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Data Is No Free Gift: An Anthropological Perspective on Data Sharing in an Inter-Organizational Context

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Abstract

Organizational research on data sharing in inter-organizational contexts is limited, giving little insight into why data is or is not shared, often bypassing social and cultural norms, values and perspectives, and issues of power, (dis)trust, and (un)willingness to share. Drawing on an empirical study in the infrastructure sector in the Netherlands, where administrators increasingly urge infrastructure operators to share their data to create a more integrated and resilient infrastructure network, we ask: How is data sharing enabled and constrained according to organizational actors of critical infrastructure operators? Our findings exhibit five perceived challenges and five opportunities of sharing data, providing two main contributions to business anthropology and organization studies. Theoretically, we reconceptualize data sharing as "gift-giving," helping to identify and understand the human-centered facets hitherto overlooked such as the reciprocal relations and cultural tensions associated with inter-organizational data exchange. Empirically, contributing in a more pragmatic sense, we add the notion of "enclosing"

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which entails the situational exchange of mutually agreed upon, limited data among pre-selected organizations via a bounded platform. We suggest that the enclosed platforms provide a context conducive for reciprocal data-gifting and a framework for future practical applications of data sharing in (inter)organizational settings.

Keywords

Inter-organizational context, Data sharing, Reciprocity, Gift-giving.

Introduction

> Sharing data. It was on our agenda again during the last meeting of the board. Of course, the privacy aspect of data sharing must be properly arranged, but then it seems very simple. I have data about my infrastructure, the others have data about their infrastructure, we throw all that data in a box, mix it up a bit and "voila," we have the smart insight that everyone is waiting for. But it's not that simple.
>
> Board member of Next Generation Infrastructures in the Netherlands (Schut 2020: 6).

In the Netherlands, and arguably in many other regions of the world, it is increasingly claimed by administrators that data sharing among critical infrastructure operators is needed to improve decision-making, increase efficiency, reduce costs, and advance the performance of the infrastructure network as an integrated whole (Nezami et al. 2022; Jalali Sohi et al. 2021; Deloitte 2017; Hazell, Novitzky, and van den Oord 2023). Operators are responsible for the construction and maintenance of critical infrastructures, including utilities like internet, energy and water, and transportation systems like roads, railways, and canals, all regarded as crucial for the wellbeing of modern citizens (Anand, Gupta, and Appel 2018). Increased integrated functionality and mutual dependency of these infrastructures makes development of new and maintenance of existing infrastructures even more complex (Biersteker and Marrewijk 2023; Nezami et al. 2023). In this context, data sharing involves the exchange and use of data – such as network data, asset data, organizational data, and user data – among infrastructure operators to optimize the design, construction, operation, and maintenance of their assets (Hazell, Novitzky, and van den Oord 2023). Perhaps more pressingly, data sharing is increasingly perceived as essential to create a more secure, resilient, and sustainable infrastructure network responsive to today's major challenges of crises management, climate change, and energy transition (Harvey and Knox 2015; Gupta 2018; Ingold 2013; Biersteker and Marrewijk 2023). Think of the sharing of operational asset

data among collaborating partners to revolutionize project execution and build "smarter" infrastructures (Deloitte 2017).

In this research context, we understand the critical infrastructure sector as a socio-technical system in which micro-relations and entanglements between humans (that is, organizational actors) and non-humans (that is, infrastructures and data) are studied within a broader social context (for instance, Gupta 2018; Larkin 2013, 2018; Anand, Gupta, and Appel 2018; Star 1999). In such a system, data sharing is understood as a contextually-dependent, social, and technical activity based on evolving technologies, mutual ties and relations, and shaped by diverse interests and interpretations (Tett 2018; Boellstorff and Maurer 2015). Extant research gives little insight into how, when, and what data is shared, or not, among organizational actors within and across organizational boundaries (Janssen, Charalabidis, and Zuiderwijk 2012; Yoo et al. 2012) – much less in the infrastructure sector (Nezami et al. 2023) – overlooking cultural norms, values and perspectives, and issues of power, (dis)trust, and (un)willingness that underlie sharing behavior or the lack thereof (Konstantinou and Fincham 2011). To address this gap, social science scholars call for more in-depth, empirical research into the often overlooked social and cultural aspects of data sharing (Harari 2017; Tett 2015; Tsoukas 1997; Fourcade and Kluttz 2020; Elder-Vass 2016).

In response to this call, our research aims to gain insight into how organizational members of critical infrastructure operators make sense of data sharing from an anthropological perspective. In particular, we challenge the assumption that data will be freely given without reciprocal expectations within an inter-organizational context (Konstantinou and Fincham 2011). Following this theorization, we apply classical literature on reciprocity and exchange (Mauss 2002; Sahlins 1973; Gouldner 1960) by reframing data sharing as "gift-giving"; that is, as a reciprocal form of exchange among diverse organizational actors. We argue that a gift-giving conceptualization can help us to unpack the social and cultural meanings and implications of data sharing (Gregg 2015) and, more specifically, to gain insight into how and why data sharing between multiple organizations is enabled and constrained.

Based upon the discussion above, our central research question is: *How is data sharing enabled and constrained according to organizational members of critical infrastructure operators?* Empirically, we focus on the members of a collaborative platform for critical infrastructure organizations in the Netherlands, called Next Generation Infrastructures (www.nginfra.nl), having the purpose to co-create a future-proof and integrated infrastructure network. Specifically, we studied the interpretations of members from six major infrastructure operators in the Netherlands: operators of (1) Energy, (2) Roads, (3) Rails, (4) Water, (5) Aviation, and (6) Maritime. We conducted our interpretive-qualitative

research between September 2018 and December 2019 based on 30 in-depth purposeful interviews with respondents, including directors, managers, advisors, consultants, developers, and programmers who deal with data management and/or data sharing within and especially beyond organizational boundaries – that is, in an inter-organizational context – in their daily work.

Based on the reflections and sensemaking of our respondents, our findings showcase five perceived challenges and five opportunities of data sharing between operators. With these findings, we contribute to the fields of business anthropology and organization studies in two main ways. Firstly, extending the theorization of others (Konstantinou and Fincham 2011; Tett 2015; Fourcade and Kluttz 2020; Gregg 2015), we reframe data sharing as "gift-giving" – that is, as a dynamic reciprocal relation of exchange – allowing us to identify and grasp the social and cultural facets of data sharing in an inter-organizational context hitherto overlooked. Secondly, based on our analyses, we propose the notion of *en*closing data sharing which affords a relationship of "balanced reciprocity" (Sahlins 1973), enabling collaborating organizations to open up and exchange equivalent data within safe, enclosed spaces with predetermined membership, having pragmatic implications for the field.

The article is structured as follows. First, we explain our perspective of data sharing in the infrastructure sector and describe the societal call to share data between infrastructure operators in the Netherlands. Subsequently, we offer an anthropological perspective on data sharing based upon classical literature on gift-giving and reciprocity and explain why it is relevant. In the methods section, we lay out our interpretive approach and how we collected and analyzed our own data based on in-depth interviews. In the findings, we present the main perceived challenges and opportunities of data sharing based on our interviews to show how data sharing is constrained and enabled. Finally, in the discussion and conclusion, we analyze and reflect on our findings concerning data sharing as a social and cultural activity and the implications this has for extant literature on data sharing in the infrastructure setting and other inter-organizational settings.

Data Sharing in the Infrastructure Sector

In the infrastructure sector, the sharing of data, generated by critical infrastructures and their users, is perceived as a promising development for the integral design, innovative (re)construction, and optimal maintenance of infrastructure networks (Harvey and Tulloch 2006; Nezami et al. 2022, 2023). For example, the Dutch infrastructure project "Room for the River" collects and analyzes topical data of weather changes and water levels to broaden riverbeds and fortify dikes to protect against flooding and climate change. The sharing of data generated in

various infrastructures across operators can potentially result in previously unexplored and unforeseen solutions (Nezami et al. 2022, 2023). An example is the construction of a new highway in the city of Maastricht in the south of the Netherlands. For many years, the city was divided by a highway characterized by congestion and unacceptable levels of pollution. Only when data on traffic and real estate development were shared, the infrastructure project could be redesigned into a city development project by bringing the highway underground in a tunnel, with new aboveground space for real estate, housing, and an environmental upgrade of the area (Gerrits and Verweij 2018). Reframing the project into the "green carpet" city development project resulted in sufficient political and societal support for a financially feasible and morally acceptable project.

Sharing data in an inter-organizational context requires novel skills and collaborative competences of infrastructure operators, calling for more empirical research (Nezami et al. 2022, 2023; Kapogiannis and Sherratt 2018). Organizational actors must deal with multiple interfaces and stakeholders of various backgrounds in densely populated and industrialized areas (Engelhart, Roehrich, and Squire 2023). Moreover, inter-organizational collaboration between critical infrastructure operators is constrained by cultural differences, power relations, and a traditional, rigid culture of working in silos (van Marrewijk and van den Ende 2022), frequently resulting in project underperformance or failure (Van Marrewijk et al. 2016). An example is the construction of a new railway line to the station of Zwolle in the east of the Netherlands, causing the closures of a number of water-winning locations. It was found that the exchange of relevant data between the road, rail, and portable water network owners at an early stage of the project could have prevented the closures from happening. In recent years, it is increasingly claimed that, by deriving and analyzing data from various infrastructure silos in relation to each other and extrapolating the outcomes towards future use and requirements, contributions can be made to an improved, integrated, and more responsive design (Biersteker and Marrewijk 2023). To realize this, extant research argues that operators must be willing and able to cooperate and share data at the earliest possibility to jointly identify pressing problems and devise innovative solutions (Nezami, 2022, 2023).

In our research, we view the infrastructure sector as a socio-technical system where micro-relations between humans and non-humans are studied within a broader societal and cultural context (see also Gupta 2018; Harvey, Jensen, and Morita 2017; Larkin 2013, 2018; Anand, Gupta, and Appel 2018; Star 1999). From this perspective, sharing data between critical infrastructure operators is perceived as an assembly of (inter)active data streams, data processing systems, human actors, and organizational contexts (Hazell, Novitzky, and van den Oord 2023). In viewing a socio-technical system, we must be wary of what Bryan

Pfaffenberger (1992: 505) calls the "standard view" which cloaks technological processes in myths of unusual power, such as the notion of "dataism"; a belief that data should be openly shared to create a better world (Harari 2016, 2017). The assumption that sharing data will automatically offer solutions and lead to innovations has been described as a myth (Janssen, Charalabidis, and Zuiderwijk 2012). Such data-centric assumptions should be considered critically and call for more in-depth research into the often overlooked social and cultural aspects and implications of data sharing (Harari 2017; Tett 2015; Tsoukas 1997; Fourcade and Kluttz 2020; Boellstorff and Maurer 2015). This is why it is important to research data sharing between infrastructure operators from a human-centered perspective. We elaborate on this in the following.

Data Sharing as Gift-Giving

The quest for sharing data is aided by the rise of digitalization and new information technologies that place more emphasis on data, databases, and data processing systems within and between organizations (for instance, Christensen and Cheney 2014; Hautz, Seidl, and Whittington 2017; Tuomi 1999). Accompanying this increasing focus on data is the temptation to view data from a functionalist and quantitative perspective as "having the status of an objective, thing-like entity, and as existing independently of human agents" (Tsoukas 1997: 832). Conversely, from an interpretive perspective, data has different interpretations and meanings, indicating that it cannot be taken as a purely quantitative phenomenon (Boellstorff and Maurer 2015: 2). According to Rob Kitchin (2014: 1), data is raw material abstracted into categories and representational forms like numbers, characters, symbols, images, sounds, waves, and bits, constituting the *building blocks* for creating information and knowledge (as cited in Hazell, Novitzky, and van den Oord 2023: 3). Thus, while data is increasingly associated with undisputed digital facts and statistics, it still needs to be processed and analyzed to be rendered intelligible and produce usable information or knowledge. It is important to recognize that data undergoes continuous processes of transformation as it is shaped and formed through relations extending beyond data itself. Therefore, Tom Boellstorff and Bill Maurer (2015: 4) emphasize the value of applying an anthropological perspective to unpack the meanings and implications of data and the sharing thereof.

From an anthropological perspective, Melissa Gregg (2015) invites us to consider the original meaning of "data" which is derived from the Latin verb "datum" which means something that is "given" or "gift." This meaning has predominantly translated to assume data as "a given" fact or thing, removed from the cultural specificity of reasoning. Gregg (2015: 6) problematizes the taken-for-grantedness of data, arguing

that data is not the same as fact as data is something "presumed *prior to* discussion," thus already containing judgements and choices about what elements to include and exclude. Relatedly, Chaim Zins (2007: 481) notes that "the given" or "naked facts" are nonexistent because they are based on human experiences and perceptions that are always biased. Hence, data and especially how it is collected, perceived, and shared are socially and situationally constructed and negotiated. In line with this thinking, we agree with others (Tett 2018; Ferryman 2017; Fourcade and Kluttz 2020; Gregg 2015) who propose a reconceptualization of data from a human-centric perspective as "something given" as a *gift* rather than the data-centric perspective as "something given" as a fact (Zins 2007). Here, the renowned work of anthropologist Marcel Mauss (2002) on "The Gift" is insightful, based on his examination of historical and cultural gifting patterns as forms and functions of exchange around the world. Mauss came to the realization that, unlike our prior dominant assumption, there is no altruistic "free gift" without the expectations of some kind of return. Rather, each gift is part of a social system of reciprocity, having three main steps that must be fulfilled: giving, receiving, and reciprocating. The giver not only gives materially, such as data as a thing, but also gives "spiritually," such as data as the "extension" of oneself, meaning that giver and gift are intimately entangled. Giving a gift is embedded in the social obligation of accepting and returning and, thus, serves to establish a social bond between giver and receiver, obliging the receiver to reciprocate to maintain that bond. If the receiver does not reciprocate in some way, mutual trust is broken, the social bond is rejected or severed, and the receiver's honor is tarnished (Mauss 2002).

The concept of reciprocity is central to a conceptualization of data sharing as gifting. Alvin Gouldner (1960: 171-172) theorized that reciprocity is a generalized moral norm as "we owe others certain things because of what they have previously done for us, because of history of previous interaction we have had with them." Gouldner's work was built upon by Marshall Sahlins (1973) who explicated three types of reciprocal exchange: generalized, balanced, and negative reciprocity. Generalized reciprocity refers to a long-term exchange over an indefinite reimbursement period, with undefined equivalency of return and with a low self-interest. An example would be an organization sharing their data with a smaller, partnered company as an investment to help that company to grow without expecting immediate or certain returns. Balanced reciprocity is a simultaneous exchange of equivalent resources without any delay in which both parties mutually benefit. An example would be two or more organizations deciding to exchange equivalent data immediately in order to complete their project together. Finally, negative reciprocity is characterized by immediate returns, high self-interest, minimum trust, and maximum social distance (Sahlins 1973). An example would be an organization providing another institution with valuable data upon request without receiving anything in return and, thus, being

perceived as unfair by the organization. These types of reciprocal relations are not stable and fixed, but can change over time (Van Marrewijk and Dessing 2019). We argue that data sharing can be associated with various types of contingent reciprocal relations, depending on the unique inter-organizational context and members involved as relations evolve over time.

Summarizing, we argue for the relevance of classical anthropological theory on the gift and reciprocity to gain insight into the data sharing behavior (or lack thereof) in an inter-organizational context. We theorize data sharing as a form of "gift-giving" (Gregg 2015), which, in our case, unfolds as a reciprocal exchange between organizations who wish to build and maintain collaborative relationships. From this standpoint, gift-giving can be seen as a form of alliance-making (Fourcade and Kluttz 2020), which is particularly relevant for our case where infrastructure operators are endorsed to establish alliances and exchange their data to improve the critical infrastructure system as a whole (Nezami et al. 2022, 2023). In forming and negotiating such alliances, we believe that social relationships are taken for granted with adherence to administrative discourse that data freely given by organizations (as a kind of "free gift") will eventually lead to solutions and innovations on a broader, societal level (www.nginfra.nl). Rethinking data as a gift can help us to understand how data sharing between organizations is enabled and constrained at an (inter)organizational level in the daily sensemaking and (inter)activities of organizational actors at the work floor, related to social themes of commitment, trust, and willingness to give (Konstantinou and Fincham 2011; Dobusch, Dobusch, and Müller-Seitz 2019; Thorén, Ågerfalk, and Rolandsson 2018).

Methodology

We adopted a qualitative-interpretive research approach that sees reality as socially constructed as opposed to being objective. This paradigm is crucial in this article because data is often viewed in an objectivist way or as giving a factual representation of reality. Yet, following the interpretive paradigm, humans interpret reality, as well as the data representing it, in different ways and with diverse interests, depending on the social context and situation (Yanow 2006). For this reason, our interpretive approach focused on conducting purposeful, in-depth interviews and sharing the narratives of our respondents and of ourselves to capture the meaning and sensemaking of data and data sharing as the central purpose and focus of this research article.

Research Methods

Our study is part of a larger research project between the VU University of Amsterdam, the Technology University of Delft, and the collaborative platform for infrastructure operators, "Next Generation Infrastructures," on data sharing for the integrated design of critical infrastructures in the Netherlands. We found that operators experienced many difficulties to share data in practice, even though they aspired to do so in theory. We therefore turned our focus to revealing and understanding how data sharing is enabled and constrained at the workplace, which we later reformulated into the main perceived challenges and opportunities of data sharing.

Four methods have been used to collect data. Firstly, in September 2018, we started with a desk study to collect relevant documents and reports from digital sources about data sharing in the infrastructure sector in the Netherlands to familiarize us with the field. Secondly, nineteen interviews were conducted with actors from the organizations under study, which we refer to as "operators" in our research: Roads, Rails, Maritime, Aviation, Water, and Energy. Thirdly, three interviews were held with data specialists from company GEO, which works closely with infrastructure operators to develop data sharing platforms as a recent development. Fourthly, we studied the Data Collaboration Platform (DCP) as one of the few inter-organizational data sharing platforms in the Dutch infrastructure sector to gain in-depth insight into how data is shared among the operators Energy and Water as utility network owners and four other contractors as utility network constructors to coordinate construction activities. One Master student assisted in conducting eight interviews on the DCP case under our supervision. Moreover, we conducted one interview with a data expert in the Netherlands who works closely with the Dutch government to help public organizations, such as infrastructure operators, to share their data, especially for the goal of energy transition. Purposeful sampling has been used to select respondents who could contribute to the research in a relevant way (Bailey 2007), such as asset and IT managers and data specialists. We also aimed for a diverse research sample including directors, managers, consultants, engineers, and developers (see Figure 1). We conducted interviews with the use of a topic guide focused on the following themes: the meaning and interpretation of data and data sharing, the need/call for sharing data, the practice of sharing data, how data sharing is constrained, and how sharing data is enabled. To supplement our interview accounts, we also carried out participant observation at two Next Generation Infrastructure conferences themed "Transition" on November 11, 2018 and "Together, Impact" on November 21, 2019, where the studied infrastructure operators annually engage in a full-day dialogue on the theme of "Data," among others.

Organization	Interviews	Function
Roads	2	Senior advisor; Advisor
Rails	2	Architect; Engineer
Aviation	5	IT manager; Project executor; Project manager; Transition consultant; Programmer
Maritime	2	Director nautical development; Maritime consultant
Water	3	Program manager; IT manager; Sustainability manager
Energy	4	Project manager; Strategy director; Transition consultant; Former manager
GEO	3	Founder; Programmer; IT manager
DCP	8	Former manager; IT Manager; Project manager; Engineer (2); Supply manager; Programmer; Work planner
Other	1	Open data expert
Total	30	

Figure 1: List of interview respondents.

Data Analysis

To analyze our own data, we took a systematic approach to enhance methodological consistency and validity, particularly the inductive, grounded-theory approach as elaborated by Dennis Gioia, Kevin Corley, and Aimee Hamilton (2013). This method helps to build theory by identifying new concepts and ideas rather than solely relying on extant ones. Following this methodology, we analyzed data through three distinct levels: first order concepts, second order themes, and aggregate dimensions (see Figure 2). While the first order coding is more empirical and informant-centric, the second order coding is more conceptual and based on theoretically informed themes; in our case revolving around data sharing, gifting, and reciprocity. Thereafter, we distilled the aggregate dimensions from the amalgamation of first and second order codes to disclose analyses related to data as "no free gift" and "*en*closing" as a bounded means of sharing in a reciprocal relationship. We elaborate on our aggregate dimensions in more detail in the discussion section.

Research focus	1st order concepts	2nd order themes	Aggregate dimensions
Challenges of data sharing	Data silos Data hoarding Risk-aversive culture Lack of data quality Lack of common "language"	Assumed generalized reciprocity Developing negative reciprocity Closedness	Data is no free gift
Opportunities of data sharing	Shared platform Limited membership Limited data Linked data Specified goal(s)	Sharing in balanced reciprocal relationships Conditions of balanced reciprocity Openness	Enclosing for the sake of openness

Figure 2: Analytical framework (adapted from Gioia, Corley, and Hamilton 2013).

Perceived Challenges of Data Sharing

Administrators of the six Dutch operators Energy, Roads, Rails, Water, Aviation, and Maritime have voiced their aspiration to share data in a joint program called Next Generation Infrastructures to co-create a future-proof infrastructure network as an integrated whole. They perceive data sharing to be essential to safeguard the future of infrastructure (www.nginfra.nl). In this administrative discourse, relationships based on generalized reciprocity are expected to be the norm in the sense that giving data is assumed to generate solutions to problems in the long run at a societal level, although the more precise and timely benefits and returns at an organizational level are unclear. As already emphasized in the very beginning of this article: "we throw all that data in a box, mix it up a bit and 'voila', we have the smart insight that everyone is waiting for. But it's not that simple," as a board member of Next Generation Infrastructures said (Schut 2020: 6). Still, data is placed at the top of the agenda as big data, data standardization, and data quality are becoming increasingly important for the analyses and design decisions of infrastructure operators. "We want to become a data-driven organization," as an IT manager in Aviation emphasized. This is in line with rapid developments and a general hype concerning data sharing,

here expressed by an open data expert: "Data sharing is one of the aspects which will be growing very fast, and the thinking about data sharing will be growing very fast in the coming years because everyone has to deal with data sharing." However, according to respondents, the sharing of data between the six operators is problematic in practice. Notwithstanding the ambitions to do so, we observed that data is not given freely or given without clear returns within and across organizational boundaries among the six Dutch operators. Based upon our interviews with representatives, we found five interrelated challenges which constrain data sharing: (1) data silos, (2) data hoarding, (3) risk-aversive culture, (4) lack of data quality, and (5) lack of common "language." These will be discussed below.

The first perceived challenge is *data silos*. Respondents report few (in)formal inter-organizational relationships related to data sharing. Our findings show that establishing and maintaining social relationships is hindered by the fragmentation of data systems in silos. A silo can refer to a bounded structure like an organization, expert system, department, or team that is specialized and predisposed against sharing and openness towards outsiders. It can also refer to a cultural orientation based on a specialized way of interpretation that is not shared with others (Tett 2015, 2018). Most respondents expressed that data silos are perceived as a ubiquitous problem, both intra- and inter-organizationally. "There are 'matryoshkas' [Russian dolls], in the organizations, between the organizations, between municipalities, between countries, between continents. You see it everywhere, everywhere are silos," an IT Manager in Water stressed. A few respondents intend to integrate silos: "We want to break the silos by letting information stream, from silo to stream" (Architect, Rails). This is not easy as data management is a tedious, specialized, and difficult job often executed by the IT and asset management departments which tend to be siloed and closed off from others. Elaborating on this, a sustainability manager of Water even claimed that "a department like asset management will often teasingly be called 'the ivory tower'."

Closely related to the first challenge, the second indicated challenge concerns *data hoarding* or the behavioral and cultural tendency to withhold data or the reciprocation thereof. Databases are often closed off and require access to be granted. A transition consultant working for Energy explained: "There are files on our general database which I do not have access to, but which contain crucial information for me. Then I need to request access and then I think 'guys, why isn't this just all open?'" This issue encompasses a general unwillingness to share data due to data sensitivity and security, especially data related to commercial, financial, or judicial matters that underscore an organization's competitive advantage, privacy, and ownership. The consultant went on to explain: "We say, 'it is sensitive data, and we don't share it'," or "we don't want to

share data on substations or where cables are located because maybe terrorists may attack us on those substations." Sensitive data is thus hoarded as it is perceived to be too valuable for giving away; "if there is no incentive, we remain close to the monkeys, then nothing [will be shared]" (Director, Maritime). Conversely, if valuable data *is* given, but without returns or benefits for the giver, this can result in developing a negative reciprocal relationship.

Hand-in-hand with the notion of data hoarding, the third challenge is the *risk-aversive culture* of infrastructure operators which, according to the respondents, tends to be traditional, monopolistic, specialized, and centralized. The six operators "are originally engineer companies, and, in the engineering world, knowledge is power. [Therefore], a lot of infra companies are fundamentally hierarchical and bureaucratic" (IT manager, Water). Respondents admittingly struggle to reach open modes of data sharing due to the risk-aversive culture of infrastructure operators; "we as [Energy] tend to be risk avoidant" (Transition consultant, Energy). This risk-aversive culture is observed in the conservative, apprehensive, or even distrustful behavior of employees in avoiding activities of data sharing across organizational boundaries: "Looking beyond the scope of water, [our organization] is considered risky [and] if we are going to change [to share data with others], we do not know what we are going to do and we find that scary" (Sustainability manager, Water). Moreover, although the six operators have collaborated in the past, there is, to date, no formal regulation or legal framework for sharing data among them. In the interviews, the respondents even stated that they were officially not permitted to give data; "from [Energy] the statement is 'we do not share that information'" (Transition consultant, Energy). This makes organizational actors "afraid to share data, because [they] think that [they] are legally more liable" (Director, Maritime).

The *lack of data quality* is the fourth perceived challenge, which, if data is given, would be much like a "worthless" or "empty gift." A director of Maritime stated that data is, therefore, not given; "because your data quality is not in order, so if you know that the data is not correct then you are not going to give it". Consequentially, internal data management is prioritized over external data sharing: "It's about the internal collaboration of data exchange […] but not yet with […] other infrastructure organizations, we don't do that yet" (IT manager, Aviation). The studied organizations internally struggle with data management as their databases and data quality are not optimized; "data and storage of data has always been the 'black sheep' in the family. Assembling data is […] not attractive, it's not sexy work, it's boring" (Project manager, Aviation). An IT manager of Aviation added that "organizations that have a lot of infrastructures […] their data quality is low." At such organizations, the infancy of data management is prominent, as you will often see that "there is no data at all, so you have zero quality anyway, or

there is data and you have low quality" (Consultant, Maritime). Respondents of all studied organizations claim that before data can be given externally, this data first needs to be made available, accurized, and standardized to provide usable information or a "valuable gift."

The fifth named challenge is the *lack of a common "language*" among operators concerning data semantics, or according to what standard the data should be defined and interpreted. If data is given, but it cannot be defined by the receiver, this makes data a "worthless gift." Respondents point to the lack of standardization as the culprit; "what we initially encountered is that nothing is standardized yet; then you have de facto no data quality because you are always talking about something else [...] [we need] to make it clear that people at least speak the same language" (Director, Maritime). Or as an architect working for Rails said, "you need to have a shared understanding of reality." Reaching a shared understanding is complicated because infrastructure operators are specialized and tend to have their own siloed processes and standards for defining data; "the challenge is still [that] different stakeholders have different semantics, standards. How can you exchange that and how do you know that you are talking about the same thing?" (Advisor, Roads). Respondents indicate that sharing data does not necessarily equate a shared understanding and interpretation of that data. If there is no shared understanding of the given data, then this gift loses its (reciprocal) value.

Perceived Opportunities of Data Sharing

The five challenges of data sharing show that generalized reciprocity cannot be assumed among the six Dutch infrastructure operators. We therefore now shift our empirical focus to examples of successful data sharing among the studied operators in which balanced reciprocity and its conditions are central. Based upon our interviews, we found five perceived opportunities that helped operators to share data: (1) shared platform, (2) limited membership, (3) limited data, (4) linked databases, and (5) specified goal(s) for sharing data.

The first opportunity is devising a *shared platform* for sharing data, where it is made clear to all involved participants what data is given, received, and reciprocated and among whom, thereby affording an inter-organizational relationship of balanced reciprocity. This enabling format was most evident in our studied case of the DCP (Digital Collaboration Platform), developed and managed by a joint venture of Dutch infrastructure operators to improve the joint construction process of utility networks, such as electricity, gas, water, and telecom. The DCP aimed to reduce the complexity of the data sharing process between customers, operators, and contractors, to lower costs and lead time (for instance, different companies opening up the ground multiple times), and to better serve customers, thus formulating clear benefits and returns.

Overall, the point was to make data exchange in the joint construction process more efficient, easier, and beneficial for all partners; "better [data] quality, quicker work processes, and major drop in the costs over time" (Former manager DCP, Energy). Importantly, the DCP enabled the exchange of standardized messages in accordance with a mutually agreed upon process to ensure the development of trustful relationships for balanced reciprocity. However, reaching such a balanced reciprocal relationship was hard work and sometimes threatened to shift to negative reciprocity. For example, the more powerful partners, mainly operators Energy and Water, decided upon the speed and standards, while other partners, mainly contractors, lost autonomy and became protective causing "severe demotivation among contractors'' (Project manager DCP, Energy). On the other hand, the more authoritative, organizational members of the shared platform were needed to take responsibility and lead the facilitation of the joint data sharing process. In short, members of a shared platform must constantly work on their relationship to maintain balanced reciprocity in the context of power differences (see also van Marrewijk and van den Ende 2022).

The second opportunity is the *limited membership* of organizations involved in a data sharing platform or context. In the DCP case, the number of organizations involved needed to be limited to make it feasible. While the platform was received well, reaching an initial membership of 60 participants, it quickly became apparent that this broad set-up did not work: "We had to do it differently because [the platform] was too complex with too many partners and it became a conflict of interests and discussion" (Former manager DCP, Energy). Hence, it took years to create social relationships between a limited number of partners among whom trust and reciprocity could emerge to even *begin* to exchange data. In order for a data sharing platform to work, "there [must be] trust amongst the team members, but also in the data system used so that, when I supply data, it will not go anywhere except between us; controlled [and] confined during the duration of the project," a transition consultant of Energy explained. In retrospect, one participant stated: "I think, because data sharing is quite complex, keep it first and foremost simple" (IT manager DCP, Energy). Another respondent advised to "only work with partners who really believe in this platform and who really want it" (Former manager DCP, Energy). This "coalition of the willing" ultimately consisted of nine fully committed partners, which enabled the DCP to work and allowed trust to develop among these partners.

The third opportunity is *limited data* that is shared because "data sharing depends on what kind of data you *need*," an advisor of Roads argued. Specifically, operators must seek "specific situations where [they] can share the data, for instance with data minimization, limited usage of the data, limited spreading of the data, and so on… So [to ask] 'can we use

this data in a very specific form?'" (Open data expert). Respondents distinguish between three specific kinds of data. The first kind is "open data" which is shared with everyone; for instance, "everyone is allowed to know what the [train] timetable is" (Architect, Rails). The second kind is "closed data" which is shared with no one; for instance, "we were not allowed to share the energy use of certain buildings" (Transition consultant, Energy). And the third kind is "enclosed data" which is shared with a select group of (inter)organizational actors; for instance, "it is not only your own, it is not the whole world's, but you do share it with each other" (IT manager, Water). The respondents tend to agree that not all data should be out in the open for other organizations to see, but that it needs to be clarified what *kind* of data is allowed to be shared, in what situation, and with whom. For example, a transition consultant in Energy explained:

> [If] you are gathering data for the project and you want the whole dataset or part of it or maybe information based on the data for a next project, then there should be agreements on this specific dataset to be used in the future by whom, to what extent, for what purposes, etc.

Furthermore, respondents make a notable distinction between geographical, technical, spatial, and logistic data such as drawings, maps, and measurements and more sensitive, commercial, financial, and judicial data in the form of contracts and financial agreements. The former is more easily given than the latter. As one respondent said: "Data that is not commercially sensitive and that is important for logistics must have at least free flow. Data that is commercially sensitive […] well that people will not share" (Director, Maritime). Strictly limiting the data shared was a significant factor to facilitate data sharing in the DCP case:

> Actually, very limited data is being shared [via the DCP], but it is especially that messages are being defined, so it is about the standardization of message-exchange and the process of message-exchange … then the collaboration process is being enormously optimized (Former manager DCP, Energy).

A fourth opportunity is to *link data* which can be achieved by linking structured data with other data so that it becomes more useful through semantic queries, as a programmer of data-expert company GEO explained. For example, when a bridge or tunnel needs to be renovated, alternative roads must be arranged to avoid traffic problems and facilitate mobility. Linking data for such a project would help the involved organizations to solve these issues in the most efficient way. Thus, organizations that mutually share their databases by linking them develop a balanced reciprocal relationship while they do not need to create a shared database with another standard; "it is also very nice that you can relate different databases together and explain the relationship

between an entry of the one database with an entry of another database" (Programmer, GEO). Respondents consider linked data as promising as it allows organizations to share relevant data for a specific context or project without worrying about its accuracy; "you will always receive the most accurate value, so you don't need to transfer so much data and you don't have the problem that you don't know how accurate the data is (IT manager, Water). We observed a prototype platform developed by GEO in which the geographic data from several infrastructure operators was linked to construct a 3D map to show the connecting of extant infrastructures in the Netherlands. The operators could then use this map for the joint design and maintenance of their infrastructure networks.

The fifth opportunity is *specifying a goal* for sharing data, such as within a specific project context. For most respondents, sharing (sensitive) data is legitimated as a way to achieve the shared project goal; "data sharing is a means to achieve a goal, not the goal itself" (Advisor, Roads). In this way, data sharing can support the development of a balanced reciprocal relationship: "Data should only be used within the context of the project. So, everybody has to know that the data gathered here is safe, nobody will use it otherwise than for the purpose of this project" (Transition consultant, Energy). Sometimes the project goal is prioritized over the challenges of sharing data, much like an informal system of exchange that typifies balanced reciprocity. In one example given by respondents, Energy employees decided to exchange sensitive data with colleagues from another organization in a project by surpassing formal organizational disclosure policies. A transition consultant explained:

> To get [the colleagues'] understanding of what our world looks like, we have to give them something, and the other way around. We understand that we need this information amongst us to get a step ahead […] We understand why we are doing this and therefore we are willing to risk the penalty of the company.

Thus, enclosing data sharing among a limited number of organizations with limited data via a bounded platform emerged in our research as the most enabling context for sharing data among operators, affording balanced and even generalized reciprocal relationships. Positive reciprocal relations, however, are not a static, but can turn into negative reciprocity when, for example, power dynamics impede inter-organizational relations, when data is too valuable or too worthless to share, or when an organization receives more than others in the exchange which is perceived as unfair. Because it is difficult for infrastructure operators to share their data, the identified opportunities of sharing data and the practice of enclosing may offer pragmatic guidance for inter-organizational data exchange.

Discussion

In this study, we explored how data sharing is constrained and enabled among six infrastructure operators in the Netherlands according to professionals working in these organizations. While inter-organizational data sharing is increasingly urged by administrators to create a more resilient and integrated infrastructure network at a societal level, we learned that the studied operators prefer not to share their data without clear or immediate returns at an inter-organizational level. We also problematized the assumption that sharing data will automatically lead to solutions, as shown by the five perceived challenges that withheld sharing data according to our respondents. On a more positive note, we also identified five opportunities that enabled operators to exchange "enclosed" data via bounded platforms shared among a limited and willing group of members. To contribute to current organizational and anthropological research and literature on sharing data in an inter-organizational context, we will discuss two aggregate themes that form our main two-folded argument: (1) data is no free gift and (2) enclosing for the sake of opening.

Data Is No Free Gift

In our research, it is clear that data sharing among diverse yet interconnected organizations has proven to be a scarce and arduous task. We argue that this can be explained by viewing data sharing as a social and cultural activity based on reciprocal relations and expectations. From this perspective, we suggest that the envisioned co-creation of a resilient and integrated infrastructure network via data sharing among operators is wrongly based upon an assumed relationship of generalized reciprocity epitomized by giving with long-term and indeterminate returns (Sahlins 1973). We hardly found generalized reciprocal relationships in which data is shared without expecting short-term return; not within organizations and much less between organizations. In a similar vein, we argue that the assumption that data should be freely given as an end in itself, or a free gift, is "flawed" (Christensen and Cheney 2014), even "mythical" (Janssen, Charalabidis, and Zuiderwijk 2012), and an important reason why the general call for data sharing has not been answered in the Dutch infrastructure sector. As one respondent stated, data sharing should be a means to achieve a goal, not the goal itself. Rather, we argue that the pressure to "give away" (Konstantinou and Fincham 2011) data is based on "future-perfect thinking" (Weick 1979, 1995), whereby actors envision and narrate a better future to be brought about by data sharing among organizations (O'Dell 2010). This thinking is problematic because it ascribes data unusual power (Pfaffenberger 1992), precisely because it is assumed as synonymous with fact (Gregg 2015: 6-7). The discourse also presumes a "perfect" exchange of data,

depicting unobstructed data streams that successfully flow from one organization to the other, which is not evidenced by our research. Applying an anthropological perspective based on classical literature on gifting and reciprocal relationships indeed "provides an effective counter to the future-oriented hype" surrounding discussions of data and data sharing (Boellstorff and Maurer 2015: 3).

Our study shows that data sharing is still in its infancy in the Dutch infrastructure sector, hindered by various challenges and tensions. The data generated by the studied operators is often not standardized (Birchall 2011), which makes it difficult to convert the data into usable and meaningful information and to find an "interlanguage" (Lenfle and Söderlund 2018). For example, a respondent from Energy explained that raw data is considered quite meaningless because it is open to multiple conversions and interpretations before it is translated into usable information and knowledge, rendering it situationally and contextually meaningful. Indeed, the ambivalence of data is "that it holds values that are subject to contestation" (Gregg 2015: 6). Data is often locally defined by an expert system of an organization, creating a barrier to share it. Furthermore, data silos are seen as challenges as these are data storage systems, often physically dispersed, which are not shared with other departments or organizations. Another challenge is data hoarding due to issues of competitive advantage and cyber security, which can be a serious threat to the operators, as hackers can steal sensitive information, commit espionage, or disrupt the functioning of critical infrastructures. This shows that the practice of data exchange should indeed be understood in a broader social context (Gupta 2018). Finally, the quality of databases was seen as another challenge because the collecting, controlling, and standardizing of data had a low priority with operators, which has much to do with the invisibility of this type of work in the management of critical infrastructures (Star and Griesemer 1989).

Importantly, we did find successful data sharing in more or less balanced reciprocal relationships between two or more organizations who agree to exchange their data in the context of a temporally and spatially demarcated project or platform. The identified opportunities of data sharing, such as limiting membership and limiting data, can be understood as practices of *enclosing* data sharing which afford an open relationship of balanced reciprocity and even generalized reciprocity in an inter-organizational context. Here, social ties are clearly defined, mutual trust and commitment can be established, often contractually, and returns and benefits are communally agreed upon, even if these are longer term or uncertain. Importantly, however, relationships of generalized or balanced reciprocity are not stable or certain, as it takes much effort to secure trust in an inter-organizational context (Maurer 2010; Swärd 2016; Wong et al. 2008). Trust development is a longitudinal process in which cooperation is anticipated between project members,

which subsequently needs to be reciprocated with further cooperation to validate that trust (Munns 1995). When partners fail to return value – for example, through "data hoarding," in taking "valuable data" without reciprocating, or in giving worthless data or an "empty gift" – we argue that this can lead to a relationship defined by negative reciprocity (Sahlins 1973). Power relations are, therefore, connected to an understanding of positive reciprocity potentially developing into negative reciprocity. For example, in the DCP case, the more powerful partners, being the operators as network owners, began to dominate the decisions, the processes, and the platform, resulting in the withdrawal of various less powerful partners, mainly the contractors as network constructors. An understanding of such power dynamics stands in contrast to how inter-organizational collaboration is generally perceived in the literature (for instance, Jones and Lichtenstein 2008). Maintaining generalized and/or balanced reciprocal relationships in an inter-organizational context is a complex social process with political overtones, requiring constant reflection, communication, and a shared interest (van Marrewijk and van den Ende, 2022).

From a more critical standpoint, Marion Fourcade and Daniel Kluttz (2020) point out that data is not like the exchanged gifts that Mauss examined, often involving more physical things or goods. Indeed, the context of data gifting is rather removed from the ceremonial gift-giving that Mauss focused on, as data gifts have a different materiality and imply a different kind of socio-technical relation than those of physical goods. Compared to physical goods, data gifts can transcend the givers as a process over which they have limited control, alluding to the agency of data. Moreover, according to Dave Elder-Vass (2016), Mauss' focus on reciprocity and the calculation of self-interest as the driver of exchange has been applied uncritically to contemporary contexts, and it does not necessarily apply to modern forms of giving. Rather, data sharing – as the term itself already implies – might be better characterized as sharing rather than gift-giving, because it lacks the ritual context of gifting and because givers and receivers, as well as the expected returns of giving/sharing, may be unknown or unclear (Romele and Severo 2016). Thus, while Mauss' work is significant for understanding that actors always operate within a social and cultural context that shapes their willingness, practices, and expectations of sharing, we should be careful with purely exchangist interpretations of his work that focus solely on the reciprocity of *things* (in this case data) rather than the reciprocity of mutual recognition and human relatedness (Elder-Vass 2016). That said, we do suggest that establishing (contractual) alliances for what we call *enclosed* data sharing platforms can provide a more enabling and safe space to share and exchange data with clearer reciprocal agreements.

Enclosing for the Sake of Opening

Our study shows that while data sharing makes sense to our respondents in theory, it is evidently constrained in practice by various perceived challenges such as data hoarding, data silos, and a risk-aversive organizational culture. In our study, operators feel vulnerable in their efforts to share their data because they still have limited experience with data management and transfer. Hence, there is an obvious tendency to withhold data, expediated by a general unwillingness to share with others; a phenomenon that is not new and animatedly discussed in increasing organizational literature on "organizational openness" (for instance, Laursen and Salter 2014; Christensen and Cheney 2014; Thorén, Ågerfalk, and Rolandsson 2018; Dobusch, Dobusch, and Müller-Seitz 2019). For example, Laura Dobusch, Leonhard Dobusch, and Gordon Müller-Seitz (2019: 344) argue that openness (in our case in terms of data sharing) needs to be understood in the light of accompanying and even required forms of closure. Keld Laursen and Ammon Salter (2014: 868) call this the "paradox of organizational openness," which is the need of organizations to share and collaborate with others for innovation, while at the same time needing to protect their returns and their data. In line with this theorization, we found that data sharing produces and requires forms of closure, which we call *en*closing data sharing. While "enclosing" resonates with the "partial disclosure" (Laursen and Salter 2014: 869), our concept offers novel insights into *how* data is shared via five opportunities identified by our respondents.

We found that sharing among infrastructure operators is enabled by using enclosed data sharing platforms that have been collectively negotiated and agreed upon, affording a balanced reciprocal relationship. Such platforms serve to temporarily demarcate the activity of sharing and (re)enforce boundaries to enable inter-organizational coordination and pragmatic compartmentalization (see also Wolbers, Boersma, and Groenewegen 2017). The platforms also serve to situationally mediate data exchange and manipulate "data space" (Davis 2015), where data is disclosed, accessed, and converted to help reach a common meaning and understanding of the data. Data sharing platforms such as the DCP case are workable with limited, committed, and exclusive members and the exchange of limited, goal-specific, necessary data. We argue that the data sharing platforms are enabling contexts as they allow a limited number of operators access to exchange specified data in standardized messages or the "same language." These platforms are similar to the notion of "trading zones" (Lenfle and Söderlund 2018), where partners can develop an "interlanguage" to exchange and understand each other's data. At the same time, reaching such an interlanguage is not a given, but requires time, effort, and negotiation. For example, in the DCP case of our research, it took over *10* years for members to decide on a common standard due to power differences. Hence, while these platforms may facilitate inter-

organizational collaboration, they do not necessarily flatten hierarchical structures as suggested by Youngjin Yoo et al. (2012). In our example of the DCP, hierarchies and power dynamics persisted over time.

We also found that willingness to share depends, not surprisingly, on the kind of data. That is, our respondents are generally unwilling to share data which is perceived as "too valuable," such as commercial or financial data, frequently related to contracts and agreements, or rather "too worthless" such as low-quality or outdated data. Conversely, logistic or spatial data like timetables, maps, drawings, and measurements are exchanged more willingly because they are more pragmatic for designing and maintaining the infrastructure network, with less threat to an organization's competitive advantage when shared. Our research further shows that most negotiations take place regarding project- and goal-specific data which are most likely to be shared via enclosed platforms, also in the absence of a legal framework or formal contract.

Conclusion

This research article, which provides an anthropological perspective on data sharing to gain insight into how data sharing is enabled and constrained in the inter-organizational context of the Dutch infrastructure sector, makes two main contributions to the fields of business anthropology and organization studies. Firstly, our reconceptualization of data sharing as gift-giving, based on reciprocal relationships of exchange, helps to reveal and grasp the social and cultural dynamics at play, particularly by detailing the perceived challenges and opportunities of sharing data according to the experience and sensemaking of our respondents. Specifically, the interlinking of gift-giving, reciprocity, and data sharing within and across organizations is a novel contribution. Secondly, by zooming in on the challenges and opportunities of data sharing, we add the notion of "*en*closing" entailing the predetermined exchange of restricted data among pre-selected organizations in a balanced reciprocal relationship via a bounded platform, which has practical value for organizations wishing to share data with others. The notion of "*en*closing" encapsulates how professionals can cope with the paradoxical need to open up and share their data while, at the same time, needing to protect their returns and their data. By enclosing the activity of data sharing in a safe space, the involved parties are more likely to trust each other and to commit to a social agreement to exchange data equally for their mutual benefit – such as, for instance, exchanging operational, spatial, or geographical data on their assets to reach their project goal, to save costs, or to streamline work practices and processes for collaboration. While our study, based primarily on interviews, offers insights into these developments, more

ethnographic field research is needed to explore how such enclosed data sharing platforms play out in practice.

The increasing focus on data means that managing the regulation of data ownership and exchange have, and will continue to, become crucial practices of organizing, which are currently still in their infancy in many (inter)organizational settings. From a pragmatic viewpoint, we think that our findings on the opportunities and enclosing of data sharing may help professionals in their future practical applications of data sharing across and in organizations. Our study indicates that deciding *how* and *what* data should be shared or exchanged, with *whom*, and *where* or in what context are pertinent factors to consider. This is a new development where organizations are currently devising frameworks to negotiate the terms and conditions for situational data sharing requiring further research. The understanding of data sharing as foremost a social and cultural activity and a dynamic reciprocal relationship can guide the creation and organization of settings conducive for sharing data.

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