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Different shades of perception: How do public managers comprehend the re-use potential of open government data?

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Completed Research Paper

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Abstract

Open government data (OGD) initiatives have become an important part of digital transformation strategies and a means for supporting digital entrepreneurship. However, several studies have shown that OGD is experiencing major barriers or even a standstill in certain countries. Little is known about what public managers think of OGD and what uses they ascribe to it. Accordingly, our paper tries to shed some light on the cognitive structures of public managers. Using the RepGrid technique as empirical method and affordance theory as theoretical grounding, our study explores how public managers working in different branches and levels of government interpret and make sense of OGD. Our findings allow for a better understanding of how managers comprehend OGD as concept and to what extent they share the same vision regarding how to re-use OGD in different application domains.

Keywords: Open government data, affordance theory, RepGrid, public manager

Introduction

Democracy is based on the premise that elected governments provide transparent information about their intended and actual implementation of laws and public policies as well as their use of public resources (Ruijer et al. 2017). Nevertheless, in many countries government data has only been accessible for a limited group of consignees, such as think tanks or lobbyists, while most of the citizens and businesses have to undergo a lengthy application process or are completely cut off from accessing information online (Peled 2011). With the Open Internet movement gaining a certain level of media attention (Financial Times 2020), along with an emerging rise of anti-government sentiments, many democratic countries have started to implement Open Government Data (OGD) initiatives in the last 15 years with the objective to increase transparency and trust between citizens and their governments (Lv and Ma 2019). However, the global economic crisis had a fair share in changing the direction of OGD, from being an instrument for promoting good governance, counteract corruption (Bertot et al. 2010), or empower citizen participation (Lee and Kwak 2012), to being an enabler for data-intensive business ventures or as a source for reducing government spending. For many governments, OGD initiatives have therefore become an important part of their digital transformation strategies and efforts for establishing digital entrepreneurship in the respective country (Ubaldi 2013). However, to date, very few initiatives pushed by governments demonstrate promising results (Danneels et al. 2017; Martin 2014). To address this mismatch between objectives and results, several hypotheses have been considered. Many authors argued that governments, seeing their OGD environment evolving (i.e. including more resources, systems and actors), were face to unprecedented technical and organizational challenges (Bakıcı et al. 2013; Corbett et al. 2018; Cranefield et al. 2014). A plethora of studies have therefore focused on mechanisms and actors that explain barriers and challenges of OGD initiatives (Harrison et al. 2012; Heimstädt et al. 2014; Parycek et al. 2014; Van Schalkwyk et al. 2016; Zuiderwijk et al. 2014). Among the assumptions presented in these studies, Wang and Shepherd (2020) emphasized accessibility as most prominent issue and noticed that only a small minority of government data appears to be really open. They described the current OGD as "*a swamp of non-granular, unstructured, aged and frequently inaccessible*". Sandoval-Almazán et al. (2017) presumed that government transformation through digital government builds on organizational efforts and accentuates individuals' issues. Many authors also suggested that OGD initiatives, in order to be successful, should center more on ecosystems and relations developed between OGD intermediaries and their environment (Chan 2013; Corbett et al. 2018; Gonzalez-Zapata and Heeks 2015; Sandoval-Almazán et al. 2017; Young and Yan 2017).

However, to our knowledge, few authors concentrate on the people at grassroot of data opening - public managers. As responsible for OGD implementation in their department, organization, or even nationally, public managers have a key role in aligning the strategic goals of institutions with national or international OGD policies (Lee and Kwak 2012). According to Whitley and Hosein (2008) managers' attitudes and perceptions towards technologies may not only impact policies but also results of policy decisions. Attard et al. (2015) and Yang et al. (2015) share the same idea and noticed that cognition and perception of public managers towards OGD implantation crucially determines the strategic direction and impact of an organization. Indeed, cognition – as the human capacity to perceive, interpret, and reason about environmental - is connected to humans actions (Carayannis et al. 2003; Hardless et al. 2015). However, with the increase of OGD initiatives, government agencies (as main publishers of data) and their managers are under pressure, which may affect their perceptions and reactions. In order that OGD is re-used, it has to be released in a timely and machine-readable manner but also follow strict de-identification rules to avoid data disclosure risks, which asks extra-effort and increased work-load from public managers. Furthermore, data publication is often unrewarding, costly, and not providing any credit or acknowledgments to the ones who have made an effort (Fane et al. 2019). In the light of the above, we argue that it is important to investigate public managers because their perception of OGD concept and its potential re-use, may influence public managers behavior (European Commission 2020) and lead them to take decision on the basis of personal gain and non-objective selection criteria. Public managers' perception - as they may directly (or unconsciously) influence the realization of an OGD initiative - could not only affect public institutions' transparency and governance but also individuals' privacy, data protection and contribute to increase what Taylor (2017) call dataveillance (Paspatis et al. 2017; Taylor 2017).

Comprehending perceptions as possible accelerators (or decelerators) of actions, we hence seek to investigate the following research question: *how do public managers perceive the re-use potential of OGD?*

To answer this research question, we take an affordance theory perspective and use the repertory grid technique for systematically exploring the perceptions of public managers.

Our findings allow for a better understanding of how managers comprehend the OGD concept and to what extent managers share the same view regarding characteristics needed to actualize the potential of OGD re-use. Our results show how the *Repertory Grid* technique can be used for capturing the underlying mechanisms of perception. We conclude by offering some suggestions as how governments may use this technique in order to develop their OGD initiatives or align their strategies. Our study is structured as follows: We start with a brief introduction to OGD and affordance theory. We then explain our research design and data collection and analysis, before we explain the most prominent thought patterns (i.e. constructs) of public managers. We finish by a discussion of our results and offer suggestions for future work.

Background

On open government, open data, and government data

The idea of OGD finds its origin in the concept of data-driven innovation. Almost all governments world-wide produce and collect data in their daily activities given the strategic relevance of data as resource (Bates 2014; Munné 2016). In order to get benefits from data as a resource, open strategies emerged and among them the idea to share access to government data (Attard et al. 2015; Kalampokis et al. 2011). For Gonzalez-Zapata and Heeks (2015) three concepts need to be disentangled: open government, open data, and government data. The concept of *open government* is based on the idea that governments should increase their transparency by providing more information to citizen and businesses about public activities. In doing so, a government is supposed to strengthen citizen engagement and participation, but also enhance the collaborative efforts between all the actors (i.e. across government's agencies, profit and non-profit organizations) (Wirtz and Birkmeyer 2015). *Open data* is based on the principles of free accessibility, reusability and data sharing, by anyone, for any purposes, and without any legal, technological, or social constraints (Open Knowledge Fundation 2018). Open data as concept aims to facilitate information diffusion, innovation and economic growth (Braunschweig et al. 2012). Different from open data which origin goes back to the digital era (Conradie and Choenni 2012), *government data* is a fairly old concept and exists since (national) governments have been founded. It simply refers to any data that is produced or gathered by public organizations (Ubaldi 2013). OGD is the interrelationship of those three concepts. It is data collected and held by a government and its agencies, shared and made freely available to anyone in order to pursue open government objectives. The value of OGD rests therefore on *universal access and universal participation – without strings attached.*

To guarantee such "universal conditions", publishers are facing important challenges. Crusoe and Melin (2018) identified technical, legal and organizational barriers as the main issues to the publication of OGD. The quality and the format of data seems to cause the main technical troubles. Given the numerous activities of a government, data may originate from different branches of government and be of geospatial, statistical, financial, or political nature (among others) and consequently stored in various (proprietary and non-proprietary) formats. However, to be considered as truly "open", these data sets (and corresponding meta data) should be made available in a machine-readable, non-proprietary way, which frequently requires an additional complex and time-consuming transformation. The complexity of this task might demotivate publishers to make OGD accessible (Albano and Reinhard 2014). Furthermore, Crusoe and Melin (2018), argued that this apparent complexity might be reinforced by a lack of knowledge regarding OGD publication. Defining general rules or guidelines to motivate data sharing are often not helpful as the context and aggregation level of data may vastly differ. Yet, from a legal perspective, a public manager needs to comprehend the consequences (and subtilties) of publishing organization-level data, like department expenditure, train timetables, topographic information, or individual-level data, such as the financial situation, health status of a citizen. Not being able to judge the boundaries of privacy and (state) secrecy vs. transparency reinforces the mentioned complexity and is one of the major inhibitors of OGD publication today (Huang et al. 2017). According to Susha et al. (2015) convincing data owners to actually publish data is a key challenge. Wirtz et al. (2016) share this observation and put forward that a risked-based attitude of public servants paired with (technical) complexity of publishing OGD are major threats to open government endeavors.

On affordance theory and its application to open government data

Although legal and technical factors already limit the success of OGD initiatives (Dulong de Rosnay and Janssen 2014), further research showed that cognition also shapes the implementation process and data publication (Safarov 2019). Many authors focused their attention on the impacts of psychological and observable characteristics of managers, such as mental models or attitudes towards organizational projects (Hambrick 2007; Hodgkinson and Sparrow 2002). Jelinek and Litterer (1994) and Schwenk (1988), among others, indicated that cognition of top managers crucially determines the strategic direction of organizations and consequently the realization and implementation of initiatives. Carpenter et al. (2004) and Hambrick (2007), asserted that top managers' interpretation of contextual information influences their organizational strategic choices. These observations are in line with Gibson's *affordance theory*. According to Gibson (1966), it is the perception about the environment which leads to some *course of action*. While the original theory defines affordance as "action possibilities" that emerge from the relation between an animal and its environment (Gibson 1986), the concept of *affordance* has been used in the IS field to identify and analyze mechanisms that underlie the relationship between an IT artefact and organizational systems (Majchrzak and Markus 2012; Volkoff and Strong 2013). The theory has been popularized because it stipulates that the actualization of affordances does not only depend on artifact properties (i.e. in our case OGD properties) but also on the properties of actors and their environment (i.e. properties of OGD publishers). Therefore, the affordance effects are jointly determined by the OGD characteristics as well as by the capabilities of the OGD publishers, i.e. their faculty to perceive the OGD re-use potential, their ability to reflect upon it and to act accordingly (i.e. actualize an affordance). To highlight the importance of the role of perception on the affordance actualization, Pozzi et al. (2014) developed a theoretical framework based on four steps (cognition, perception, actualization, effects). First, they argued that the idea of affordance existence (i.e. the idea of a potential action) is based on a cognitive process, which means that to exist, an actor and an environment must be aware of the affordance may occur. Second, an affordance needs to be perceived by actors, i.e. an actor must be aware of the affordance opportunities. Third, an actor needs to adopt his behavior according to the perceived opportunities in order to finally take actions which produce effects of the perception.

We share the same view and see affordances to be relative and reliant to human perception. This, however, means that while public managers may share similar public values or act in a similar fashion, they must not see the world in the same way. The Repertory Grid Technique (RGT or RepGrid) provides information on how people perceive the world. Consequently, to propose improvements in the OGD implementation and propose ways for solving publications issues, we used the Repertory Grid Technique (or RepGrid).

Research Method

Repertory Grid Technique

Originally from Kelly's Personal Construct Theory (i.e. the psychological study of personality), RepGrid is a technique for studying cognition structures and for showing how individuals perceive a given topic, how they construe it and represent it (Kelly 2003; Oppenheim et al. 2003; Wagner et al. 2015). Even though not very prominent in the IS research field, it has been applied in some studies in the past years (Almusharraf et al. 2015). For example, it has been used for studying IS professionals' perception on important characteristics of good team members (Siau et al. 2010) or explorations on systems analysts qualities (Hunter 1997), to mention just a few examples.

The technique involves the construction of a personal grid (i.e. representation of a mental model), composed of *elements* and *constructs*. Elements represent the objects of attention for an investigated topic. They may be people, things or events (Jankowicz 2005; Siau et al. 2010). They are abstracted from the context of the investigation and can be interpreted as representations of the topic studied (Fransella et al. 2004). For instance, Siau et al. (2010) used team members as elements. Although elements are crucial, constructs are the central notion of RepGrid. Constructs are elicited during a semi-structured interview and define how individuals perceive the contents or characteristics which they attribute to the elements (Fransella et al. 2004). A construct seeks to express a contrast and is by nature always composed of two poles (Tan and Gallupe 2006). For Oppenheim et al. (2003), the only way to understand what means "good" for individuals is to understand what means "bad". In that case, "good" represents the emergent pole, "bad"

represents the implicit pole of the construct. Following the example given by Siau et al. (2010), poles of a construct are the characteristics perceived as important to be a good team member (e.g. leader, honest, good communication skills). "*Leader* versus *follower*", "*positive general attitude* versus *negative general attitude"* or "*honest* versus *dishonest*" are examples of 3 constructs built by Siau et al. (2010) during semi-structured interviews.

As pointed out by Pozzi in the affordance theory, the cognition (i.e. affordance existence) and recognition process (i.e. affordance perception) of "potentials actions" are essential so that the actualization produces effects (outcomes). In our study, we have opted for RepGrid because we wanted to understand better the cognition and recognition process of public managers regarding the potential re-use of OGD. By focusing on how individuals perceive, interpret and reason about their environment, RepGrid is a powerful technique to better understand how (and if) they see potentials of OGD re-use.

Data Collection

The sample for our RepGrid study comprises 18 public managers, stemming from different branches (and levels) of Swiss government, including IT, Culture, Education, Justice department or Social affairs. A purposive sampling strategy was chosen to recruit the respondents that were all following a certificate of advance studies in Digital Government. The target audience consist of managers in public organizations from federal, cantonal and communal level as well as not-for-profit enterprises who are responsible for or are engaging in public digitalization projects. The subsequent data collection followed the guidelines proposed by Fransella et al. (2004), Jankowicz (2005) and Tan and Hunter (2002) and consisted of three steps.

Step 1 - Definition of elements

We started with a focus group discussion in order to define the RepGrid elements. The moderation of the focus group discussion was led by one researcher, while another researcher was taking observational notes. As suggested by Tan and Hunter (2002), we started the focus group by first explaining the RepGrid technique and our overall goal of this study. The discussion then went straight to the heart of the matter when we asked public managers to think about the question: *what could be application domains of open government data?* To encourage the exchange of reflection and avoid redundancy, we created three sub-groups of four persons, respectively two sub-groups of three persons. After a short time for reflection, we then asked public managers to write on cards five or six application domains of OGD per group. All ideas proposed by the groups were posted on a whiteboard. After an extensive discussion, we selected the most representative applications by first eliminating the applications which were off-topic. Then, we grouped the redundant ones, and finally, the participants voted for the nine most important application domains according their personal experience. This consensus process yielded a list of the following OGD domains: *traffic control, natural disasters management, job creation, public protection, standards and certificates, academic research promotion, fiscal optimization, heritage sites conservation* and *infrastructure resources management.*

Step 2 - Elicitation of constructs

After having identified nine elements, the next step consisted of eliciting the *personal constructs* of each participant. There are different ways how to elicit constructs. We followed the suggestions by Tan and Gallupe (2006) and used the triadic procedure (i.e. triples of elements). The idea through this procedure is to highlight a similitude between two of the three elements by opposing them to the third. In doing so, managers express the emergent pole and the implicit pole of the construct. To achieve the triadic procedure, public managers were separated into two groups, one group of nine managers played the role of interviewers, the other nine managers played the role of interviewees. First, each interviewer wrote nine elements on cards, one per card. Then, the interviewers randomly picked three cards and propose them to the interviewees. At that moment, the interviewers asked the interviewees to describe how two of the three elements were similar, yet different from the third. Once the interviewees abstracted one construct from the proposed triad, the interviewers shuffled and exchanged cards for the following iteration. The interviewers continued the triadic procedure until the interviewees could not find any new constructs. The total constructs of an interviewee represent a personal Repertory Grid. For that study, we asked each interviewee to get between eight and twelve constructs each. Then, after each of the nine interviewees had

built his or her personal RepGrid, we asked managers to reverse role-playing. Thus, for the second round of constructs elicitation, interviewers became interviewees and vice versa. To avoid the same answers between the interviewer-interviewee group, we also asked them to change their partner during the second round of constructs elicitation. One construct elicitation round usually lasted about one hour. During that part of the experiment, we moved from group to group, to follow discussions, observe reactions and take notes.

Step 3 - The scoring process

After managers had played the two roles – interviewee and interviewer –each of the 18 public managers had his or her own grid, ready for scoring the potentials of OGD re-use. At this point, each participant's grid was composed of the nine OGD domains which was defined during the focus group, and a set of at least eight personal constructs. To finalize the repertory grid, we asked managers to score each OGD re-use potential on each construct. The scoring process aims to position elements along with each construct to compare elements between each other. We used a five-point scale with 1 meaning that public managers perceive the potential of OGD re-use according to the characteristic of *the emergent pole*. On the contrary, a score of 5 means that public managers perceive the potential of OGD re-use according to the characteristic of *the implicit pole*. For example, if a manager addresses a score of 2 to the OGD re-use potential *job creation* for a construct composed of *individual* (as the emergent pole) and *group* (as the implicit pole), that means the managers perceive the affordance *job creation* according to *individual* characteristics. On the contrary, if the manager addresses a score of 5, that means the managers perceive *job creation* according to *group* characteristics. Once scored, the entirety of personal grids can be analyzed in order to explore how managers perceive the potentials of OGD re-use and to better understand characteristics that they conceive to actualize OGD re-use potentials.

Data Analysis

We used a combination of different data analyses techniques associated with RepGrid to investigate public managers' views regarding the potentials of OGD re-use. A first analysis was to identify common themes across managers' constructs. For that purpose, we applied a content analysis (CA) procedure, as described by Jankowicz (2005), for the purpose of pooling and categorizing participants' constructs regarding their similarities. We realized the CA in three steps. First, we cleaned constructs and removed those that were unusable (i.e. illegible handwriting, elicitation guidelines not respected, etc.). In the second stage, we first focused on identical constructs (i.e. constructs with the same emergent and implicit pole) such as *individual-group* or *public-private* and grouped them under the same dimension (e.g. group vs. individual). We then concentrated on constructs that were not identical but that had very close poles (e.g. *individual-group* vs. *individual-collective*) and allocated them to existing dimension. We continued this process until all of the constructs have been categorized, creating sometimes new dimensions. As recommended by Jankowicz (2005), we grouped the unclassifiable constructs under the "miscellaneous" dimension. Finally, to avoid subjectivity in the choice of dimensions, Jankowicz (2005) recommend a *reliability check*. It requires that two researchers perform the CA independently. Accordingly, we realized the CA (i.e. the moderator and the observer) in parallel, without any dialogue. After some deliberations, we compared our results and agreed on the choice of dimensions. Dimensions are combinations of managers' view of the OGD re-use potentials. They highlight public managers' reflections on the actualization of the OGD re-use potentials. They can be understood as the necessary *characteristics* to actualize the potentials of OGD re-use.

To facilitate the qualitative interpretation of the results, we used the Principal Component Analysis (PCA). The objective of the PCA is to observe relations between and among elements and constructs. To go further and identify *whether public managers share the same view regarding how the potentials of OGD re-use should be actualized*, we created new grids (i.e. dimension grids), one for each dimension. The *dimension grids* were composed of elements elicited during the focus group as well as constructs that composed the dimension (e.g. for the combined grid *group vs. individual*, we included the construct *individual-group, individual-collective). These grids regroup managers' reflections on the actualization of the OGD re-use potential and facilitate the visualization of common viewpoints.* According to Jankowicz (2005), only grids that possess at least six elements and six constructs should be analyzed with PCA. We present the results of four grids in the next section. We use for that purpose the

package "openrepgrid" available on RStudio. We used the bertinCluster function for extracting different clusters and subsequently conducted the PCA using the biplot function.

A particular interest was placed on the result regarding (1) the distribution of the constructs, (2) the distribution of the elements and (3) on the length of constructs. The distribution of the constructs shows the correlation between constructs, i.e. *to what extent managers share the same view regarding characteristics needed to actualize the potential of OGD re-use*. Following Jankowicz (2005), the proximity of the constructs (i.e. the presence groups) could be interpreted differently according to analysts (i.e. psychologist, researcher, or manager). However, in this study, a group of constructs means that public managers scored similarly the potentials of OGD re-use. This implies that they share similar views regarding characteristics needed to actualize the potential of OGD re-use. Distinct groups may have different points of view concerning characteristics to apply, which may imply different ideas regarding the rules for publishing OGD. We also focused on the distribution of elements to explore which OGD re-use potentials present the highest variability (i.e. where public managers have different views regarding how to actualize the potential of OGD re-use). The closer the elements are to the horizontal axis, the less variability there is in the rates assigned to the elements and the more managers share the same view regarding the actualization. Finally, by studying the length of constructs, we explored *to what extent the characteristics to actualize the potential of OGD re-use may vary according to the OGD re-use potential.* In doing so, we were able to provide information on how managers comprehend the OGD concept. We sought to understand to what extent public managers may adapt OGD publication rules according to the OGD re-use potential. The greater the length of the construct, the more variable the scores assigned to the OGD re-use potentials and the more the characteristics to actualize the potentials of OGD re-use depends on the OGD re-use potential. This implies that each of the OGD re-use potentials is envisaged with its own characteristics of actualization and with its own publication rules. On the other hand, the shorter the construct, the less variability and the less characteristics to actualize the potentials of OGD re-use depend on the OGD re-use potential itself (i.e. independently of the OGD re-use potentials, publication rules tend to always be the same).

Results

Structuring and limiting the re-use potential of OGD

We applied CA on the 18 personal grids. With, on average nine constructs per grid, public managers elicited a total of 120 constructs. Most of these constructs were clear, comprehensive and consistent with our instructions. We only removed 11 constructs from the analysis when their poles did not express contrast (i.e. good vs. bad). A significant part of the constructs was similar, meaning that the emergent implicit poles were identical. This was the case for constructs such as *proactive-reactive*, *individual-group*, *tangible-intangible*, *past-future,* among others. In some cases, the words that managers used for expressing a pole were not exactly identic but belonged to the same family or were semantically similar (e.g. *constraint-free* or *constraint-freedom*). Given the similarities in the proposed constructs, we agreed on four dimensions (i.e. characteristics perceived by public managers to actualize the potentials of OGD re-use) – *group vs. individual behavior, affordance vs. constraint, utilitarian vs. non-utilitarian effect* and *active vs. passive actualization*. Definitions of dimensions and examples of constructs used are presented in Table 1.

Dimension	Definition	Exemplary constructs
Group vs. individual behavior	This dimension expresses the extent to which the actualization of OGD re-use potentials should be taken by an individual person or a group.	Individual – group, individual – collectivism
Openness vs. constraints	This dimension expresses the extent to which the actualization of OGD re-use potentials depends on a balance between constrains and complete openness.	regulated –liberalized, protection – amelioration, accessible – controlled

Utilitarian vs. non-utilitarian effects	This dimension expresses the extent to which the effects of actualizing the OGD re-use potential has rather a utilitarian or non-utilitarian effect.	Economical – environment, economic – social,
Active vs. passive actualization	This dimension expresses the extent to which the actualization of OGD re-use potential should be embrace by government agencies.	Proactive – reactive, anticipation – correction, innovation - conservation

Table 1. Definition of dimensions

Different perceptions on OGD re-use potential

As mentioned above, the results from the PCA allow us to draw various conclusions. Using the previous dimensions, next we discuss how public managers perceive the re-use potential of OGD. In the interest of clarity, we would like to underline that the figures presented below highlight three important shades of perception: to what extent managers share the same view regarding OGD re-use, where their views differ (i.e. in which application domains) and to what extent personal point of view regarding the actualization of the potential of OGD re-use may vary according to potential applications.

Dimension 1: Group vs. Individual behavior

The first dimension is relative to the users and their behaviors to actualize the potential of OGD re-use. It expresses the extent to which the actualization of OGD re-use potentials should be taken by an individual user (with non-profit intention) or a group (with profit intention). Owing to the numerous repetitions of the constructs – individuals vs. groups -, public managers seem to assign importance to the user profile (i.e. individual vs. group) and its behavior (i.e. commercial vs. non-commercial purposes) regarding the actualization of the potential re-use of OGD.

In Figure 1, the distribution of the constructs provides information to what extent public managers have similar perceptions regarding who should actualize the OGD re-use potentials. We differentiate four groups of public managers. The first cluster is composed of managers 11, 12, 14, 16 and 17 and the second includes managers number 7, 8, 10, 13 and 15. The third and fourth clusters only group few managers (i.e. two managers for cluster three, whereas manager number 4 shapes the last group). Clusters of constructs show that there are few variabilities in the rating among managers of the same cluster, which implies that managers of the same cluster assign same scores to the OGD re-use potentials. Consequently, they tend to share the same view regarding who should actualize the potentials of OGD re-use. It is interesting to mention that although managers may be subject to a different cluster, apart for the manager 16, they tend to all believe that a group with profit intentions should actualize applications such as *traffic control*, *natural disasters management* and *infrastructure resources management*. Managers also seem to agree on the fact that individuals with non-profit intentions should actualize *fiscal optimization* and *job creation*. Surprisingly, only manager number 16 seems to have a distinct view on this.

All managers seem to share a similar perception who (individuals or a group) should be concerned with harnessing the potentials of *job creation, fiscal optimization, traffic control, natural disasters reduction and natural resources management*. However, a large proportion of managers does not seem to agree on which users will profit from the actualization of the OGD re-use potentials. The potentials of OGD re-use are closer to the vertical ends, which represents an increase in the variability of the scores. This means that managers share different views regarding which users should actualize *public protection*, *standards and certificates* as well as *academic research promotion* and *heritage site conservation*.

Apparent from Figure 1 is that the length of constructs appears very similar and relatively long, expect for managers 10 and 16. The length of a construct reflects the personal perception of a manager regarding the actualization of the nine potentials OGD re-use. The greater the length of the construct, the more variable the score assigned to the OGD re-use potentials and the more the manager's perception will be influenced by the user who will actualize the potentials of OGD re-use. Consequently, according to the potential OGD

re-use, managers will not have the same expectation regarding the actualization, which may influence them on how to publish OGD.

Figure 1. Group vs. individual behavior
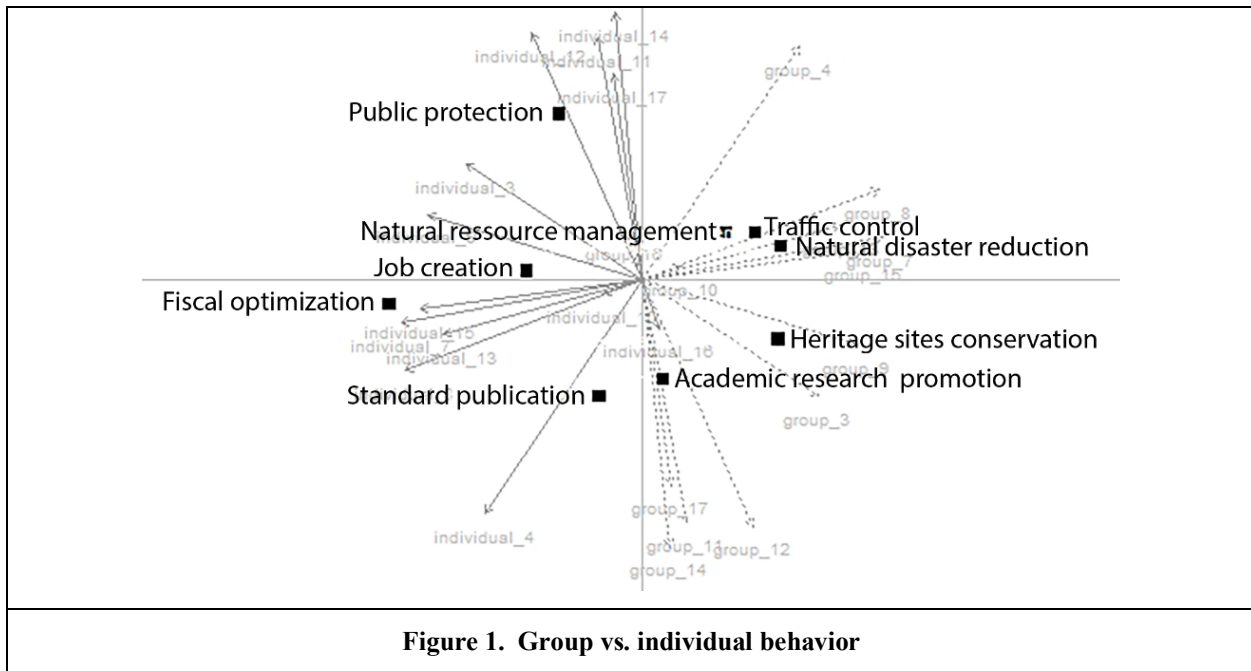
Dimension 2: Openness vs. Constraints

During the focus group discussion, public managers asked many questions about legal issues, such as data ownership, responsibility, and risks associated with the publication of data. We argue that constructs used by public managers such as *regulated – liberalized* or *accessible – controlled*, reflects those legal concerns. Thus, we define the openness vs. constraints dimension as follows: *it expresses the extent to which the actualization of OGD re-use potentials should be constrained or completely open*. This dimension hence describes the openness level that should be attached to the actualization.

The shape of the constructs distribution of Figure 2 is similar to Figure 1. We identified three clusters of managers. This means managers from each cluster seems to share a similar vision regarding the level of openness that should be attached to actualize the potential of OGD re-use. By being closer from each other, the three managers' clusters tend to share the same vision regarding the level of openness to applying for *standards and certificates* and *job creation*. The first group is composed of managers 10, 11 and 16, group two is composed of managers 12 and 15, and managers 4 and 17 form the third group. Although most of the managers agree on the constraints that should be implemented to actualize *standards and certificates* and *job creation*, the distribution of the remaining affordances shows that managers tend to share different views regarding the level of openness that should be attached to the OGD re-use potentials. The score variability is more important for *infrastructure resource management*, *heritage site conservation*, and *traffic control*. This means that some managers think that the actualization of the OGD re-use potentials should be controlled, while others think the opposite. For instance, managers 1 perceives *fiscal optimization*, *heritage sites conservation* and *infrastructure resources management* as OGD re-use potentials that require less restrictions, while manager 2 thinks they need to be more controlled. Despite this, we notice that public managers tend to favor control over unrestricted re-use of OGD, which is in line with previous research we discussed in the background section.

Similar to our observations of the previous dimension, we also see in Figure 2 that constructs tend to be relatively long. Public managers do not apprehend the actualization and publication of OGD with the same openness level. While one manager may expect a low level of constraint for *job creation,* the same manager

prefers a higher degree of openness for *natural disaster management*. Figure 2 shows that the degree of constraint or openness perceived by public managers seems depends on the potential of OGD re-use. For instance, for OGD re-use potentials generating privacy risks, public managers might apply binding licenses, such as non-commercial data use, which may impede the universal participation concept of OGD.
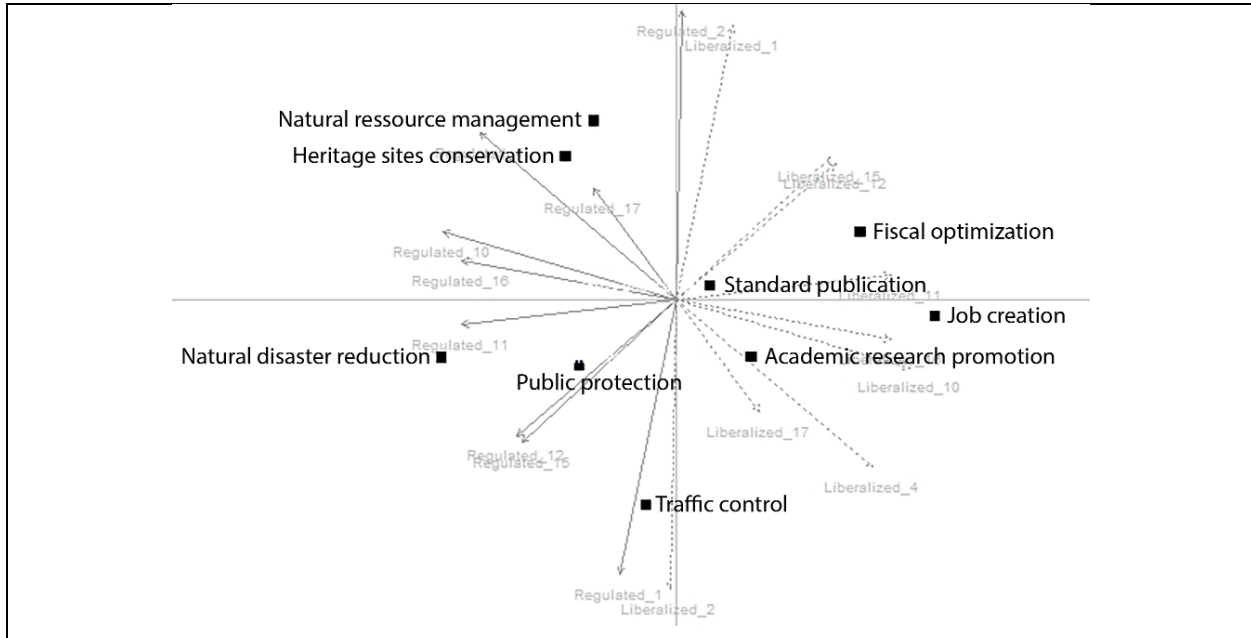

Figure 2. Openness vs. constraints

Dimension 3 – Utilitarian vs. non-utilitarian effects

During the focus group discussions public managers expressed some concerns regarding the nature of effects when OGD re-use potentials are actualized. In the personal grids these concerns were manifested by developing constructs, such as social-economical, environmental-economical, and cultural-economical. We thus defined a third dimension that expresses the extent to which the effects of actualizing the OGD re-use potential has rather a utilitarian or non-utilitarian effect. We interpret utilitarian effects as economic effects, while non-utilitarian may be understood as social, cultural, or even environmental effects.

Figure 3 shows a lower degree of variability in the scoring of elements. It appears that managers' point of view regarding the effects of actualizing the OGD re-use potentials look more homogenous than previous categories. Contrary to the second dimension, most of the elements are close to the horizontal axis and do not deviate much from it. Only *citizen protection* and *job creation* tend to be perceived differently by managers. For the other OGD re-use potentials, managers tend to agree on the effects of the actualization (i.e. social versus economical), although it is more difficult to identify distinct groups. In Figure 3, we can further see that the distribution of constructs appears to be most concentrated (i.e. 2 groups on a bit more than 90%). This confirms the common view regarding the effects of actualizing the OGD re-use potentials. We observe that *standards and certificates* and *fiscal optimization* should provide economic outcomes, while *natural disaster* and *heritage sites conservation* should be associated with social and cultural objectives.

Contrary to the two previous dimensions, when we look at the length of the constructs we observe major differences. Some constructs are much shorter than others. These shorter constructs show that some managers always perceive the potentials of OGD re-use in the same ways, independently of the actualization effects (i.e. utilitarian vs. non-utilitarian). This is the case for managers 3, 9 and 13. For those managers, whether economic, social, cultural or environmental effects actualization will produce, this will have little

impact on how they perceive the OGD re-use potentials. These thee public managers will not adapt their publication rules according to the effects of the OGD re-use potentials. However, for the other managers, the OGD re-use potentials depend on the effects of the actualization. We observe it distinctly for the managers 6 and 15. Figure 3 suggests that the nature of effects (utilitarian vs. non-utilitarian), in some cases, affect the perception on OGD re-use potentials (i.e. longer constructs). Therefore, managers may adapt their OGD publication practices according to the effects of the actualization.
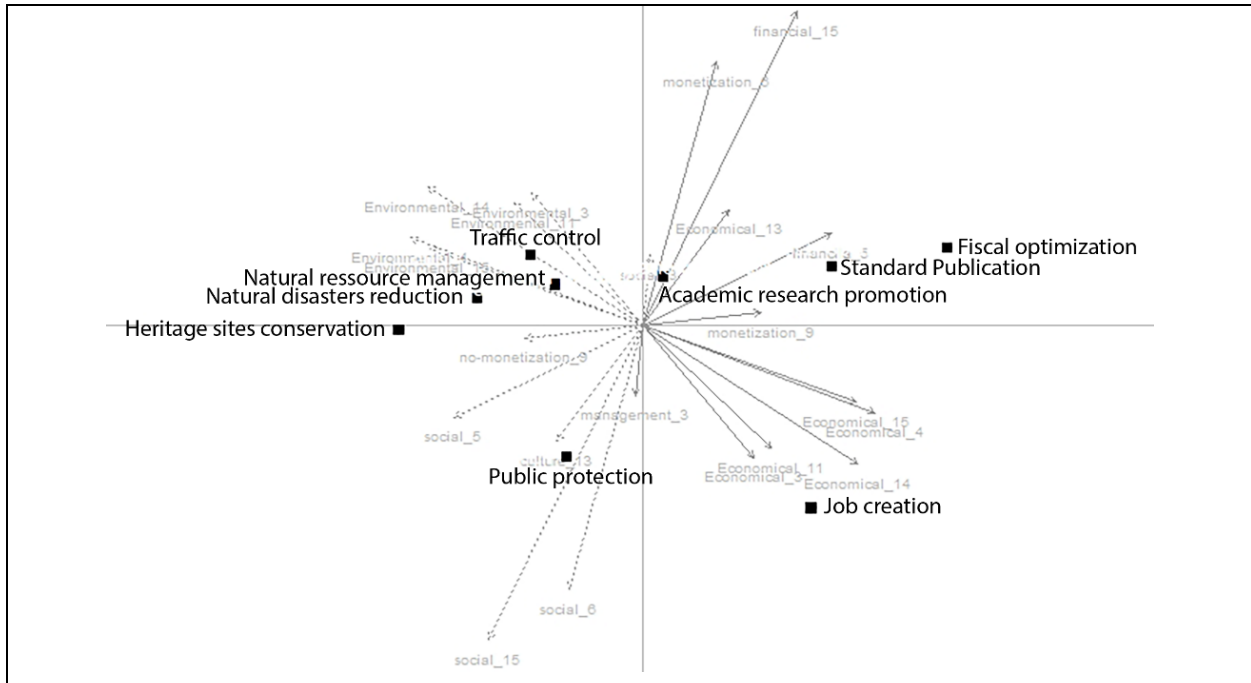

Figure 3. Utilitarian vs. non-utilitarian effects

Dimension 4 – Active vs. Passive actualization

A large number of participants often expressed the lack of government engagement in contributing to the active development of an OGD ecosystem. With constructs, such as *proactive – reactive* or *anticipation – correction,* managers articulated some concerns related to the degree of engagement that a government should exercise for establishing an OGD initiative. The active vs. passive actualization dimension expresses, therefore, the extent to which the actualization of OGD re-use potential should be embraced by government agencies.

Two observations can be based on Figure 4. First, there is a high degree of variability of the scorings of elements. We observed OGD re-use potentials spread over the whole figure and rather far from the center. This indicates that public managers tend to disagree on the government's role to push OGD. This means that there is no consensus on the extent to which the actualization of OGD re-use potential should really be a priority for government agencies. This is particularly observable in the case of *natural disaster management* or *infrastructure resource management*. While manager 7 argues in favor of an active implication in using OGD in the context of *natural disasters management*, manager 13 tends to advocate a passive stance by governments. The shape of constructs distribution confirms this observation: it looks like a wheel where dashed constructs lines intermingle with solid line constructs. This form of distribution does not allow the identification of a clear trend in the managers' point of view. These various opinions on how government should embrace the actualization of the OGD re-use potential may influence the publication process of OGD. For instance, different believes regarding the role of government in OGD re-use may encourage managers to adopt different behaviors, being themselves rather active or passive.

As mentioned previously, the length of a construct gives information on the high variability of the scores that a manager addressed to the potentials of OGD re-use. While the government's engagement degree on the actualization of OGD re-use potentials seems to have no impact on the scoring for the manager 12, it largely affected the other managers (particularly managers 4, 6 and 7).
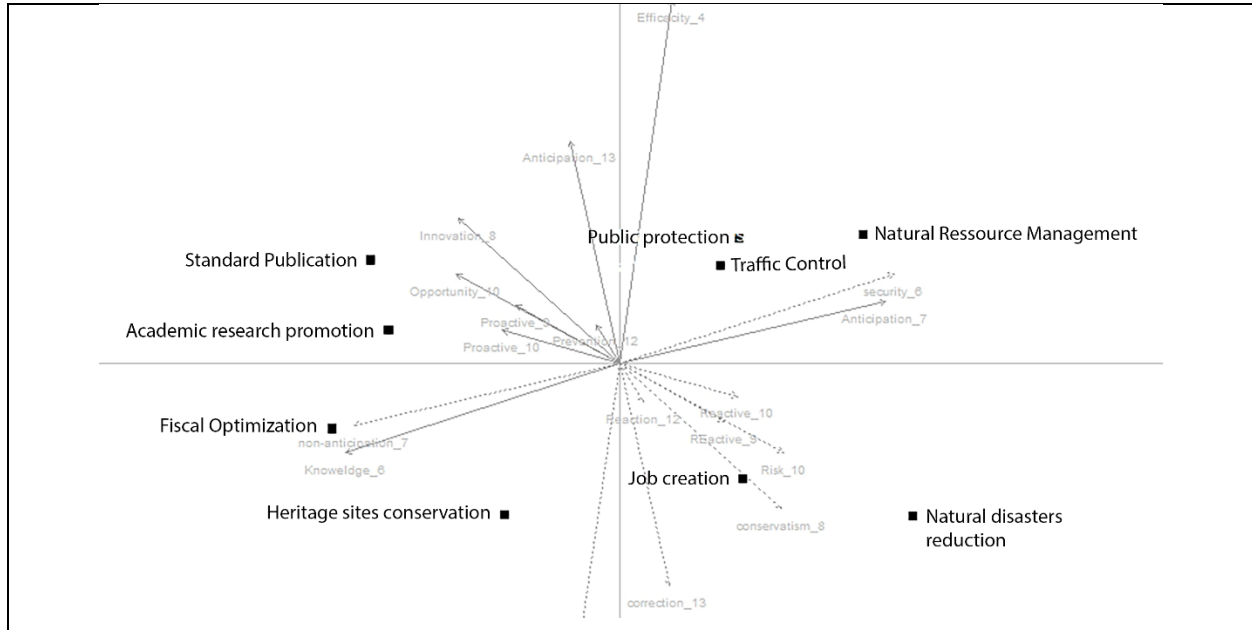

Figure 4. Active vs. passive actualization

Conclusion

With the goal to shed some light on the reasons why OGD is experiencing major barriers or even a standstill in certain countries, our study tried to comprehend how public managers perceive the actualization of OGD re-use potential. We analyzed the content of 18 grids from public managers working in different branches and levels of government. We identified four relevant dimensions based on a CA and categorized common themes which were expressed by public managers. Drawing on affordance theory and the assumption that being able to perceive a potential before one can act and create real-world effects, we further explored if public managers share the same vision with respect the re-use potentials of OGD in different application domains. We attempted to understand to what extent public managers apply and comprehend the concept of OGD in a similar way and what application domains and dimensions lead to variability and/or conflicting opinions. In doing so, we analyzed four dimensions in more detail: (1) who should actualize the re-use potential of OGD (i.e. group vs. individual), (2) the openness level that should be considered to actualize the OGD re-use potential (i.e. openness vs. constraints), (3) the effects that possibly emerge from actualizing OGD (i.e. utilitarian vs. non-utilitarian effects) and, lastly (4) the degree of government engagement in promoting the re-use of OGD (i.e. active vs. passive actualization).

Our analyses show that, expect for the perceived affordance effects (i.e. dimension utilitarian vs. non-utilitarian), public managers seem to share different views regarding how OGD must be actualized to potentially be re-used. There is no clear and shared vision regarding who should actualize the re-use potentials of OGD, neither which openness degree should be applied. We could not find either a common view on the role of the government in the actualization of OGD. Although we extracted the dimensions from the same constructs (i.e. individual-group, regulated-liberalized and active-passive), we did not identify what Hardless et al. (2015) called a "team mental model". According to them, it is possible to find "organized mental representations, which group members share about key elements in their environment". A high level of similarity between individuals' perception implies common expectations regarding task completion,

interpersonal cooperation and contribute to organizational effectiveness. This was not the case with our sample and may be an indicator why OGD initiatives are developing slowly or facing resistance.

As other RepGrid studies have shown, sharing different points of view or having a strong personal point of view, may affect task completion and the success of a project. Raman et al. (2013) showed that top managers' interpretation of a situation had a major influence on their organizational strategic choices. Indeed, as demonstrated by Zhao and Fan (2018), if public managers place great emphasis in OGD, they will deploy extra resources and their subordinates will be more predispose to participate to OGD implementation. The European Commission (2020), confirmed this idea and remarked that fragmentation of actors' perception is a major risk in the current realization of a common data strategy and may, therefore, impact the continued realization and implementation of OGD initiatives. Our results are consistent with these observations and give a more nuanced view on where perceptions on OGD differ. By identifying these distinct viewpoints, our study may help to explain current mismatches between OGD strategies and actual implementation. The fact that public managers do not stick to a "team mental model" and see OGD quite differently reveals that governments need to intensify communication and persuasion work so that OGD becomes a reality for all branches of government and not just for those areas where there is a history of publishing government data (e.g. Census bureau, public transportation). Our results reveal the need for a focus and resources toward organizational processes and not only to technical issues, which is traditionally the case (Kitchin 2014).

Moreover, we also remarked that perceptions often are constructed upon judgments who will actualize the potential, opinions about the role of government, and personal preferences for or against open government. Our results indicate that public managers do not seem to put equal emphasis on free accessibility, reusability and data sharing, to anyone, for any purposes, and without any legal, technological or social constraints. On the contrary, the different lengths of the constructs show that public managers seem to adapt these principles according to the domain of application, which is consistent with findings on affordance niche adaption (Mettler et al. 2017). There is no such thing as "universal accessibility" of OGD for the participants of our study. In practice, this means that discrimination against beneficiaries or user profiles (e.g. individuals, private group, education or citizen), type of utilization (e.g. cultural, environmental, commercial, non-commercial, or social) may happen. We argue that managers may be inclined to use different approaches to publishing OGD, because universal accessibility is an illusionary concept in practice and imposes many organizational, technical, and legal problems. According to Fane et al. (2019), the biggest challenge to publish OGD concerns the uncertainty of data ownership and the misuse of data. By making nuances in the publication of OGD, public managers may calibrate some of the risks. This becomes particularly apparent with respect to the second and fourth dimension. According to El Emam et al. (2015), sharing data creates strong pressure on data publishers and may expose them to the unintentional posting of sensitives information. This is tricky, given that Article 24 of the GDPR makes data publishers responsible for complying with data protection. Countries like India and China but also United Kingdom, already created many smart cities allowing governments gather information on every activity of every citizens (Salmasi and Gillam 2010; Taylor 2017). Improper opening of such data may engender several risks such as breach of confidentiality, mass surveillance or personal intrusion that affect individuals' privacy. According to Taylor (2017), these risks should not be underestimate given that data processing technologies advance faster than data justice. These aspects may strengthen managers' fears and demotivates them to take an active stance in publishing OGD of their department data. It may also explain why sometimes the actualization of some OGD re-use potentials seem to be clear for a large majority of managers, while there is a great disagreement in other application domains. Depending on these risks, public managers seem to adapt their OGD perception. If risks are limited, such as for datasets to be re-used in a job creation application, then openness and universal accessibility of datasets is favored. If they see threats to privacy, as could be the case with the example of public protection, a more nuanced way of liberating data is preferred. In this sense, we argue that the comprehension of OGD as concept is relative, and far away from a universal vision promoted by some OGD advocates. If governments really wanted to make OGD universally accessible, they crucially need to deploy supportive measures (i.e. formations, budget, etc.) to educate people in charge of OGD publication, reduce risks and thus limit individual choice based on distorted perceptions.

Future research and limitations

To date, most studies concerned with open government have focused on OGD policy initiatives, technologies, and barriers of using or publishing OGD (Crusoe and Melin 2018; Dulong de Rosnay and Janssen 2014; Susha et al. 2015). Although having a better understanding of what public managers think about OGD has been found to be essential for properly controlling and steering OGD initiatives, not much evidence exists about the way how they form decisions, what deliberations and preferences guide this process, and how they (if at all) act up on it. By following the affordance theory and using the RepGrid technique, our study tried to provide some further insights on the constructs and dimensions preceding the actualization process of OGD re-use potentials. The mechanisms arising from perception are usually not detectable at first sight. To be identified, studies on human cognition are needed. The RepGrid technique combined with the affordance theory help to capture the underlying structures of perception and shed some light on reasons that may explain different stances in favor or against publishing OGD in a certain application domain.

However, although our paper provides insights for researchers and practitioners, it is subject to certain limitations. RepGrid, as a cognitive mapping technique, does not allow predicting public managers' resistance against OGD publication. It does also not provide evidence regarding cause-and-effect relationships between the publishing of OGD and certain profiles of public managers (e.g. variation in behavior between public managers on different levels of government or in different departments). RepGrid is an analytic and descriptive tool that may be used as a starting point for developing explanatory contributions.

To go further and extend this study, we suggest to use our results in order to develop a national or international survey of public organizations that are engaged in the process of data openness in order to see if aspects such as background, personal values and organizational culture may explain these different perceptions of openness. Also, our observation that public managers do not share a common vision on the implementation of OGD requires further corroboration using, preferably, some explanatory techniques. Lastly, in view of the presented results, we see a need for more research clarifying the terminology in an "user-friendly" manner and which develops more nuanced frameworks that can be used by governments to adapt their open data strategies or specific OGD initiatives. We also call for more practice-based research that helps to develop such frameworks and which supports public managers in systematically assessing risks - organizational, technical, and legal ones – so that government data is shared and made publicly available from all branches of government (Berghmans et al. 2017).

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