Tilburg University

How to combine rules and commitment in fostering research integrity?

Labib, K.; Tijdink, Joeri; Sijtsma, K.; Bouter, Lex M.; Evans, N.; Widdershoven, Guy

How to combine rules and commitment in fostering research integrity?

Krishma Labib[1], Joeri Tijdink[1,2], Klaas Sijtsma[3], Lex Bouter[2,4], Natalie Evans[1], Guy Widdershoven[1]

[1] *Amsterdam University Medical Centers Vrije Universiteit Amsterdam, Department of Ethics, Law and Humanities, Amsterdam Public Health Institute, 1081HV Amsterdam, the Netherlands*

[2] *Vrije Universiteit Amsterdam, Department of Philosophy, 1081HV Amsterdam, the Netherlands*

[3] *Tilburg University, School of Social and Behavioral Sciences, Department of Methodology and Statistics, 5037AB Tilburg, the Netherlands*

[4] *Amsterdam University Medical Centers, Vrije Universiteit Amsterdam, Department of Epidemiology and Data Science, Amsterdam Public Health Institute, 1081HV Amsterdam, the Netherlands*

Correspondence to Krishma Labib (k.labib@amsterdamumc.nl,+31-20444 8218 / +3120444 8266), ORCID: https://orcid.org/0000-0001-5305-8984

Abstract

Research integrity (RI) is crucial for producing research that is trustworthy and of high quality. Rules are important in setting RI standards, improving research practice and fostering responsible research practices. At the same time, rules can lead to increased bureaucracy, which without commensurate increased commitment amongst researchers towards RI is unlikely to lead to more responsible research behavior. In this paper, we explore the question: How can rules and commitment be combined to foster RI?

There are three ways that research institutions can govern RI: markets (governing through incentives), hierarchies or bureaucracies (governing through rules), and network processes (governing through commitment and agreement at group level). Based on Habermas' Theory of Communicative Action, we argue that network processes focusing on consensus, as part of the lifeworld, are necessary to legitimize and support systems, i.e. market and bureaucratic modes of governance. We analyze the institutional response to a serious RI case to illustrate how network processes can create a context in which rules can foster RI. Specifically, we analyze how the Science Committee established at Tilburg University in 2012 has navigated and combined different modes of governance to foster RI. Based on this case analysis, we formulate recommendations to research institutions on how to combine rules and commitment.

Key words: *research integrity, responsible conduct of research, research misconduct, research governance, bureaucracy, networks, rules, system, lifeworld*

1. Introduction

The replication crisis and prominent cases of research misconduct in the past decade have suggested that research is in 'crisis' (Piper, 2020; Titus & Ballou, 2014). The high prevalence of research misconduct (2-8% according to self-reports) and questionable research practices (QRPs) such as inadequate mentorship and p-hacking (30-50%) jeopardizes not only the quality, relevance and validity of research findings, but also their trustworthiness (Fanelli, 2009; Gopalakrishna et al., 2022; Xie et al., 2021). In response to these concerns, many institutions across the globe have resorted to policies aimed at fostering research integrity (RI) (Mejlgaard et al., 2020), including the adoption of codes of conduct (e.g., All European Academies, 2017; Resnik & Shamoo, 2011), which are translated at an institutional level into rules and procedures. These steps are crucial for setting clear standards about research practice, providing guidance to researchers, as well as encouraging institutions to more actively support researchers to engage in responsible research practices (Bouter, 2020; Mejlgaard et al., 2020).

Rules, however, typically add additional burdens on researchers who are already navigating high workloads, competition, and stress, and these pressures in research may lead researchers to 'cut corners' and engage in QRPs (Haven et al., 2019; Labib, Evans, et al., 2021; Sørensen et al., 2021). Furthermore, rule-based approaches to fostering RI might lead to a 'check-box' mentality where researchers are more concerned about complying with externally imposed rules and requirements, rather than being intrinsically motivated to reflect on how to engage in research responsibly (Hemminki, 2016; Labib, Roje, et al., 2021). If researchers are not internally motivated to engage in responsible research practices, it is unlikely that they will commit to these practices or that institutional policies will have the desired effect (Davies, 2019). In other words, while efforts to foster RI are much needed, if efforts focus only on imposing rules, they can be potentially counterproductive.

Research is inherently a social phenomenon, requiring interaction between individuals who are part of the research community (Anderson et al., 2010); efforts to foster RI should adequately take into account the social context of research to cultivate the commitment of researchers to RI. To understand how efforts to foster RI can adequately take into account the social practices of research, it is helpful to look at three different modes of governance, as described in governance theory, for instance by Thompson and colleagues (1991): 'markets' (governance through incentives); 'hierarchies' (governance through rules); and 'networks' (cooperative governance). In practice, these modes of governance are often implemented in combination, and do not occur in isolation (Thompson et al., 1991), also in the context of research. We propose that fostering RI will require appropriate combination of these different governance modes. Habermas' Theory of Communicative Action – with its core concepts of lifeworld and systems - is a theoretical framework which can provide a normative

explanation of how these modes of governance can be combined most effectively and efficiently in institutional efforts to foster RI.

In this paper, we investigate how research institutions can combine rules with researchers' awareness of and commitment to RI practices. First, we distinguish between three modes of governing social practices as described by governance theorists such as Thompson et al. (1991) and how they can be applied in research governance. Next, we use Habermas' Theory of Communicative action to provide a normative perspective on how the modes of governance should be optimally combined to foster RI. We then present a case analysis to see how our theoretical considerations relate to practice. We explore how the Science Committee of the Tilburg School of Social and Behavioral Sciences (TSB) has navigated between different modes of governance, combining system and lifeworld elements. Based on the insights gained from this case analysis, we end with recommendations to research institutions on how to combine rules and commitment in fostering RI.

2. Governance in research

As discussed by governance theorists (e.g., Pahl-Wostl, 2019; Powell, 1990; Thompson et al., 1991), social life consists of the interaction of various individuals and groups. Organizations are responsible for governing these interactions to ensure they contribute towards the goals of the organization. Three modes of governing social life – markets, hierarchies, and networks – have been identified by governance theorists (e.g., Pahl-Wostl, 2019; Powell, 1990; Thompson et al., 1991), which we will elaborate on further in this section. In governance theory, market refers to an 'automatic' and 'unconscious' way of coordinating social life, which is driven by the self-interest of individuals and groups who are acting and interacting under the guiding hand of market mechanisms (e.g., incentives, demands and prices present in the system). Alternatively, in hierarchies, social life is coordinated by formal procedures and rules aimed at consciously regulating the interaction between agents. In contrast to this, networks are characterized by governance theorists as the cooperation of equal, rather than hierarchically organized, agents who steer themselves cooperatively. Applying markets, hierarchies, and networks to the field of RI can be fruitful in understanding the approaches institutions can take to foster RI.

Market, hierarchical, and network mechanisms can function both outside and within research institutions. Research institutions do not function in isolation but have a complex relationship with other research stakeholders, and the internal governance strategies of the institution are partially determined by external factors. The social practices of research institutions can be externally influenced by market, hierarchical, and also network mechanisms of publishers, funders, and governments. It is important to note that especially publishers', and funders' incentive structures are

thought to be important in influencing RI practices at the research institution (Bouter, 2018; Titus & Bosch, 2010). This is because the number and impact of publications are important for obtaining funding and furthering careers, and there is a low availability of (and therefore high competition for) funding for research.

Markets, hierarchies, and networks also govern research practice and influence RI within research institutions. Table 1 is adapted from Pahl-Wostl (2019), Powell (1990) and Thompson et al. (1991), and provides our application of the three modes of governance to research institutions. In this context, market governance can be seen as regulating research through incentives, for example, for hiring, evaluating and promoting researchers. The incentives used by the research institution will likely mirror incentives imposed by journals and funders. For instance, within the current system of research, many institutions look at the number and impact of publications, as well as prior success in obtaining funding, as important criteria for hiring, evaluating, and promoting researchers (Aubert Bonn & Pinxten, 2021). Thus, bibliometric indicators (e.g., impact factors, Hirsch (H) indices) are used to evaluate research performance. In a market governance mode, researchers are free to behave as they wish, but those who do not obtain incentivized achievements will likely be forced out of the system – since they will not be hired or promoted – pushing all researchers to behave in specific ways that increase their chances of surviving in research. This might include engaging in QRPs, for instance focusing on positive outcomes to publish in high rated journals, rather than responsible research practices; hence the 'publish or perish' analogy in the current research system (Grimes et al., 2018). While individuals in market governance structures may be collegial and want to cooperate with each other, these do not primarily function as drivers for coordination of actual practice. Coordination is driven, instead, primarily through market incentives and strategic actions, and the climate is competitive.

Hierarchical governance of RI by research institutions, on the other hand, is rooted in rules and procedures that are mandated by a governing body. There are clear lines of authority and organizational structures to create a formalized and bureaucratic research environment. As such, researchers are required to comply with specific rules and regulations, for instance regarding the ethical or methodological requirements of study protocols, or data management (e.g., how and where data should be collected, stored and archived). Hierarchies provide a consciously created, procedural and organizational system, and a chain of command. Monitoring for compliance with rules and regulations is essential in evaluating the functioning of this type of research governance.

In the third mode of research governance – networks – researchers cooperatively govern themselves at group level by forming mutual agreements. Researchers' actions are oriented towards their relationships of trust and solidarity with others in the network. They engage with each other in reciprocal and mutually beneficial relationships. Contributing to and being supported by the

community is a key motivation for individuals in the network. It is generally accepted that markets, hierarchies and networks, as modes of governance, do not mutually exclude each other and usually occur in hybrid forms (Pahl-Wostl, 2019; Thompson et al., 1991). However, it is not clear how the three modes of governance influence each other and can be combined in a good way, to optimally foster RI.

Table 1: Key features of different research integrity governance modes

Mode of governance	Market	Hierarchy	Network
Motives of researchers	Obtaining funding Number of publications, particularly in high impact-factor journals	Following the rules of the research institution	Contributing and belonging to the network
Factors limiting actions	Self-interest	Rules	Relationship with others in the network
Drivers of behavior	Incentives	Formal authority	Mutual trust and solidarity
Who governs?	Journals and funders *(since incentives are externally formulated)*	Governing body	All involved in the network
Conflict resolution	Those who obtain incentivized achievements win	Formal procedures	Aiming for consensus
Monitoring & evaluation	Focused on bibliometric indicators	Compliance with rules	Participatory, joint reflection on agreed goals
Tone/climate	Competitive	Formal, bureaucratic	Cooperative

3. Combining modes of governance: relations between systems and lifeworld

Markets, hierarchies, and networks – modes of coordinating social practices as discussed by governance theorists – provide us with an analytical distinction between different approaches that institutions can use to foster RI. To obtain a normative understanding of how the modes of governance can be optimally combined to foster RI, we will use Habermas' 'Theory of Communicative Action' (1981, 1987).

3.1 Communicative and strategic action

Habermas distinguishes between two types of interactions in social practices: *communicative action* occurs when two or more actors are involved in an interaction that is oriented towards understanding and mutual goals (Habermas, 1998b), while *strategic actions* are characterized by interactions in which

each actor aims to reach their own individual goals (Habermas, 1998a). 'Communicative action' is oriented towards consensus. This process entails the exchange of validity claims. Each speaker in the interaction presents validity claims and each listener can accept or refute them (Habermas, 1981 pp. 70-72, 1998a). More specifically, each speaker makes three claims, as their statement can be assessed regarding 1) truth (i.e., Is what the speaker is saying empirically correct?); 2) normative rightness (i.e., Is the speaker's claim in line with what is right according to shared values and standards?), and 3) truthfulness (i.e., Is the speaker genuine and sincere?) (Habermas, 1981 pp. 70-72, 1998a). For instance, if speaker A says: "Good supervision is very important in research", then speaker B can question the claims of 1) truth (e.g., Does the evidence about supervision and its relationship to research practices show this?), 2) normative rightness (e.g., Is good supervision an important value in our research community? Are researchers entitled to good supervision?), and 3) truthfulness (e.g., Is the speaker genuine with this statement or do they just want people to pay them for the supervision training they have on offer?). If all three claims are accepted, communicative action can go on; if one or more claims are refuted, the speaker will have to support them with reasons, or give them up. As such, mutual understanding is built through a process of accepting and rejecting validity claims between two or more actors.

Because this consensus building process is time-consuming, not every interaction that takes place between actors, particularly when it needs to be fast and efficient, can take place through communicative action (Habermas, 1987 pp. 153-189). Sometimes the three validity claims need to be relaxed to allow actors to engage in interactions, which allow them to accomplish goals that do not require reaching mutual understanding. For instance, a faculty head can communicate a policy to the faculty requiring incoming faculty supervisors to complete a supervision training. In this case, reaching mutual understanding between the faculty head and new supervisors is not the goal and there is no need to go through a consensus building process; the goal is rather to ensure that new supervisors are being trained. Actions in which validity claims are relaxed and in which reaching mutual understanding is not a goal but are rather focused on achieving the outcomes of actors in an efficient and fast process, can be referred to as 'strategic actions' (Habermas, 1981 pp. 285-295).

3.2 Applying Habermas' Theory of Communicative Action to Markets, Hierarchies, and Networks

Social practices consist of both communicative and strategic actions (Habermas, 1987 pp. 153-189). Communicative actions are characteristic of the types of interactions that take place in what Habermas refers to as the 'lifeworld' (Habermas, 1987 pp. 113-153). The lifeworld consists of the background resources and contexts in which communicative action takes place (Habermas, 1987 pp. 113-153). As such, network governance would fall within the lifeworld, since network governance operates through communicative action. The lifeworld can be contrasted to 'markets' and 'bureaucracies', which

Habermas calls 'systems'. These are pre-defined modes of interaction among actors – pre-defined in the sense that the three validity claims mentioned earlier of truth, normative rightness and truthfulness, need not be tested, as certain assumptions are taken for granted, and a consensus building process is not carried out (Bohman & Rehg, 2017; Habermas, 1987 pp. 310-331). Social relations in markets and bureaucracies are regulated primarily by money and power, respectively (Habermas, 1987 pp. 154). Since incentives and rules are mechanisms by which money and power operate (Habermas, 1987 p. 159, 307), Habermas' concepts of markets and bureaucracies are comparable to the market and hierarchy modes of RI governance outlined in Table 1. Therefore, we use the terms 'hierarchy' and 'bureaucracy' synonymously to refer to a RI governance mode operating through rules. Strategic, rather than communicative, actions are dominant in markets and bureaucracies (Habermas, 1987 pp. 153-189). According to Habermas, both the lifeworld and systems are necessary for today's social practices (Habermas, 1987 pp. 153-189, 310-331).

In an ideal situation, the agreements that are reached in the lifeworld form the basis for and legitimize the systems (Habermas, 1987 pp. 153-189, 1996a pp. 408-409). For instance, bureaucratic decisions such as whether to mandate training for supervisors, should be rooted in prior lifeworld communicative action processes (e.g., consensus building among the research community about the importance of supervision training for research). Similarly, market mechanisms (e.g., incentives) should preferably be based on agreements made in the lifeworld about what constitutes good research (e.g., quantity or quality of publications). Networks (i.e., as part of the lifeworld) are thus needed to legitimize markets and bureaucracies, while markets and bureaucracies allow for an organized and efficient approach to coordinating actions in a complex environment such as that of research (Habermas, 1987 pp. 153-189).

However, an imbalance can occur between systems and lifeworld, as systems may 'colonize' the lifeworld; in such a case, strategic actions in markets and bureaucracies impinge on the lifeworld and displace communicative action (Habermas, 1987 pp. 310-331). In the context of research, for instance, market mechanisms would colonize the lifeworld when research incentives focused on a high quantity of publications impede on communicative processes in the research community about what entails good research, as well as hinder RI. Similarly, strict regulation of supervision agreements could add pressure and paperwork on researchers' already busy schedules, and actually prevent supervisors and supervisees from engaging in communicative processes about supervision, and reduce the quality of supervision offered.

When the lifeworld is colonized by a system, countervailing power is needed to act against the interference of the system in the lifeworld (Habermas, 1996b). Countervailing power comes from members of the community coming together and becoming actively involved in a deliberative and participatory process aimed at limiting the interference of the system at stake (Habermas, 1996b). For

example, if mandatory supervision training becomes a bureaucratic burden that adds little value to the research community's conception of good research, counterforces could entail the research community (e.g., at the department, the faculty, or the university) working together to change the training offered so that it addresses supervisors' needs. This could mean talking to supervisors directly about the questions and problems for which they require support, as well as what format this support could have, and building training events together with supervisors, which directly address their concerns. Likewise, when market mechanisms (e.g., incentives to publish in high impact journals) interfere in the endeavor of producing high quality studies, members of the research community could work together to change the incentives of research to privilege higher quality research. This could involve developing networks within or between institutions - perhaps something akin to the URKN Local Network Leads (*Local Network Leads*, n.d.) – who together with researchers create new standards for how funders, journals, or institutions can assess who to hire, promote, fund, or publish, which then provide better research incentives (Aubert Bonn & Bouter, 2021).

Applying these insights to the question of how to combine rules and commitment in fostering RI, we argue that institutional RI policies should be anchored in agreements formed among networks of researchers engaged in communicative action, and that deliberative participatory countervailing forces are needed to counter any existing colonization of lifeworld processes in the research community by markets and bureaucracies. As such, rules used to foster RI can be considered as justified and necessary, and garner the commitment of researchers and other stakeholders, so long as they are rooted in network processes, and tendencies towards colonization are recognized and acted against.

4. Case: Tilburg Science Committee and data handling

What does it mean to anchor market or bureaucratic mechanisms in network processes and how can this play out in practice? To answer this question, we present a case focusing on how the Science Committee at the Tilburg School of Social and Behavioral Sciences (TSB) navigated between different governance modes after a highly publicized case of research misconduct was discovered at the institution. The case description is based on a document analysis of the yearly evaluation reports of the Science Committee from 2013-2020, as well as interviews with the former and the current chair of the Science Committee. Obtaining information about the case via these sources allowed for triangulation.

4.1 Case description

In 2011, it was discovered that the dean of the TSB – Diederik Stapel – had engaged in research misconduct, especially fabrication of data. The report which contained the results of the investigation into the misconduct case, concluded that Stapel was solely responsible (Levelt Committee et al., 2012). However, the report also highlighted that the prevailing research culture at the time might have not promoted openness and transparency about data sharing, which could explain why Stapel's misconduct was not discovered earlier. The new dean of the TSB, eager to address the RI concerns established a committee – titled the 'Science Committee' – consisting of researchers from different departments at the TSB having sufficient seniority and knowledge about good data practices and RI, with the goal to improve the culture of RI at the TSB. The exact tasks that the committee would be responsible for were left open.

Upon formation, the Science Committee decided not to impose RI policies on the school in a top-down approach, but instead contacted all department heads at the TSB, to cooperatively explore appropriate approaches to improve RI at the school. In the first two years since the establishment of the committee, the main activity of the committee was to engage in communicative processes with the researchers at the various departments of the TSB to explore how the Science Committee could help foster RI at the school. During these communicative processes, the Science Committee learned that some departments at the school, such as the one where the case of misconduct originated, were eager to introduce measures to improve RI practices. Other departments were less eager to implement measures since they considered their type of research to be vastly different from Stapel's and doubted whether any RI policies would be helpful for their research practice.

Based on these conversations, together with the departments, the members of the Science Committee realized that setting up a 'future-oriented' policy for RI at the school – that is, putting a variety of different measures in place to make sure that research would be conducted responsibly from the outset (including a data management steward, a privacy officer, a research ethics committee, an open-science framework) – would take time and might be met with resistance from researchers perceiving such measures as the school distrusting their research activities. Therefore, it was decided that the Science Committee should start its activities by using a 'hindsight' approach, retrospectively evaluating data practices at the school through 'audits' of published studies, rather than checking these prospectively and providing advice from the start. The idea here was to first learn from the past (i.e., from existing publications and data management practices) and then implement new policy based on past learning and other sources, in small incremental steps forward.

The Science Committee worked with representatives and volunteers in the various departments to develop guidelines on Data Handling and Methods Reporting (DHMR) at the school, as well as an auditing procedure to evaluate the data of studies that had recently been published at the TSB. Thus, the various departments at the school were actively involved in both the decision process

that led to the agreement to create the DHMR and conduct the audits, but also in the actual development of both the DHMR and the audit procedure. The DHMR provided guidance to researchers about the data management standards expected at the audit. The audit procedure entailed a member of the Science Committee meeting with an author of a recently published article from the school to jointly reflect on how the data had been managed and stored for the study at hand and discuss any perceived problems together, with the help of a checklist which served as a tool to guide the discussion (Appendix I). The audits aimed to provide a learning opportunity during which researchers could obtain advice about their practices and ask questions. Although the focus of the audits was on discussing data management of studies, the Committee also used the audits as an opportunity to discuss broader issues relating to RI with researchers. Additionally, the Science Committee members would reflect on the insights gained during the audits in yearly evaluation meetings and form recommendations for adaptations for future years, with the goal to improve the DHMR and audit procedure, and as input for additional future RI policies. The studies for auditing would be randomly selected, so only a random sample of the publications at the school were to be audited (e.g., 14 out of a total of 716 publications at the school were sampled in 2020).

The audit procedure was first piloted among a group of volunteer researchers who then provided feedback about the procedures, including the checklist for questions asked during the audit. The Committee revised both the DHMR and the audit procedure based on the comments and feedback from the various departments, as well as the researchers who participated in the pilot. The first official audits were launched in 2015. The Committee has since held annual meetings to evaluate the results of the audits and reflect on its own functioning, in order to revise and update the auditing procedures. For instance, in the early years of the auditing procedure, it became apparent that papers were often only published after the PhD student – who was often the first author – had left the institution, making it difficult to conduct the audit together with the former PhD student. Therefore, after consultation with the departments, the TSB now requires PhD students to share data with supervisors prior to submitting their thesis, to ensure that data remain available at the TSB. This is not only relevant for the audits, but also for the RI responsibility of the institution and supervisors more broadly (i.e., in terms of having complete information about the data for each study).

The Science Committee has continued its auditing activities at the TSB and has become an integral part of the school. The annual reports of the audits show that researchers are becoming increasingly familiarized with good data practices, although their implementation of these practices is not always perfect. For instance, the report from 2020 showed that all 14 researchers audited had stored their data package in a secure location, but one of them had only made the data accessible to one person instead of two as required by the DHMR. The insights gained during the audits conducted by the Science Committee throughout the years have contributed not only to better data handling

practices at the TSB, but also to combining rules and communication in the development of additional valuable forward-looking RI structures, which include a research ethics committee, RI training for researchers, and assignment of a privacy officer that guides and advises researchers on how to deal with privacy issues in the research process. These additional structures are now also present in other schools at Tilburg University. Many of these structures, like the Science Committee, have a dual function of both educating researchers (e.g., about various ethics considerations that can arise in research) and improving practice, as well as creating bureaucratic control of research practices (e.g., the research ethics committee checks whether ethics requirements have been met).

4.2 Case analysis

This case provides an example of how institutions can implement RI policies which are legitimized and supported by communicative, network processes. Prior to the installment of the Science Committee at the TSB, there was little discussion about RI and few rules existed (Levelt Committee et al., 2012). The dominant governance approach could be said to have been a market one, where researchers' behavior was mostly guided by the incentives present in the system of research (e.g., publishing a large number of articles in high-impact journals and obtaining funding). However, the Science Committee started processes of communication and introduced rules at the TSB on data handling. These network processes included 1) cooperatively developing RI rules and procedures at the school with researchers from all departments rather than implementing these in a hierarchical and top-down approach, as well as 2) organizing audits to continuously communicate with researchers, to educate them about data handling, and reflect with them in order to improve the rules in place based on the insights gained during the audits.

The goal of the Science Committee's audits is not focused on compliance to the DHMR and imposition of rules, but rather on learning and improving the research culture more generally. Some Science Committee members therefore find the term 'audit' somewhat misleading because they see the audits as a 'conversation' or 'interview' with researchers about what entails high quality research and how to achieve it, rather than a compliance-focused bureaucratic procedure. The auditors have a list of questions (Appendix I) that they ask researchers (which are sent to researchers in advance), to learn about how they store their data. The questions serve as a starting point for communication with researchers and discussion of data practices. Instead of criticizing or punishing researchers for not storing data perfectly, the Science Committee members treat the audits as a moment for reflection and learning about better data handling and RI practices. The committee evaluates the results of the audits to continuously adapt and improve the support provided by the Science Committee to the TSB researchers, as well as to provide input to future RI policies at the school. For instance, after the audits in 2020, the Science Committee discussed that the audits revealed that researchers in some

departments receive more support regarding structuring their data management than in other departments. Based on this reflection, they recommended the TBS to make an inventory of the support structures provided by various departments, and help to create more coherence between the support offered to researchers across departments. As such, the insights gained during the audits are used by the Science Committee and the TSB more broadly to understand the data practice problems at the institution with a view to be better equipped to support researchers with responsible practices, rather than to police data practices at the level of individual researchers – unless very serious violations of the DHRM are committed, such as losing data.

The resolution to start a Science Committee was initiated by the school's management team and approved by the departments and TSB council representing both faculty and students . The Science Committee decided to involve all the departments at the school in cooperatively developing policies for RI, rather than imposing policies in a top-down manner. The decision about what the main tasks of the Committee would entail – that is, conducting audits focused on data management – was made jointly by the Science Committee and the departments at the TSB after a year of consensus building and deliberation. Furthermore, the rules set by the Science Committee on data handling were developed cooperatively with the research community, which contributed to their legitimation. As such, while the Science Committee itself is a formal (and hence bureaucratic) body within the TSB, it continuously uses network processes of deliberation and consensus building together with researchers to develop and legitimize its bureaucratic elements.

The Science Committee's approach of using audits to understand and improve data practices within the school rather than police individual researchers has been especially helpful to the TSB since the introduction of the European General Data Protection Regulation (GDPR) (General Data Protection Regulation, 2016). Because the Science Committee members were already familiar with data practices and challenges at the TSB before the GDPR was implemented, they were in a good position to advise the institution how to help navigate the GDPR and relate it to standards of good research practices. For example, the Science Committee members knew that most of the data sets collected and stored at the TSB were already anonymized and therefore not sensitive. Thus, they advised the legal and policy staff at the TSB to only focus on those few studies at the school which included sensitive data when doing privacy assessments. In this way, based on knowledge obtained during conversations with researchers in audits, the Science Committee helped to prevent rules being introduced when they were unnecessary at Tilburg University because of the GDPR, thus countering the potential of colonization of the research lifeworld by bureaucratic procedures.

5. **Discussion and recommendations**

In this article, we explored how institutions can combine rules and commitment in fostering RI. To answer this question, we discussed three modes of RI governance including markets (governing through incentives), bureaucracies (governing through rules), and networks (cooperative governance). Since these modes of governance occur in hybrid forms rather than in isolation, we argued that fostering RI will require appropriate combinations of these modes. We used Habermas' Theory of Communicative Action to discuss how to optimally combine these modes of governance. Namely, we argued that system – i.e. market or bureaucratic – mechanisms to foster RI should be rooted in lifeworld processes, that is, in network mechanisms. In other words, our central claim in the paper is that any rules used to foster RI need justification and support by network processes – communicative, consensus-building action – among the research community within and outside of the institution. Furthermore, action is needed to counter tendencies of markets and bureaucracies to interfere in network processes in the research community. We showed how the Science Committee at the Tilburg University's School of Social and Behavioral Science has created rules on data management, while at the same time fostering researchers' commitment to RI, by using network mechanisms to legitimize bureaucratic rules and procedures and to prevent unnecessary bureaucracy. Based on the insights discussed in this paper, we formulate several recommendations for research institutions on how to combine rules and commitment in fostering RI.

5.1 Recommendations

   1. *Involve researchers in the development of RI rules*

To anchor market and bureaucratic mechanisms in network processes, institutions could involve the research community to cooperatively develop RI rules (Labib, Roje, et al., 2021; Mejlgaard et al., 2020). As an example, we have argued that the TSB's Science Committee has improved RI practices at the TSB by developing rules and procedures about data handling, using deliberation and consensus building with researchers at the various departments of the school. Degn's (2020) work showing that the top-down implementation of institutional policies does not influence researchers' approach to RI, supports the idea that network-oriented communicative processes among the research community are necessary for the implementation of policies that the research community owns and commits to. It could be helpful for institutions to involve researchers in the development of rules in a systematic manner, using co-creation or other participatory methods (e.g., as we have described in Labib, Pizzolato, et al., 2021).

   2. *Approach RI rules and regulations to further the research community's goals, rather than as ends in themselves which need stringent enforcement*

Using bureaucracy to further the community's shared goals can help the research community to become intrinsically motivated to engage in responsible research practices, rather than doing so because of potential punishments, and might thereby prevent a 'check-box' mentality (Labib, Roje, et al., 2021). For instance, audits can serve as a valuable communicative tool for learning, exchanging knowledge, and exploring mutual goals, rather than policing (Gerritsen et al., 2021). At the TSB, the audits are focused on education and reflecting on data handling and RI more generally, and this has helped to increase awareness of RI. Also, unnecessary rules are prevented, countering the tendency of the bureaucratic system to colonize the lifeworld. Bureaucracies that become ends in themselves could lead to a policing culture at the institution where researchers are under pressure to comply with externally imposed rules that they might not believe in (DuBois, 2004). Of course, that is not to say that serious misbehavior should not be addressed appropriately if it arises, as dealing with misconduct and its negative consequences appropriately is also in the interests of the community (Fanelli et al., 2015; Labib, Roje, et al., 2021).

3. *Implement RI policies gradually to allow sufficient time to anchor bureaucracies in network processes, but also use momentum when there is increased attention for RI*

Implementation of new policies and initiatives can take time, not only due to procedural issues, but also due to the need for reflection on the values behind the policies and their relationship to community goals and culture (Gerritsen et al., 2021; Vasconcelos et al., 2015). Changing attitudes towards RI and forming agreements with stakeholders across the network about what measures to take can be a slow process (Coates, 2014). Institutions will likely benefit from gradual implementation of new policies, to allow for sufficient time for network process to create commitment of researchers to these policies (Adams et al., 2014; Horbach & Halffman, 2018; Vasconcelos et al., 2015). However, the need to carefully define and reflect on RI criteria does not exclude the possibility – in some situations such as the occurrence of misconduct cases – for policy makers to make top-down decisions about introducing RI policy. After such decisions, the process of implementation requires time and inclusion of stakeholders as can be seen in the case of the TSB, in which the initiative to install a Science Committee to foster RI was taken by the management team in a top-down manner after which the exact tasks and responsibilities of the Committee were developed together with researchers from the departments. Indeed, we see that cases of misconduct elsewhere have also led to important policies and changes aimed at fostering RI (Jones, 2003; Opel et al., 2011; Resnik, 2014). This suggests that the shock caused by the discovery of cases of misconduct in the research community may be an important catalyst in legitimizing the introduction of new RI policies aimed at preventing such cases in the future, but participation of researchers through network processes is also needed for legitimation.

4. *Legitimize rules through network processes continuously rather than only in the initial implementation stage, for updating and improvement of RI policies*

Legitimization of rules requires the involvement of the affected network of researchers not only in the initial creation process of bureaucracies, but also in regular evaluations and updating (Pires, 2011; Weller, 2020). This is important to explore whether the rules serve community goals in practice, or if any adjustments are needed, and to reevaluate community goals (Pires, 2011; Weller, 2020). The latter might especially be important when new developments in research, such as the introduction of new regulations (e.g., the GDPR) or standards (e.g., related to open science) emerge. Continuous adaptation and legitimization is especially important in serving as a countervailing force against any potential colonization of communicative processes by market and bureaucratic processes. The TSB case shows the need for continuity of audits to reflect on the basic principles of RI and their application in data management; in addition, policies concerning data management should be related to a wider discussion of the importance of RI for research practice.

5. *Use RI policies to foster awareness and good practice of individual researchers and to address challenges and opportunities for RI at the institutional level, and relate them to developments in the larger research community*

Using RI policies to promote responsible research practice at an individual level, as well as address RI challenges and opportunities at an institutional level – as done by the TSB Science Committee, – can prevent researchers from experiencing rules as a policing tool (Labib, Roje, et al., 2021; Landi et al., 2015; Mejlgaard et al., 2020). Such an approach to organizational culture where the emphasis lies on learning from challenges and mistakes rather than punishing individual persons has been termed as 'just culture' and described as important in increasing the safety and quality of the work at the organization (Dekker, 2009; Khatri et al., 2009). Of course, this should be balanced with making researchers take accountability for their actions when they have engaged in clearly unacceptable behavior (Dekker, 2009). Additionally, relating the policies to developments in the larger researcher community – for instance by sharing experiences with other institutions (e.g., Sijtsma, 2017) – can be valuable in exchanging insights and joint learning, and therefore in legitimizing RI policies on a broader scale.

5.2 Strengths and limitations

In this study, we combine a theoretical perspective with a case analysis to reflect on how to combine rules with commitment in fostering RI. Our theoretical perspective brings together the conceptual approach of governance theory with Habermas' analysis of societal development, including a normative view concerning the relationship between systems and lifeworld. Our case analysis,

informed by a document analysis and interviews with the former and current Science Committee chairs at the TSB, provides a real-life example of this. The chairs are well informed about the functioning of the Science Committee and likely have a more complete overview than others, including regular members.

However, our case analysis is limited to the perspectives of the past and present TSB Science Committee chairs. We do not have direct information about researchers' experiences in dealing with the committee, which could provide additional insights on the commitment of TSB's researchers toward RI. Furthermore, while this case provides important insights in the issue how various governance approaches can be combined to foster RI, it mostly focused on bureaucracies and networks, whereas reshaping market governance can also be valuable in fostering RI, particularly considering that perverse incentives in research are seen as a factor contributing to research misconduct and QRPs (Edwards & Roy, 2017). In fact, there are many initiatives currently to address incentives in research to reward responsible research practices rather than quantity of publications (see Aubert Bonn & Bouter, 2021 for an overview of initiatives).

5.3 Conclusion

In this paper, we argued that institutions should use network processes to develop and legitimize rules that foster RI in research institutions. As an example, we showed how the Science Committee at Tilburg University's TSB has involved the researchers at the school's departments in the process of creating and applying rules and procedures (i.e., regulations on data management). This has been used to garner the commitment of researchers to RI rules. Based on our analysis of the Science Committee, we have formulated five recommendations that can be valuable for research institutions in developing RI policies.

References

Adams, V., Burke, N. J., & Whitmarsh, I. (2014). Slow research: thoughts for a movement in global health. *Medical Anthropology*, *33*(3), 179–197.

All European Academies. (2017). *The European Code of Conduct for Research Integrity*. All European Academies. https://www.allea.org/wp-content/uploads/2017/05/ALLEA-European-Code-of-Conduct-for-Research-Integrity-2017.pdf

Anderson, M. S., Ronning, E. A., Vries, R. De, & Martinson, B. C. (2010). Extending the Mertonian norms: scientists' subscription to norms of research. *The Journal of Higher Education*, *81*(3), 366–393.

Aubert Bonn, N., & Bouter, L. (2021). Research assessments should recognize responsible research practices—Narrative review of a lively debate and promising developments. In *OSF Preprints*. https://doi.org/10.31222/osf.io/82rmj

Aubert Bonn, N., & Pinxten, W. (2021). Advancing science or advancing careers? Researchers' opinions on success indicators. *PloS One*, *16*(2), e0243664.

Bohman, J., & Rehg, W. (2017). *Jürgen Habermas*. The Stanford Encyclopedia of Philosophy. https://plato.stanford.edu/entries/habermas/#TheComAct

Bouter, L. (2018). Fostering responsible research practices is a shared responsibility of multiple stakeholders. *Journal of Clinical Epidemiology*, *96*, 143–146.

Bouter, L. (2020). What Research Institutions Can Do to Foster Research Integrity. *Science and Engineering Ethics*, 1–7.

Coates, H. L. (2014). Ensuring research integrity: The role of data management in current crises. *College & Research Libraries News*, *75*(11), 598–601. https://doi.org/https://doi.org/10.5860/crln.75.11.9224

Davies, S. R. (2019). An ethics of the system: Talking to scientists about research integrity. *Science and Engineering Ethics*, *25*(4), 1235–1253.

Degn, L. (2020). Integrating integrity: The organizational translation of policies on research integrity. *Science and Engineering Ethics*, *26*(6), 3167–3182.

Dekker, S. W. A. (2009). Just culture: who gets to draw the line? *Cognition, Technology & Work*, *11*(3), 177–185.

DuBois, J. M. (2004). Is compliance a professional virtue of researchers? Reflections on promoting the responsible conduct of research. *Ethics & Behavior*, *14*(4), 383–395.

Edwards, M. A., & Roy, S. (2017). Academic research in the 21st century: Maintaining scientific integrity in a climate of perverse incentives and hypercompetition. *Environmental Engineering Science*, *34*(1), 51–61.

Fanelli, D. (2009). How many scientists fabricate and falsify research? A systematic review and meta-analysis of survey data. *PloS One*, *4*(5), e5738.

Fanelli, D., Costas, R., & Larivière, V. (2015). Misconduct policies, academic culture and career stage, not gender or pressures to publish, affect scientific integrity. *PloS One*, *10*(6), e0127556.

Gerritsen, S., van Melle, A. L., Zomer, L. J. C., Widdershoven, G. A. M., & Voskes, Y. (2021). Communities of Practice in Acute and Forensic Psychiatry: Lessons Learned and Perceived Effects. *Psychiatric Quarterly*, *92*(4), 1581–1594.

Gopalakrishna, G., Ter Riet, G., Vink, G., Stoop, I., Wicherts, J. M., & Bouter, L. M. (2022). Prevalence of questionable research practices, research misconduct and their potential explanatory factors: A survey among academic researchers in The Netherlands. *PloS One*, *17*(2), e0263023.

Grimes, D. R., Bauch, C. T., & Ioannidis, J. P. A. (2018). Modelling science trustworthiness under publish or perish pressure. *Royal Society Open Science*, *5*(1), 171511.

Habermas, J. (1981). *The Theory of Communicative Action 1 - Reason and the Rationalization of Society* (T. McCarthy (Ed.)). Beacon Press.

Habermas, J. (1987). *The Theory of Communicative Action 2 - Lifeworld and System: A Critique of Functionalist Reason* (T. McCarthy (Ed.)). Beacon Press.

Habermas, J. (1996a). *Between Facts and Norms - Contributions to a Discourse Theory of Law and Democracy* (W. Rehg (Ed.)). MIT Press.

Habermas, J. (1996b). Civil Society and the Political Public Sphere. In W. Rehg (Ed.), *Between Facts and Norms: Contributions to a Discourse Theory of Law and Democracy* (pp. 329–387). MIT Press.

Habermas, J. (1998a). Social action, purposive action, and communication. In M. Cooke (Ed.), *On the pragmatics of communication* (pp. 105–183). MIT Press.

Habermas, J. (1998b). Some further clarifications on the concept of communicative rationality. In M. Cooke (Ed.), *On the pragmatics of communication* (pp. 307–342). MIT Press.

Haven, T., Bouter, L., Smulders, Y. M., & Tijdink, J. (2019). Perceived publication pressure in Amsterdam: Survey of all disciplinary fields and academic ranks. *PloS One*, *14*(6), e0217931.

Hemminki, E. (2016). Research ethics committees in the regulation of clinical research: comparison of Finland to England, Canada, and the United States. *Health Research Policy and Systems*, *14*(1), 1–12.

Horbach, S. P. J. M., & Halffman, W. (2018). The changing forms and expectations of peer review. *Research Integrity and Peer Review*, *3*(1), 1–15.

Jones, A. H. (2003). Can authorship policies help prevent scientific misconduct? What role for scientific societies? *Science and Engineering Ethics*, *9*(2), 243–256.

Khatri, N., Brown, G. D., & Hicks, L. L. (2009). From a blame culture to a just culture in health care.

Health Care Management Review, *34*(4), 312–322.

Labib, K., Evans, N., Roje, R., Kavouras, P., Reyes Elizondo, A., Kaltenbrunner, W., Buljan, I., Ravn, T., Widdershoven, G., Bouter, L., Charitidis, C., Sørensen, M. P., & Tijdink, J. (2021). Education and training policies for research integrity: Insights from a focus group study. *Science and Public Policy*, *scab077*. https://doi.org/https://doi.org/10.1093/scipol/scab077

Labib, K., Pizzolato, D., Stappers, P. J., Evans, N., Lechner, I., Widdershoven, G., Bouter, L., Dierickx, K., Bergema, K., & Tijdink, J. (2021). Using co-creation for guideline development - How why and when? *OSF Preprint*. https://doi.org/10.31219/osf.io/cg3rw

Labib, K., Roje, R., Bouter, L., Widdershoven, G., Evans, N., Marušić, A., Mokkink, L., & Tijdink, J. (2021). Important topics for fostering research integrity by research performing and research funding organizations: a delphi consensus study. *Science and Engineering Ethics*, *27*(4), 1–22.

Landi, M. S., Shriver, A. J., & Mueller, A. (2015). Consideration and checkboxes: incorporating ethics and science into the 3Rs. *Journal of the American Association for Laboratory Animal Science*, *54*(2), 224–230.

Levelt Committee, Noort Committee, & Drenth Committee. (2012). *Flawed science: The fraudulent research practices of social psychologist Diederik Stapel*. https://www.tilburguniversity.edu/sites/default/files/download/Final report Flawed Science_2.pdf

Local Network Leads. (n.d.). Retrieved July 6, 2022, from https://www.ukrn.org/local-network-leads/

Mejlgaard, N., Bouter, L., Gaskell, G., Kavouras, P., Allum, N., Bendtsen, A.-K., Charitidis, C. A., Claesen, N., Dierickx, K., Domaradzka, A., Reyes Elizondo, A., Foeger, N., Hiney, M., Kaltenbrunner, W., Labib, K., Marušić, A., Sørensen, M. P., Ravn, T., Ščepanović, R., … Veltri, G. A. (2020). Research integrity: nine ways to move from talk to walk. *Nature*, *586*, 358–360.

Opel, D. J., Diekema, D. S., & Marcuse, E. K. (2011). Assuring research integrity in the wake of Wakefield. *British Medical Journal*, *342*(342:d2).

Pahl-Wostl, C. (2019). The role of governance modes and meta-governance in the transformation towards sustainable water governance. *Environmental Science & Policy*, *91*, 6–16.

Piper, K. (2020). *Science has been in a "replication crisis" for a decade. Have we learned anything?* https://www.vox.com/future-perfect/21504366/science-replication-crisis-peer-review-statistics

Pires, R. R. C. (2011). Beyond the fear of discretion: Flexibility, performance, and accountability in the management of regulatory bureaucracies. *Regulation & Governance*, *5*(1), 43–69.

Powell, W. W. (1990). Neither market nor hierarchy: Network forms of organization. *Research in Organizational Behavior*, *12*, 295–336.

Resnik, D. B. (2014). Scientific misconduct and research integrity. *Handbook of Global Bioethics*, 799–810.

Resnik, D. B., & Shamoo, A. E. (2011). The Singapore Statement on Research Integrity. *Accountability in Research*, *18*(2), 71–75.

Sijtsma, K. (2017). Never waste a good crisis: Towards responsible data management. *Keynote Lecture on the 5th World Conference on Research Integrity*. https://wcrif.org/images/2017/documents/2. Tuesday May 30, 2017/1. Aula/K. Sijtsma - Never waste a good crisis - Towards responsible data management.pdf

Sørensen, M. P., Ravn, T., Marušić, A., Elizondo, A. R., Kavouras, P., Tijdink, J. K., & Bendtsen, A.-K. (2021). Strengthening research integrity: which topic areas should organisations focus on? *Humanities and Social Sciences Communications*, *8*(1), 1–15.

Thompson, G., Frances, J., Levacic, R., & Mitchell, J. (1991). *Markets, hierarchies and networks: the coordination of social life* (1st Editio). Sage Publications.

Titus, S., & Ballou, J. M. (2014). Ensuring PhD development of responsible conduct of research behaviors: Who's responsible? *Science and Engineering Ethics*, *20*(1), 221–235.

Titus, S., & Bosch, X. (2010). Tie funding to research integrity. *Nature*, *466*(7305), 436–437.

Vasconcelos, S. M. R., Sorenson, M. M., Watanabe, E. H., Foguel, D., & Palácios, M. (2015). Brazilian science and research integrity: Where are we? What next? *Anais Da Academia Brasileira de Ciências*, *87*, 1259–1269.

Weller, A. (2020). Exploring practitioners' meaning of "ethics," "compliance," and "corporate social responsibility" practices: A communities of practice perspective. *Business & Society*, *59*(3), 518–544.

Xie, Y., Wang, K., & Kong, Y. (2021). Prevalence of research misconduct and questionable research practices: A systematic review and meta-analysis. *Science and Engineering Ethics*, *27*(4), 1–28.

Declarations

Authors' contributions

Drafting of article – KL

Article revision – KL, JT, KS, LB, NE, GW

Supervision – GW