when applied to a specific case (Zhang et al., 2017). In that regard, previous research served as a source of possible determinants.

2.3 Determinants of open data provision

Open data studies provide a very large number of possible determinants. Some of the most occurring are discussed here. First, the technological context. Here, perceived benefits and IT infrastructure are among the most frequently found determinants. Wang & Lo (2016) explain how the decision of adopting new technology often comes with comparing the risks and rewards of that technology. This costs-benefit analysis produces perceptions of possible benefits and barriers. In that way, perceived benefits can influence the decision to adopt open data, which is the new technology. To be able to adopt open data, the organisation must have a technological environment that is capable of handling this new technology. Thus, good IT infrastructure can contribute to the adoption of open data (Zhang et al., 2017).

Second, the organisational context. Most often, this category contains organisational culture and financial resources. Organisations can have a more conservative or progressive culture, and open data is often seen as a novelty. According to Yang et al. (2015), government agencies usually have a risk-averse culture. This makes them more likely to resist open data initiatives. In that way, organisational culture can influence open data adoption. Financial resources is a determinant found in fiscal transparency research. Chen et al. (2018) discuss the possibility of both a positive and a negative relationship with open data. Organisations need financial resources to invest in technology to be able to provide open data. Additionally, an organisation may be more motivated to be transparent if they are in a good financial position. Therefore, it might be a positive relationship. Conversely, if an organisation is in a worse financial position, there may be more external pressure for them to become transparent. Thus, the relationship might be negative.

Finally, the environmental context. In this context, the most recurring determinants include external pressures or demands and government legislation and policy. Often, institutional theory is used here, because of its focus on the external environment of organisations. This environment can pressure organisations to adopt open data. External pressures can come in many forms, such as demand from higher authority, stakeholders, citizens or the media (Yang & Wu, 2016). Government legislation or policy always plays a role in any government initiative, because organisations have to comply to the legal framework (Fan & Zhao, 2017). Government policy could push organisations to provide open data. However, Yang et al. (2015) found that existing legislation and policy can also hinder organisations from opening up their data. For example, privacy and copyright laws may restrict the publication of certain data.
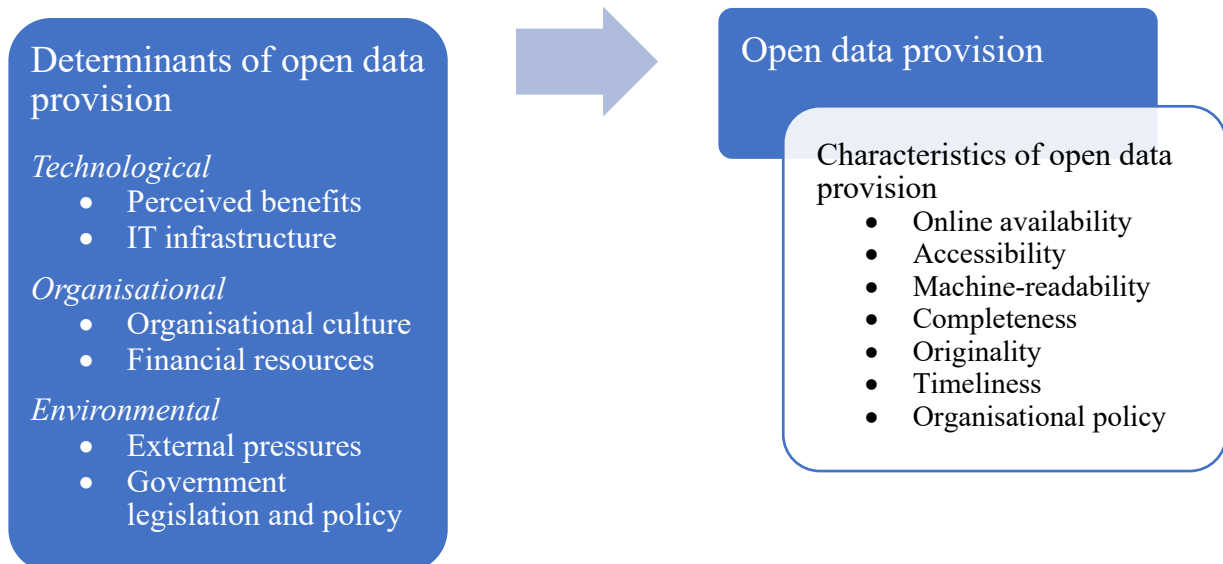
2.4 Answer to the first sub-question

Now that the literature is reviewed, the findings from the literature can be used to answer the first sub-question: *Which possible determinants of open data provision can be found in existing academic literature?* First, section 2.1 defined the concept of open data, and the different definitions gave insight into the characteristics of open data provision. Online availability, accessibility, machine-readability, completeness, originality, timeliness and organisational policy were found to be the main characteristics. Then, section 2.2 discussed that many different determinants of open data can be found, using a variety of methods, theories and frameworks. In this thesis, the TOE framework was chosen to identify determinants. Next, in section 2.3, six of the most common determinants were identified: perceived benefits, IT infrastructure, organisational culture, financial resources, external pressures and government legislation and policy.

2.5 Conceptual model

The findings of this chapter are summarised in Figure 1 below. This conceptual model gives an overview of the important concepts discussed. On the left side, the determinants of open data provision identified in the literature review are listed, sorted by the three contexts: technological, organisational and environmental. On the right side is open data provision, and below that the characteristics of open data provision identified in the literature are listed.

Figure 1

Determinants and characteristics of open data provision: a conceptual model

Determinants of open data provision

Technological
- Perceived benefits
- IT infrastructure

Organisational
- Organisational culture
- Financial resources

Environmental
- External pressures
- Government legislation and policy

Open data provision

Characteristics of open data provision
- Online availability
- Accessibility
- Machine-readability
- Completeness
- Originality
- Timeliness
- Organisational policy

The arrow represents the causal relation between determinants and open data provision. The characteristics are below open data provision, and not on the same level as the determinants. This is because determinants do not influence the characteristics themselves, but rather open data provision as a whole. The conceptual model served as a guide for the analysis, which is further explained in chapter three. However, this research does not study the causal relationship between the determinants and open data provision. Rather, it observes the presence of the characteristics and determinants of open data. The association between them is an expectation from the literature, and is not tested in the analysis. This thesis focusses on six characteristics, the ones from the conceptual model except accessibility, and two determinants: financial resources and government legislation and policy. The selection of these is detailed more in the next chapter.

In summary, this chapter presented different definitions of open data, from which seven characteristics of open data were derived. Then, different theories and frameworks were discussed, and the choice for using the TOE framework was explained. Next, this framework was used to identify six determinants of open data. Finally, the findings from the literature were used to answer the first sub-question, and summarised in a conceptual model. The next chapter explains how this model served as a guide for the analysis, and further present the research methodology used in this thesis.

3. Methods

In the previous chapters, theoretical findings were discussed. This chapter explains the methodology that was used to answer the research question. First, the research design is explained. Then the method of data collection is described. The chapter concludes with the method of data analysis.

3.1 Research design

This research explored the determinants of open data provision through a cross-sectional case study. Cross-sectional means that the data represents one point in time (Babbie, 2014). The case study had an embedded single-case design, following Yin's definition (2018). The single-case is open data provision within the context of Twente region. It is embedded, because there were multiple units of analysis: municipalities in Twente region. At the time of research, Twente had 14 municipalities: Almelo, Borne, Dinkelland, Enschede, Haaksbergen, Hellendoorn, Hengelo, Hof van Twente, Losser, Oldenzaal, Rijssen-Holten, Tubbergen, Twenterand and Wierden (Overzicht Twentse gemeenten, n.d.).

3.2 Data collection

A variety of data had to be collected to answer the research (sub-)questions. The conceptual model from chapter two (Figure 1) was used to identify which data was needed. For sub-question two: *What is the current state of open data provision by municipalities in Twente region?*, the characteristics of open data provision served as indicators to assess the current state of open data provision. In order to study the characteristics of open data provision, the open data repositories of the municipalities must be analysed. To find the different locations of these databases, the websites of the municipalities were searched and an internet search was done using the key term 'open data' in combination with the names of the municipalities. The data repositories that were found are listed in Table 1 in the appendix. For the characteristic organisational policy, it is needed to analyse not the data platforms, but rather the policy of the municipality. Therefore, the websites of the municipalities were searched for policy documents about open data.

For sub-question three: *Which determinants of open data provision are present in municipalities in Twente region?*, the determinants from Figure 1 were used. To maintain a narrow scope in this thesis, it was decided to limit the methods to desk research. This means that only secondary data was gathered. Therefore, not all determinants from the conceptual model could be

studied. Two determinants were selected for the analysis: financial resources and government legislation and policy. To study the determinant financial resources, financial data of the municipalities needed to be collected. The most recent reports available were from 2022. Financial data were retrieved from the websites of the municipalities. A complete list of the sources is available in Table 2 in the appendix. For the determinant government legislation and policy, it was needed to identify which legislation and policy influences the provision of open data. Information about government legislation and policy was found by internet search. It is also important to note that because this research analysed municipalities in the Netherlands, the gathered data was Dutch. The researcher has the necessary language skills to conduct the analysis in the original language.

3.3 Data analysis

To gain insights from the collected data, it was analysed. To ensure that this analysis was conducted systematically, the characteristics and determinants of open data provision had to be operationalised. The characteristics are operationalised in section 3.3.1 and the determinants in section 3.3.2. Then, in section 3.3.3, the analysis is explained.

3.3.1 Operationalisation of characteristics

To answer the second sub-question, the open data provision of the municipalities had to be assessed. Section 2.1 provided seven characteristics of open data provision that can serve as indicators for this assessment: online availability, accessibility, machine-readability, completeness, originality, timeliness and organisational policy. The characteristics online availability and accessibility are about the data repository, and organisational policy is about the municipality in general. Meanwhile, the other characteristics are about the datasets in specific. The general characteristics will be discussed first, followed by the data-specific ones.

First, **online availability**. Because the data was collected from special repositories, the found data is by default available online. However, as discussed in section 2.1, the findability of the data is also important and can be improved by publishing in a well-known location, and providing a search function or metadata on the data platform. Therefore, this characteristic was assessed by three criteria: location, search function and metadata. Location was operationalised as 1) own website, 2) national portal or 3) other. Search function and metadata were both operationalised as 0) absent or 1) present. The second characteristic, **accessibility**, checks that the data portals are free of limitations such as licenses, copyright, trademarks and accessing fees.

During the data collection, only data that was completely accessible was collected. Therefore, this characteristic can be disregarded. Then, for **organisational policy**, it was assessed whether the municipality has its own organisation-specific policy on open data. To do this, first the policy information on the website of the municipality was browsed for policy on open data. Next, the search function of the website was used to search for any pages mentioning open data. In addition, the year report, also used for the financial information, was examined using the key term 'open data' in the search function. This characteristic was operationalised as 0) absent or 1) present.

The first data-specific characteristic, **machine-readability**, can be assessed by examining the format of the data. Here Muñoz (2022) was followed and four categories were defined: 1) transferable, 2) less transferable, 3) non-transferable and 4) other data. The specific data formats in every category can be found in Table 3 in the appendix. The next characteristic, **completeness**, can be assessed by looking at policy domains. Following Mol (2016), the categories as defined in his thesis were used. These are twelve policy categories: 1) finance and economy, 2) environment, 3) health, 4) energy, 5) education, 6) employment, 7) transportation, 8) infrastructure, 9) population, 10) elections, 11) legislation and 12) government plans and administrative documents. For the government platform (https://data.overheid.nl/), such a category is given with every dataset. Datasets on other websites were fit into the predefined categories where possible. If the data did not fit into one of the categories, it was noted down. When more of the same type of datasets appeared, a new category was added. Otherwise, the dataset was categorised as 'other'.

Then the characteristic **originality**, which can be assessed by checking whether the data is primary. As explained in section 2.1, this means that the data is not aggregated or modified. This was operationalised as 0) not primary or 1) primary. Lastly, the characteristic **timeliness** assesses whether the data is up to date. This was done by checking whether a timestamp is provided with the data file, and was operationalised as 0) absent or 1) present. A complete overview of the operationalisations of the characteristics can be found in Table 3 in the appendix.

3.3.2 Operationalisation of determinants

As discussed in section 3.2, two determinants were selected for the analysis: financial resources and government legislation and policy. Section 2.3 describes how financial resources can have both positive and negative relationships with open data provision. The financial situation of an organisation might motivate or pressure transparency, for different reasons. Additionally, financial resources are needed to make technological investments. Therefore, two things were

assessed: the financial situation of the municipality, and whether specific investments are made for the provision of open data. Common dimensions of the financial situation of a local government organisation are liquidity and solvency (Iacuzzi, 2021). Various indicators are used to measure both dimensions. Based on the information available in the collected data, it was decided to operationalise liquidity with the current ratio (CR), which is calculated as the ratio between liquid assets and short-term liabilities. Solvency was operationalised with the debt-to-asset ratio (DAR), which is calculated as the ratio between total liabilities and total assets. Open data investments were operationalised as 0) absent or 1) present.

Also described in section 2.3 is how government legislation and policy can both promote and hinder the provision of open data. Therefore, any legislation and policy that concern open data and the publication of data, specifically by municipalities, are relevant here. This includes 1) legislation and policy that require municipalities to provide open data, as well as 2) legislation and policy that limit this provision. A complete overview of the operationalisations of the determinants can be found in Table 4 in the appendix.

3.3.3 Content analysis

During the data collection and analysis, all the data were coded in Excel, using the operationalisations as explained in section 3.3.1 and 3.3.2 above. The data repositories and the websites of the municipalities were used to assess the characteristics online availability and organisational policy, respectively. For the other characteristics, which are about the datasets themselves, the metadata provided on the data portals was used. First, the data format was used to code the data on category of machine-readability. Then, the data was coded on the policy domain. Lastly, the data was coded on originality and timeliness. Important to take into account with policy domain is the necessary translation between Dutch and English. Because of this, the policy domain was coded in both languages. This translation could influence the analysis. During the analysis, it became clear that the municipalities publish many of the same kind of documents. For example, some repositories contained hundreds of letters between councils. For that reason, it was decided not to list every datafile separately. Instead, for every data repository the different types of datafiles were listed, and the number of entries of that kind.

Then, for the determinants, the financial data was used to assess the financial situation of every municipality, and to look for specific open data investments. For each municipality, the numbers necessary to calculate the liquidity and solvency ratios were extracted from the balance

sheet. Then, the ratios were calculated using Excel formulas. Next, the year report, and more specifically the income and expenses overview, was searched for open data investments. Since all municipalities are in the same province and country, they fall under the same legislation and policy. Therefore, the determinant government legislation and policy could be analysed for the case as a whole. In the year report of Almelo, a reference to an overview of all legislation related to data management of municipalities was found. This turned out to be from a report of the association of Dutch municipalities, VNG (VNG, 2022, p. 30). This figure was used as a starting point to identify relevant legislation about open data. For additional information about legislation and policy, the internet was searched.

Overviews of all the collected data and how they were coded can be found in Tables 5 through 19 in the appendix. Table 5 shows the coding of the general characteristics, Tables 6 through 17 show the coding of the data specific characteristics per municipality, Table 18 shows the coding of the determinant financial resources and Table 19 shows the coding of the determinant government legislation and policy.

3.4 Strengths and weaknesses of the research design

In every study, design choices are made that can have a positive and negative impact on the research. This section discusses some of the choices of this thesis and their impact. This research has a cross-sectional design, which gives the ability to get a 'snap-shot' of a situation at one point in time. This fits well with the research question, specifically the second sub-question, because it is concerned with the current situation of open data provision in municipalities. The analysis being at local level is another strength of this research. As mentioned in the introduction, "open data as a concept is best understood" at the local level (Conradie & Choenni, 2014, p. S11).

Besides the strengths, this research also has weaknesses. The decision to limit the methods to desk research excluded other methods, such as interviews or surveys, while they might have been able to give valuable insights. A consequence of this is that the number of determinants that were selected for the analysis was very limited. Therefore, not all contexts from the TOE framework were represented. As a result, the outcome of the analysis may present an incomplete picture. For example, there could be determinants present in the municipalities that this thesis did not include in the analysis.

4. Analysis

The previous chapter explained the methodology used in this research. This chapter presents the results of the analysis. First the results about open data provision are presented, before answering sub-question two. Then the results regarding the determinants of open data provision are discussed, and sub-question three is answered.

4.1 Characteristics of open data provision

This section presents the part of the results about the characteristics of open data. It starts with a few descriptives of the open data provision in general in section 4.1.1, and the general characteristics in section 4.1.2, before going over the data-specific characteristics in section 4.1.3. Finally, the second sub-question is answered in section 4.1.4.

4.1.1 Open data provision in general

Out of the 14 analysed municipalities, 12 provide open data. The only municipalities that do not have a special data repository are Hengelo and Wierden. Wierden appears to be developing a repository, but at the time of analysis, this platform did not yet contain any data and was therefore not included. The municipalities of Hengelo and Wierden do publish various documents. However, these are spread over different locations on their website, and not in a central place. Since this does not match the definition of a special data repository as established in section 2.1, this data was neglected. The 12 municipalities that do have a special data repository also publish many documents outside of that repository. For the same reason, this data was neglected and only the data inside the repository was analysed.

Table 20 below shows for every municipality that provides open data the amount of datasets they provide, in which data category, the amount of policy domains, and if there was a domain added, the additional domain. As is visible in the table, there is a large variety in the amount of datasets that every municipality makes available. In contrast, the amount of data categories and policy domains is very low. The next sections go into this in more detail.

Table 20

Open data provision by municipalities in Twente region

Municipality	Amount of datasets	Data category	Amount of policy domains	Additional domain
Almelo	2,098	3	2	WOO requests
Borne	1,632	3	1	
Dinkelland	5,258	3	1	
Enschede	1,700	3	1	
Haaksbergen	60	3	1	
Hellendoorn	1,314	3	1	
Hof van Twente	436	3	1	
Losser	1,290	3	1	
Oldenzaal	164	3	1	
Rijssen-Holten	390	3	1	
Tubbergen	1,546	3	2	WOO documents
Twenterand	2,600	3	1	

Note. General descriptives of the open data provision by municipalities in Twente region.

4.1.2 General characteristics

The repositories are mainly websites on which the municipalities provide information from the municipal council. Some municipalities also provide different documents. Section 4.1.3 will go more into detail regarding the content of the documents. For the general characteristics online availability and organisational policy, Table 5 in the appendix shows how the collected data was coded.

When it comes to the location, all 12 municipalities provide open data on their own website. Enschede is the only municipality that can also be located on the government platform (https://data.overheid.nl/). However, on further inspection it became clear that this website only provides metadata and references to data published elsewhere, and not the data itself. Therefore it was not considered a special repository following the definition in section 2.1. All data repositories have a search function and provide metadata. While the search functions work similarly, there are differences in the amount and kind of metadata that the repositories provide. For example, some

repositories only provide the author of the document, while others also assign the documents an ID or a category. These differences impact the findability of the data, which also varies per municipality as a result.

None of the municipalities had its own organisational policy. When the website of a municipality had information about its policy on open data, it was on a page about the *Wet open overheid* (Woo). This government legislation is further discussed in section 4.2.2 below. All open data policy of the municipalities seems to be implementation of the Woo. This law was mentioned in every year report, including from the municipalities that do not provide open data.

4.1.3 Data-specific characteristics

There were four data-specific characteristics. How the collected data was coded for these can be found in Tables 6 through 17. The first data-specific characteristic was machine-readability. All identified datasets were documents in PDF format. Therefore, the data is in category 3: non-transferable data. This is the least reusable data, because it is not machine-readable. The second characteristic, completeness, was assessed by the policy domain. Almost all provided open data belongs to policy domain 12, which corresponds to government plans and administrative documents. Two municipalities additionally published Woo documents. These are documents related to information requests regulated under the Woo. The identified data repositories were mostly websites that publish information from the municipal council. Very common document types were amendments, audit office documents, letters to the council, motions, received documents and written questions. Nearly all of these are documents related to the municipal council meetings.

The third characteristic was originality. Most of the collected datafiles are primary, they are directly produced by the municipality itself and its employees. There are only a few documents that are secondary or aggregated data. These include some audit office documents, which are reports based on other municipal information, and lists of other documents such as motions. Finally, for the fourth characteristic timeliness, it was checked whether a timestamp was provided with the data files. All collected documents were provided with a timestamp, indicating that they are up-to-date. Additionally, other information that is provided for some document types such as letters and requests, is whether or not these have already been handled or answered. This shows that the municipality monitors timeliness.

4.1.4 Answer to the second sub-question

With the analysis of the characteristics of open data provision, the second sub-question: *What is the current state of open data provision by municipalities in Twente region?* can be answered. Nearly all municipalities in Twente region, 12 out of 14, provide open data in their own data repository. The data they provide are mostly documents related to municipal council meetings. These documents are not in a machine-readable format. Furthermore, the data is original and up-to-date. Due to the limited variety in data types and the non-transferable format of the data, it could be argued that while most municipalities have started to provide open data, this open data provision is still in the early stages. One of the purposes of open data is to be reused or linked to other data for applications. With the data currently provided, this is not possible. Therefore, open data has not reached its full potential yet.

4.2 Determinants of open data provision

In this section, the results regarding the determinants of open data provision are discussed. First, financial resources are reviewed in section 4.2.1. Then, section 4.2.2, examines government legislation and policy. Finally, the third sub-question is answered in section 4.2.3.

4.2.1 Financial resources

The financial reports of the municipalities gave insight into their financial situation. A complete overview of the coded financial data can be found in Table 18 in the appendix. The CRs of the municipalities are presented in Figure 2. This ratio is used as an indicator of liquidity. According to the Government of Western Australia (2013), the liquidity is good when the CR is higher than 1.00. This is depicted in the figure with an orange line. As shown in the figure, 13 out of the 14 municipalities have a CR higher than 1.00. Only Oldenzaal, with a CR of 0.81, has a lower ratio. Overall, it can be said that the liquidity of the municipalities in Twente region is good. Two municipalities even stand out with a very high ratio: Hellendoorn with a CR of 4.16, and Wierden with a CR of 4.50.

Figure 2

Current ratio of municipalities in Twente region
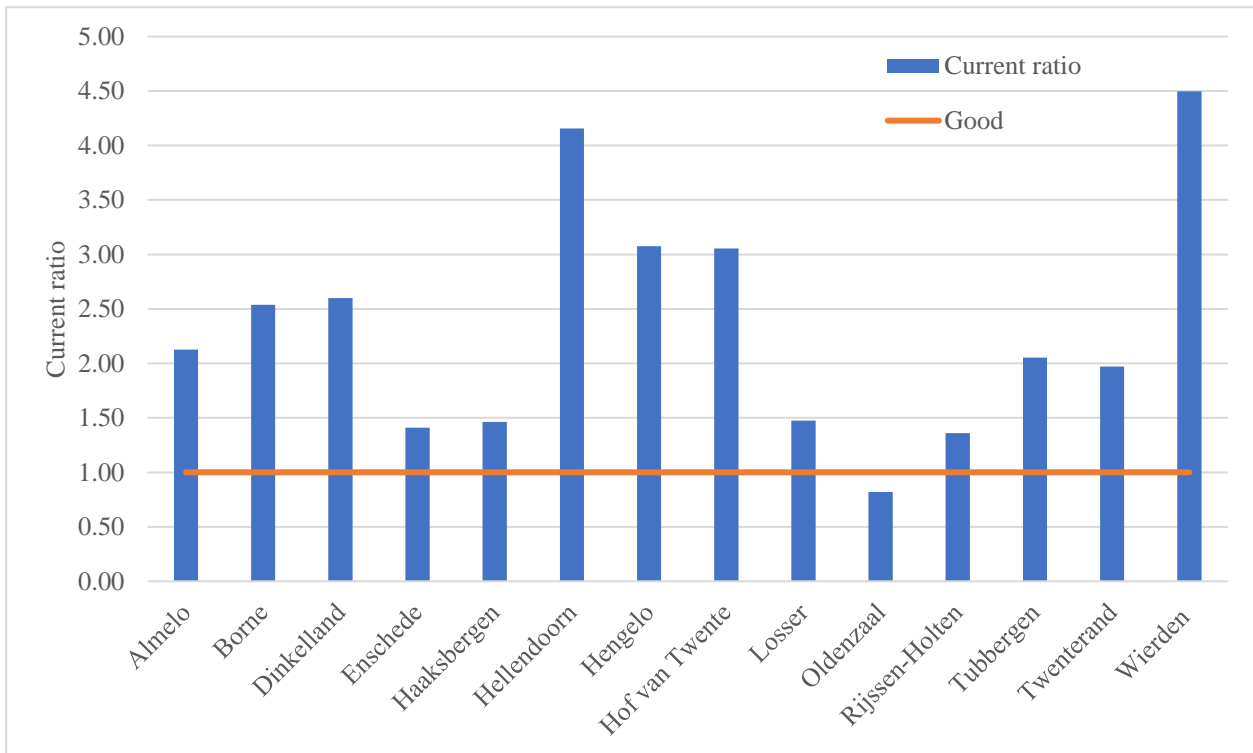
Note. The orange line depicts a good current ratio.

The DARs of the municipalities are displayed in Figure 3 below. This ratio is used as an indicator of solvency. A lower DAR indicates a better ability to repay debt, and therefore better solvency. What can be considered a good ratio depends on the organisations in the same field, but in general, a ratio of 0.3 is considered low (Business Development Bank of Canada, 2023). The orange line in the figure illustrates this. However, with the interpretation of the DAR, liquidity can also be considered. If an organisation has a high liquidity, it is less problematic to have a higher DAR (Business Development Bank of Canada, 2023). As visible in the figure, most of the municipalities have a DAR higher than 0.30. Tubbergen, with a DAR of 0.29, is the only one with a slightly low ratio. Almelo, Borne, Enschede, Haaksbergen, Hellendoorn and Hengelo have a somewhat high DAR. However, all of them have good liquidity, which offsets the financial risk.

Figure 3

Debt-to-asset ratio of municipalities in Twente region
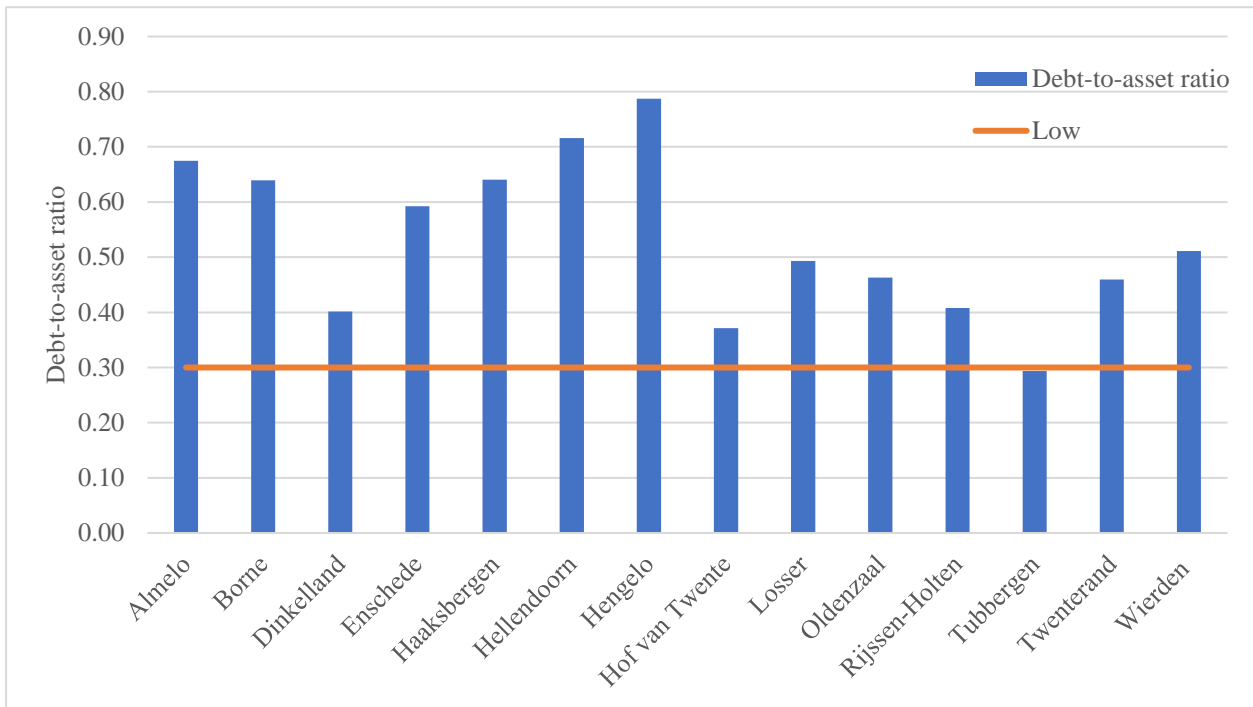
Note. The orange line illustrates a low debt-to-asset ratio.

The other aspect of financial resources that was analysed is specific open data investments. As Table 18 shows, only three out of 14 municipalities invested in open data: Almelo, Borne and Enschede. All three organisations allocate this expense as implementation of the Woo. Municipalities get a part of this budget from the national government.

4.2.2 Government legislation and policy

In the figure in the report of VNG (VNG, 2022, p. 30), there are many laws about data management in general. These were examined and researched to find out their relevance to open data as defined in chapter two. In the analysis, five laws were identified that directly impact open data provision. Of those, one law both requires and limits the provision of open data, one law requires the provision of open data, three laws limit the provision of open data. An overview of these laws and how they were coded during the analysis is given in Table 19 in the appendix. Now the laws will be discussed one by one.

First, the Woo, or open government act. The Woo is the main law that requires governments, including municipalities, to provide open data. It is active since May 2022 and replaces the older *Wet openbaar bestuur* (Wob). The Wob already required governments to provide open data passively, when requested. The difference with the new Woo is that governments now additionally have to provide open data actively, on their own initiative (Digitale Overheid, 2024). The basic principle is that data is open, unless there is a reason that it cannot be. The law lists categories of data that should be made publicly available, as well as providing guidelines for data management (Ministerie van Algemene Zaken, 2024). The Woo also limits open data provision. The law establishes a list of exceptions, data that should not be made public. Examples are information that could harm national security, certain confidential information and information that invades privacy. (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2023). Another law that requires passive open data provision is the *Wet hergebruik overheidsinformatie* (Who). It regulates requests for government information for reuse. The Who is the Dutch implementation of the European Union (EU) directive on open data (Ministerie van Algemene Zaken, 2021).

Then the laws that limit open data provision. One of them is the *Algemene verordening gegevensbescherming* (Avg). The Avg is the Dutch translation of the General Data Protection Regulation (GDPR) from the EU. Some specifics of the GDPR have to be legislated on a national level. In the Netherlands, this is done with the *Uitvoeringswet Avg* (Uavg). The Avg and Uavg protect the use of specific personal data by giving rights to people providing personal data and responsibilities to those who use it (Autoriteit Persoonsgegevens, n.d.). Certain data might not be allowed to be made open if it is protected under this law. Another law that limits open data provision in a similar way is the *Auteurswet*, the Dutch copyright law. The *Auteurswet* protects literary, scientific and art creations, and gives authors sole rights of publication of their work (Auteursrecht, n.d.). The final law that limits open data provision is the Data Governance Act (DGA), another EU law. It introduces rules about data governance, in order to make data sharing save. This is relevant for open data, because it includes rules about the reuse of government data. However, since the DGA is aimed mostly at national governments, the impact on decentral government is limited (Van Der Wal, n.d.).

4.2.3 Answer to the third sub-question

With the analysis of the determinants of open data provision, the third sub-question: *Which determinants of open data provision are present in municipalities in Twente region?* can be answered. Two possible determinants were assessed, financial resources and government legislation and policy. All in all, the municipalities in Twente region are in a good financial situation. The liquidity and solvency are good, which means that the municipalities are able to pay off both short-term and long-term debts. Out of the 14 municipalities, three allocate specific budget for open data provision in order to implement national legislation. When it comes to government legislation and policy, the analysis identified five laws that require or limit open data provision. Looking at Table 19, it may seem that there are many more limiting laws. However, some laws that limit open data provision, such as the *Auteurswet* and the DGA, have less impact than other laws that require open data provision, such as the Woo.

So are financial resources and government legislation and policy present as determinants? The literature indicates a possible causal relationship between these factors and open data provision. However, since this analysis does not study this causal relationship, it cannot be said definitively. What can be observed, is that while the financial situation of the municipalities is good, only few municipalities actually invest in open data. Additionally, the municipalities that do not provide open data do not seem to have a notably worse financial position than the ones that do. Therefore, the positive relationship that could be expected from the literature is not very apparent. So if financial resources is a determinant, it seems to be to a lesser extent than government legislation. One thing to note here is that because the financial reports used in this analysis were from 2022, it is possible that the current financial situation is different.

Contrary to financial resources, a connection between government legislation and open data provision is more visible. Not only does the legislation exist, it also seems to be the reason for municipalities to provide open data, specifically the Woo. There is no organisation specific policy, all municipalities refer to this law when they mention open data. In addition, the types of data that the municipalities publish corresponds with part of the requirements of the Woo. Moreover, the law went into effect in May 2022, which is only two years before this analysis. Since government organisations need a long time to adapt and implement policies, this could explain why the open data provision is still in an early stage. Taking these things into consideration, government legislation and policy is clearly present as a determinant in all municipalities in Twente region.

5. Conclusion

This chapter concludes the research done in this thesis. First, key insights from the analysis are summarised and used to answer the main research question. Next, the results are discussed, and suggestions for further research are given. The chapter ends with an explanation of the practical implications of this study.

To summarise, this thesis explored determinants of open data provision by performing a content analysis on the open data repositories of municipalities in Twente region. First, through a literature review, characteristics and possible determinants of open data provision were identified. These characteristics were then used to analyse the repositories, in order to assess the current state of open data provision. It was found that while 12 out of 14 municipalities have their own data repository, open data provision is still in the early stages, and reusable data is not provided yet. Next, two possible determinants were selected for the analysis: financial resources and government legislation and policy. For these two determinants, it was assessed whether they were present in the municipalities in Twente region.

The results of the analysis can now be used to answer the main research question: *What is the distribution of determinants of open data provision in municipalities in Twente region as of May 2024?* Both financial resources and government legislation and policy were present in the municipalities. Government legislation and policy was found to be present as a determinant of open data in all municipalities, mostly due to the Woo which is mentioned by the municipalities as the reason for providing open data. For financial resources, it is more difficult to say whether it is a determinant. At least it seems to be present to a lesser extent than government legislation. Because of this uncertainty, it is difficult to express the presence of the determinants in a distribution. A possible approach is to look at the municipalities Almelo, Borne and Enschede. Because these municipalities are the only ones that specifically invested in open data, it could be interpreted that for these municipalities, financial resources is more present as a determinant. This distribution of determinants is displayed in Table 21 below.

Table 21

Distribution of determinants of open data provision

	Almelo	Borne	Dinkelland	Enschede	Haaksbergen	Hellendoorn	Hengelo	Hof van Twente	Losser	Oldenzaal	Rijssen-Holten	Tubbergen	Wierden
Financial resources	X*	X*		X*									
Government legislation and policy	X	X	X	X	X	X	X	X	X	X	X	X	X

Note. The distribution of determinants of open data provision in municipalities in Twente region as of May 2024.

* Less certain.

This thesis adds to the state of the art by providing insights on open data provision. It identified characteristics and possible determinants of open data provision, as well as constructing a conceptual model combining them. Other researchers could use these characteristics as indicators of the open data provision of an organisation, and the determinants could be studied in a different organisational context as well. Another way this thesis adds to existing research is by filling a knowledge gap. Especially in the Netherlands, there has not been much research done about open data on a local level. As far as the researcher is aware, this is the first study that analyses Twente region specifically. Additionally, because the TOE framework is used, this research also adds to the literature on this framework, by providing an example of how the framework can be applied.

While the research design had its strengths, it also had its weaknesses. One weakness, as discussed earlier in section 3.4, was the limitation in research methods. Future studies could provide even more insight into open data provision by municipalities in Twente region, by using a different research method. For example, by gathering primary data through interviews or surveys, more determinants could be studied that were not analysed in this thesis. Furthermore, the open data provision at the time of research was found to be quite limited. Therefore, it might provide interesting results if a follow up to this study was done in a couple of years. Additionally, future researchers might use different operationalisations. For example, during the assessment of online

availability, it was observed that the repository of Rijssen-Holten did provided meta data, but still was very difficult to navigate and analyse. Perhaps there are better criteria for findability, such as the ability to filter, having a certain structure in the repository, or to display the amount of files.

The insights gained from the analysis have practical implications for the municipalities in Twente region, because they might help improve their open data provision. This study took the first step by creating awareness of the current state. The analysis provides multiple aspects of open data that could be addressed to improve the situation. For example, the location of the repositories could be increased by moving it to a more central location. This would first require the existence of such a data platform. Furthermore, the published data should have a more machine-readable format. This will enable reuse of the open data. Additionally, to make the open data provision more complete, the variety in open data should be increased. This means that more data should be provided from different policy domains. Moreover, it was observed that the Woo is the main determinant of open data provision in the analysed municipalities. If a municipality wants to further enhance its open data provision, it should consider going beyond the requirements of the law, and identifying additional data that could be made open. Ultimately, improving open data provision could increase transparency, strengthen democratic accountability and increase public engagement.

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Appendix

Table 1

List of data repositories

Municipality	Data repository
Almelo	Overzichten Almelo. (n.d.). https://almelo.bestuurlijkeinformatie.nl/Reports
Borne	Overzichten Borne. (n.d.). https://borne.bestuurlijkeinformatie.nl/Reports
Dinkelland	GemeenteOplossingen. (n.d.). Documenten. https://gemeenteraad.dinkelland.nl/documenten
Enschede	Overzichten Enschede. (n.d.). https://enschede.bestuurlijkeinformatie.nl/Reports
Haaksbergen	Dashboard Gemeente Haaksbergen. (n.d.). https://haaksbergen.raadsinformatie.nl/dashboard
Hellendoorn	Gemeente Hellendoorn. (n.d.). https://hellendoorn.notubiz.nl/
Hengelo	n/a
Hof van Twente	GemeenteOplossingen. (n.d.-b). Documenten. https://gemeenteraad.hofvantwente.nl/documenten
Losser	Overzichten losser. (n.d.). https://losser.bestuurlijkeinformatie.nl/Reports
Oldenzaal	Gemeente Oldenzaal. (n.d.). https://oldenzaal.raadsinformatie.nl/
Rijssen-Holten	Raad. (n.d.). https://raad.rijssen-holten.nl/vergaderstukken/overlegorgaan/raad
Tubbergen	GemeenteOplossingen. (n.d.-c). onderwerpen. https://bestuur.tubbergen.nl/onderwerpen
Twenterand	Overzichten twenterand. (n.d.). https://twenterand.bestuurlijkeinformatie.nl/Reports
Wierden	n/a

Table 2

List of financial data sources

Municipality	Financial data source
Almelo	Gemeente Almelo. (2023). Jaarverantwoording Gemeente Almelo 2022. In *almelo.jaarverslag-2022.nl*. https://almelo.jaarverslag-2022.nl/p15277/pdf-versie
Borne	Gemeente Borne. (2023). Jaarstukken Gemeente Borne 2022. In *borne.nl*. https://www.borne.nl/voorgaande-begrotingen-en-jaarrekening
Dinkelland	Gemeente Dinkelland. (n.d.). *Jaarstukken 2022*. https://dinkelland.begrotingsapp.nl/jaarstukken-2022
Enschede	Gemeente Enschede. (n.d.). *Gemeenterekening 2022*. https://documenten.enschede.nl/gr2022
Haaksbergen	Gemeente Haaksbergen. (2023). Gemeente Haaksbergen Jaarstukken 2022. In *haaksbergen.nl/gemeentebestuur/Beleidscyclus*. https://www.haaksbergen.nl/Docs/Bestuur/Financieel/Jaarstukken-2022.pdf
Hellendoorn	Gemeente Hellendoorn. (2023). Gemeenterekening 2022. In *hellendoorn.nl*. https://www.hellendoorn.nl/politiek-gemeente/publicatie/begroting-en-jaarrekening
Hengelo	Gemeente Hengelo. (2023). Gemeente Hengelo Jaarstukken 2022. In *jaarstukken.hengelo.nl*. https://jaarstukken.hengelo.nl/pdfondemand/printpdf?docId=194942
Hof van Twente	Gemeente Hof van Twente. (2023). Jaarrekening 2022. In *hofvantwente.nl*. https://www.hofvantwente.nl/fileadmin/files/hofvantwente/bestuur/Jaarstukken_2022/Jaarrekening_2022_definitief.pdf
Losser	Gemeente Losser. (n.d.). *Jaarstukken 2022*. https://documenten.losser.nl/jaarrekening2022
Oldenzaal	Gemeente Oldenzaal. (2023). Jaarstukken 2022. In *oldenzaal.nl/financien*. https://www.oldenzaal.nl/file/jaarstukken-2022
Rijssen-Holten	Gemeente Rijssen-Holten. (n.d.). *Jaarstukken 2022*. https://rijssen-holten.begrotingsapp.nl/jaarstukken-2022

Table 2 (continued)

Municipality	Financial data source
Tubbergen	Gemeente Tubbergen. (n.d.). *Jaarstukken 2022*. https://tubbergen.begrotingsapp.nl/jaarstukken-2022
Twenterand	Gemeente Twenterand. (n.d.). *Jaarstukken 2022*. https://twenterand.begrotingsapp.nl/jaarstukken-2022
Wierden	Gemeente Wierden. (2023). Jaarverslag en jaarrekening 2022. In *wierden.nl/financien*. https://cuatro.sim-cdn.nl/wierden/uploads/jaarverslag_en_jaarrekening_2022_0.pdf?cb=UTuZjqaB

Table 3

Operationalisation of the characteristics of open data provision

Characteristics of open data provision	Criteria	Operationalisation
Online availability	Location	1) own website 2) national platform 3) other
	Search function	0) absent, 1) present
	Metadata	0) absent, 1) present
Organisational policy	Organisation-specific policy on open data	0) absent, 1) present
Machine-readability	Data format	1) transferable data a. CSV, b. XLS, c. XML, d. XLSX, e. WMX, f. RDF, g. PRJ, h. SHP, i. SHX, j. JSON, k. CPG, l. GEOJSON 2) less transferable data a. ZIP, b. DBASE, c. WMTS, d. DBF, e. DAT, f. KML, g. KMZ, h. SBN

Table 3 (continued)

Characteristics of open data provision	Criteria	Operationalisation
Machine-readability	Data format	3) non-transferable data PDF 4) other data
Completeness	Policy domain	1) finance and economy 2) environment 3) health 4) energy 5) education 6) employment 7) transportation 8) infrastructure 9) population 10) elections 11) legislation 12) government plans and administrative documents 13) other
Originality	Primary	0) not primary, 1) primary
Timeliness	Timestamp	0) absent, 1) present

Table 4

Operationalisation of the determinants of open data provision

Determinants of open data provision	Criteria	Operationalisation
Financial resources	Financial situation	Liquidity: current ratio $= \dfrac{Liquid\ assets}{Short-term\ liabilities}$
		Solvency: debt-to-asset ratio $= \dfrac{Total\ liabilities}{Total\ assets}$
	Open data investments	0) absent, 1) present
Government legislation and policy	Legislation and policy that impact open data	1) Legislation and policy that requires open data provision 2) Legislation and policy that limits open data provision

Table 5

Coding of the general characteristics

Municipality	Data repository (see Table 1*)	Online availability			Organisational policy
		Location	Search function	Metadata	
Almelo		1	1	1	0
Borne		1	1	1	0
Dinkelland		1	1	1	0
Enschede		1	1	1	0
Haaksbergen		1	1	1	0
Hellendoorn		1	1	1	0
Hengelo		n/a	n/a	n/a	0
Hof van Twente		1	1	1	0
Losser		1	1	1	0
Oldenzaal		1	1	1	0
Rijssen-Holten		1	1	1	0
Tubbergen		1	1	1	0
Twenterand		1	1	1	0
Wierden		n/a	n/a	n/a	0

Note. An overview of general characteristics as they were coded during the collection and analysis.

* To save space, the repositories, which can be found in Table 1 above, are not repeated here.

Table 6

Coding of the data specific characteristics of Almelo

Data type (NL)	Data type (EN)	Amount	Data format	Data category	Policy domain (NL)	Policy domain (EN)	Primary	Up to date
Moties	Motions	139	pdf	3	Bestuur	12	1	1
Raadsbrieven	Letters to the council	1,207	pdf	3	Bestuur	12	1	1
Rekenkamer informatie	Audit office information	4	pdf	3	Bestuur	12	1	1
Rekenkamer rapporten	Audit office reports	46	pdf	3	Bestuur	12	0	1
Schriftelijke vragen	Written questions	655	pdf	3	Bestuur	12	1	1
Verbonden partijen	Connected parties	17	pdf	3	Financiën	1	1	1
Vergaderschema's gemeenteraad	Meeting schedules council	4	pdf	3	Bestuur	12	1	1
Organisatiegegevens	Organisational data	2	pdf	3	Bestuur	12	1	1
WOO informatieverzoeken	WOO* information requests	24	pdf	3	WOO verzoeken	13	1	1

* WOO is the 'Wet Open Overheid', a Dutch law. For more information, see section 4.2.2.

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Table 7

Coding of the data specific characteristics of Borne

Data type (NL)	Data type (EN)	Amount	Data format	Data category	Policy domain (NL)	Policy domain (EN)	Primary	Up to date
Besluitenlijst B&W	Decisions list mayor and aldermen	361	pdf	3	Bestuur	12	1	1
Besluitenlijst Raad	Decisions list council	111	pdf	3	Bestuur	12	1	1
Informatie aan de raad	Information for the council	761	pdf	3	Bestuur	12	1	1
Moties	Motions	120	pdf	3	Bestuur	12	1	1
Raadsvragen	Questions from the council	257	pdf	3	Bestuur	12	1	1
Rekenkamer	Audit office	22	pdf	3	Bestuur	12	0	1

Table 8

Coding of the data specific characteristics of Dinkelland

Data type (NL)	Data type (EN)	Amount	Data format	Data category	Policy domain (NL)	Policy domain (EN)	Primary	Up to date
Moties	Motions	177	pdf	3	Bestuur	12	1	1
Amendementen	Amendments	92	pdf	3	Bestuur	12	1	1
Open debatronde	Open debate round	12	pdf	3	Bestuur	12	1	1
Raadsbrieven	Letters to the council	1,023	pdf	3	Bestuur	12	1	1
Schriftelijke vragen	Written questions	241	pdf	3	Bestuur	12	1	1
Vragenhalfuur	Question round	98	pdf	3	Bestuur	12	1	1
Ingekomen stukken	Received documents	56	pdf	3	Bestuur	12	1	1
Bijlagen	Attachments	3,559	pdf	3	Bestuur	12	1	1

Table 9

Coding of the data specific characteristics of Enschede

Data type (NL)	Data type (EN)	Amount	Data format	Data category	Policy domain (NL)	Policy domain (EN)	Primary	Up to date
Ingekomen stukken	Received documents	103	pdf	3	Bestuur	12	1	1
Schriftelijke vragen	Written questions	74	pdf	3	Bestuur	12	1	1
Moties	Motions	507	pdf	3	Bestuur	12	1	1
Verslagen	Reports	900	pdf	3	Bestuur	12	1	1
Rekenkamer	Audit office	116	pdf	3	Bestuur	12	0	1

Table 10

Coding of the data specific characteristics of Haaksbergen

Data type (NL)	Data type (EN)	Amount	Data format	Data category	Policy domain (NL)	Policy domain (EN)	Primary	Up to date
Ingekomen stukken	Received documents	52	pdf	3	Bestuur	12	1	1
Moties en Amendementen	Motions and amendments	6	pdf	3	Bestuur	12	1	1
Schriftelijke vragen	Written questions	2	pdf	3	Bestuur	12	1	1

Table 11

Coding of the data specific characteristics of Hellendoorn

Data type (NL)	Data type (EN)	Amount	Data format	Data category	Policy domain (NL)	Policy domain (EN)	Primary	Up to date
Besluitenlijsten	Decisions list	16	pdf	3	Bestuur	12	1	1
Openbare notulen	Public minutes	3	pdf	3	Bestuur	12	1	1
Ingekomen stukken	Received documents	688	pdf	3	Bestuur	12	1	1
Moties en Amendementen	Motions and amendments	190	pdf	3	Bestuur	12	1	1
Raadsmededelingen	Council announcements	86	pdf	3	Bestuur	12	1	1
Raadsvoorstellen	Council proposals	267	pdf	3	Bestuur	12	1	1
Schriftelijke vragen	Written questions	64	pdf	3	Bestuur	12	1	1

Table 12

Coding of the data specific characteristics of Hof van Twente

Data type (NL)	Data type (EN)	Amount	Data format	Data category	Policy domain (NL)	Policy domain (EN)	Primary	Up to date
Moties	Motions	114	pdf	3	Bestuur	12	1	1
Schriftelijke vragen	Written questions	85	pdf	3	Bestuur	12	1	1

Table 12 (continued)

Data type (NL)	Data type (EN)	Amount	Data format	Data category	Policy domain (NL)	Policy domain (EN)	Primary	Up to date
Raadsbrieven	Letters to the council	204	pdf	3	Bestuur	12	1	1
Amendement	Amendments	33	pdf	3	Bestuur	12	1	1

Table 13

Coding of the data specific characteristics of Losser

Data type (NL)	Data type (EN)	Amount	Data format	Data category	Policy domain (NL)	Policy domain (EN)	Primary	Up to date
Artikel 39 vragen (schriftelijke vragen)	Written questions	100	pdf	3	Bestuur	12	1	1
Moties	Motions	237	pdf	3	Bestuur	12	1	1
Raadsinfo	Council information	937	pdf	3	Bestuur	12	1	1
Raadsplanning	Council planning	2	pdf	3	Bestuur	12	1	1
Rekenkamer	Audit office	14	pdf	3	Bestuur	12	0	1

Table 14

Coding of the data specific characteristics of Oldenzaal

Data type (NL)	Data type (EN)	Amount	Data format	Data category	Policy domain (NL)	Policy domain (EN)	Primary	Up to date
Bestuursdocumenten	Administrative documents	4	pdf	3	Bestuur	12	1	1
Ingekomen stukken	Received documents	112	pdf	3	Bestuur	12	1	1
Moties	Motions	48	pdf	3	Bestuur	12	1	1

Table 15

Coding of the data specific characteristics of Rijssen-Holten

Data type (NL)	Data type (EN)	Amount	Data format	Data category	Policy domain (NL)	Policy domain (EN)	Primary	Up to date
Schriftelijke vragen	Written questions	88	pdf	3	Bestuur	12	1	1
Moties	Motions	154	pdf	3	Bestuur	12	1	1
Amendementen	Amendments	113	pdf	3	Bestuur	12	1	1
Raadsbrieven	Letters to the council	35	pdf	3	Bestuur	12	1	1

Table 16

Coding of the data specific characteristics of Tubbergen

Data type (NL)	Data type (EN)	Amount	Data format	Data category	Policy domain (NL)	Policy domain (EN)	Primary	Up to date
Raadsbrieven	Letters to the council	454	pdf	3	Bestuur	12	1	1
Moties	Motions	87	pdf	3	Bestuur	12	1	1
Amendementen	Amendments	15	pdf	3	Bestuur	12	1	1
Schriftelijke vragen	Written questions	75	pdf	3	Bestuur	12	1	1
WOO documenten AZC Albergen*	WOO documents AZC Albergen*	915	pdf	3	WOO	13	1	1
Raadsbrieven	Letters to the council	454	pdf	3	Bestuur	12	1	1

* AZC Albergen is an asylum seeker center in the Dutch town Albergen. These are documents about a specific case.

Table 17

Coding of the data specific characteristics of Twenterand

Data type (NL)	Data type (EN)	Amount	Data format	Data category	Policy domain (NL)	Policy domain (EN)	Primary	Up to date
Amendementen	Amendments	4	pdf	3	Bestuur	12	1	1
Besluitenlijst B&W/Burgemeester	Decisions list mayor and aldermen	280	pdf	3	Bestuur	12	1	1
Besluitenlijst Raad	Decisions list council	84	pdf	3	Bestuur	12	1	1
Ingekomen stukken	Received documents	1,417	pdf	3	Bestuur	12	1	1
Lijst ingekomen stukken	List received documents	59	pdf	3	Bestuur	12	0	1
Lijst moties	List motions	48	pdf	3	Bestuur	12	0	1
Lijst toezeggingen	List commitments	48	pdf	3	Bestuur	12	0	1
Moties	Motions	347	pdf	3	Bestuur	12	1	1
Schriftelijke vragen	Written questions	226	pdf	3	Bestuur	12	1	1
Vergaderschema	Meeting schedule	1	pdf	3	Bestuur	12	1	1
Verslag debatten/hoorzitting	Report debates/hearings	86	pdf	3	Bestuur	12	1	1

Table 18

Coding of the determinant financial resources

Municipality	Liquidity			Solvency			Open data investments (€)
	Liquid assets*	Short-term liabilities*	Current ratio	Total liabilities*	Total assets*	Debt-to-asset ratio	
Almelo	93,627	44,037	2.13	235,013	348,369	0.67	154,000
Borne	57,381	22,603	2.54	81,092	126,828	0.64	25,000
Dinkelland	27,111	10,431	2.60	36,033	89,726	0.40	n/a
Enschede	198,680	140,984	1.41	386,399	652,164	0.59	200,000
Haaksbergen	22,184	15,171	1.46	47,804	74,652	0.64	n/a
Hellendoorn	55,358	13,320	4.16	127,764	178,415	0.72	n/a
Hengelo	194,446	63,259	3.07	589,532	748,738	0.79	n/a
Hof van Twente	35,473	11,611	3.06	60,274	162,193	0.37	n/a
Losser	14,273	9,688	1.47	42,273	85,762	0.49	n/a
Oldenzaal	19,980	24,349	0.82	51,369	110,987	0.46	n/a
Rijssen-Holten	21,737	15,987	1.36	62,395	153,051	0.41	n/a
Tubbergen	13,224	6,437	2.05	14,229	48,497	0.29	n/a
Twenterand	30,851	15,643	1.97	55,565	120,962	0.46	n/a
Wierden	38,630	8,588	4.50	42,493	83,103	0.51	n/a

Note. An overview of financial data as they were coded during the collection and analysis.

* Amounts x€1000.

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Table 19

Coding of the determinant government legislation and policy

Legislation/policy	Requires open data provision	Limits open data provision
Algemene verordening gegevensbescherming (Avg) and Uitvoeringswet Avg		X
Auteurswet		X
Data Governance Act		X
Wet hergebruik overheidsinformatie	X	
Wet open overheid	X	X

Note. An overview of identified legislation and policy as they were coded during the collection and analysis.