

The missing link: How university managers mediate the impact of a performance-based research funding system

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Abstract

The impact of Performance-based Research Funding System (PRFS) has received increasing attention in recent years. However, the literature has focused on individual-level or country-level effects, mostly ignoring the ‘missing link’ between PRFSs and their effects: university managers. Drawing upon the sociology of numbers and theories of organizational translation, this article uses the concepts of *actionability* and *legitimacy* to analyse how and why managers at two Danish universities undertook local translations of a new Bibliometric Research Indicator (BRI). While scholars have emphasized how research evaluation systems can be either strong or weak by design, this study demonstrates how local managers to some extent *make* national systems strong or weak. The study also finds though that managers’ translations are conditioned by a range of background factors. These factors are identified as *financial incentives*, *problem definitions*, *indicator competition*, and *identity and culture*.

Key words: research evaluation; performance-based research funding systems; university managers; sociology of numbers; organizational translation.

1. Introduction

National Performance-based Research Funding Systems (PRFSs) have become widespread in Europe since the 1980s, when the UK was a frontrunner (Martin and Whitley 2010), and they can be seen as symptomatic of the arrival of New Public Management in the higher education sector (Hicks 2012; de Rijcke et al. 2015). Although PRFSs vary greatly, they share many characteristics and rationales, most prominently the desire to boost productivity, quality, and accountability (Hicks 2012). These research evaluation systems, in which funding is tied directly to performance on research-output indicators, naturally attract considerable attention from scholars studying science policy, research evaluation, and higher education. However, some aspects of PRFS impact remain poorly understood, especially concerning the link between PRFSs and the behaviour of individual researchers, which might be one explanation why evidence on PRFS effect on performance is still inconclusive (Aagaard 2015).

Scholars have carried out a number of general studies on different national PRFSs (Schneider 2009; Good et al. 2015), on how PRFSs affect national research output (Butler 2003; Jimenez-Contreras,

Anegon and Lopez-Cozar 2003; Moed 2008; Ingwersen and Larsen 2014), and on how PRFSs affect researcher motivation and behaviour (Opstrup 2014; Aagaard, Bloch and Schneider 2015; Bloch and Schneider 2016). However, there are few studies on how universities handle the introduction of national PRFSs (Aagaard 2015; Hammarfelt et al. 2016). The few studies with this focus reveal differences in terms of how indicators are used locally (Gläser et al. 2010; Hammarfelt et al. 2016; Mouritzen, Opstrup and Pedersen 2018; Woelert and McKenzie 2018),¹ but none look into the management practices that condition these differences. As the only study focusing on these practices emphasises though, management practices can indeed be seen as the ‘missing link’ between national systems and researcher behaviour (Aagaard 2015) and are therefore vital to explore.

This article analyses how managers at two Danish universities, Aalborg University (AAU) and the University of Copenhagen (UCPH), reacted to the introduction of the Bibliometric Research Indicator (BRI), which was a new element of the revised PRFS that was introduced at a national level in 2010. The focus will be on reactions to the BRI, which was the only new element in the revised PRFS. As will become clear from this article, the BRI was deeply

implemented in one case (AAU) while only superficially implemented in the other (UCPH) because managers chose to react differently. By analysing these divergent managerial reactions, the article seeks to answer the following research question: *How and why did managers make local translations of the Danish BRI?*

This article combines contributions from the sociology of numbers (Porter 1995; Espeland and Stevens 2008) with theories of organizational translation (Czarniawska and Joerges 1996; Røvik 2007; Sahlin et al. 2017) to investigate local implementation of the BRI. In combining these literatures, the article stresses that, if we are to understand why indicators become influential, it is important to consider both the construction of indicators themselves (and their more general qualities as numerical representations of reality) and the organizational contexts in which they are used. As will be demonstrated, numbers are not authoritative *per se* but can become so when local conditions, as interpreted by managers, are conducive to their success.

Following this introduction, Section 2 describes the BRI in greater detail. Section 3 develops the theoretical framework, followed by a description of data and methods in Section 4. Section 5 analyses how the BRI was translated to the local contexts of the two universities, drawing upon the theoretical framework. Section 6 discusses in greater detail a number of background factors that condition the BRI's local translations. Section 7 provides a conclusion.

2. The BRI

The BRI was introduced in 2010 as a result of negotiations, most notably between the Ministry of Science and Higher Education and Universities Denmark (the association of Danish universities), which ultimately decided to develop a research indicator based on the Norwegian model (Aagaard and Schneider 2012). The steering committee behind development of the new indicator described the BRI's purpose as follows: 'The aim of the indicator is to strengthen the quality of Danish research and support behaviour which promote publishing in the most recognized peer reviewed publication channels' (Faurbæk 2007: 1).

Like the Norwegian model, the Danish model sought to develop an indicator for research production that countered some of the problems with both undifferentiated publications counts (which measure only quantity) and citation-based indicators (which are backward looking and favour the natural sciences) (Aagaard et al. 2015). The solution was an indicator-based system in which a peer-review element added a 'quality' dimension. Another important feature was that the indicator did not rely upon data from one of the dominant publishers of academic journals (e.g. Web of Science from Thompson Reuters) but was developed from the universities' own registration of publications. This enabled the BRI to better cover the humanities and social sciences where publication outlets in Danish and in book format were more widespread than in the natural sciences (Schneider 2009).

The BRI was, at the time of the interviews, very simple. Groups of researchers appointed by Universities Denmark evaluated all the relevant journals (and book publishers) in the field and placed them at two levels. Level 1 held all the journals meeting some minimum standards (e.g. being peer reviewed), and Level 2 held the top 20% of journals in the field.² Articles published in Level 1 journals yielded 1 point, while articles published in Level 2 journals yielded 3 points. With these two levels in the model, the system's designers

hoped to prevent gaming (i.e. producing more articles of lesser quality), as was seen in an Australian case, which used undifferentiated publication counts in the PRFS (Butler 2003).

The performance of each university, in terms of total awarded BRI points, determined the distribution of a small fraction of the total basic funding for research. This amounted to around 1% of funding at the time when the BRI was introduced in 2010 and represented around 4% of funding in 2016 (Aagaard 2016). The distribution level was low because the BRI only counted for 25% in the PRFS model (student activity is 45%, external funding is 20%, and PhD production is 10%) and, importantly, because the entire model was only used for 'new' funding (i.e. funding added to the system after the introduction of the BRI). Furthermore, the model only redistributed funding within each of the major academic areas. Instead of a common pot, there was a separate pot for each academic area (Health, Humanities, etc.).

In terms of implementation, one level of implementation of the model was mandatory: all universities had to deliver raw data on publications to the ministry, and, in turn, some of the university funding was then based on this performance. However, universities decided themselves if they wished to somehow use the national system locally. When the present article uses the terms *implementation* and *translation*, these refer to this second level of implementation.

3. Theory

It is often taken for granted that numbers create change when put to use. There is 'strength in numbers' (Porter 1994), numbers 'commensurate' (Espeland and Stevens 2008), numbers create 'reactivity' (Espeland and Sauder 2007), and indicators have 'constitutive effects' (Dahler-Larsen 2014). Reacting to the traditional belief that numbers merely reflect reality, scholars in the sociology of numbers have focused on the constitutive nature of numbers. Not only are numbers social artefacts, often being constructed in far-from-innocent politico-administrative contexts, but also are also active in constructing the social world when they are put to use (Espeland and Stevens 2008). There is thus great power in being able to define how numbers are constructed.

A central assumption in the sociology of numbers is that the strength in numbers hinges upon their ability to commensurate phenomena (Espeland and Stevens 2008). They render comparable phenomena that were otherwise incomparable. In the case of the BRI, they transform a worldwide selection of various journals with different subject matters, different organizations, and different purposes into two simple categories: Level 1 and Level 2. In addition to commensurability as a source of their power, numbers purportedly gain power simply by being numbers. Because quantitative representations hold an aura of objectivity, they are generally seen as more legitimate than qualitative representations of reality (Porter 1995).

However, while the above considerations might elucidate why numbers in general possess strength, they have less to say about why the strength of numbers can differ. Why does the same number fail to gain importance in one context and succeed in another? The possible 'weakness' of numbers is, in fact, an aspect that has been somewhat neglected in the sociology of numbers (Asdal 2011). This is also the case in the public administration literature, in which scholars have typically studied failing governance by numbers in terms of gaming (Bevan and Hood 2006), perverse effects (Van Thiel and Leeuw 2002), or goal displacement (Perrin 1998), with less attention

being paid to the types of unsuccessful use in which numbers fail to have any effect at all (van Dooren, Bouckaert, and Halligan 2010).

Nevertheless, in the study of numbers devoted specifically to indicators, there have been some attempts to analyse the organizational conditions that are conducive to their influence. Most such studies focus on the construction of these indicators (Mickwitz and Melanen 2009); focus on their politico-administrative contexts (Innes 1990; Van Dooren 2009); or develop elaborate, all-encompassing models that are unfit for an empirical analysis (Lehtonen 2013). There are only few in-depth, qualitative analyses that focus on organizational context as a mediator of indicator influence. This focus is especially needed in the present study, in which the local contexts at the two universities seem to be the obvious explanation for the stark differences in the influence of the *same* indicator. This article thus combines the sociology of numbers with organizational theory, specifically by drawing upon translation theory within institutional theory (Czarniawska and Joerges 1996; Røvik 2007; Sahlin et al. 2017). This choice is motivated by the initial analysis of the empirical material, which revealed that the BRI is not simply used or not used. Instead, attempts are often made to mould the BRI to fit the organizational context. I thus choose to analyse organizational handling of the BRI as cases of translation.

Translation is a central concept in Scandinavian institutionalism. It describes the process by which organizations adopt general ideas, concepts, techniques, systems, etc., and translate them to match the local contexts (Røvik 2007; Sahlin et al. 2017). While traditional institutional theory emphasizes isomorphism—which can certainly be seen as an important mechanism in explaining why so many countries have PRFSs (Hicks 2012)—translation theory and Scandinavian institutionalism emphasize organizational variation (Boxenbaum and Pedersen 2009). I rely primarily upon the insights from translation theory as developed by Røvik (2007). Røvik develops a position he terms *pragmatic institutionalism*, which takes inspiration from both the modernist/rational tradition (referring e.g. to the scientific management tradition) and the social constructivist tradition (referring mainly to neo-institutionalism). This position, grounded in the philosophical tradition of pragmatism (Dewey 1958), is characterized by a strong empirical orientation and an eye for ambiguity: the intentions behind translations of ideas are most often both instrumental (i.e. translating an idea to solve a specific local problem) and symbolic (i.e. translating an idea to make it more appropriate to the organizational context).

Actors adopt different strategies when translating ideas to their organizational contexts. Røvik (2011) identifies these modes of translation as *copying* (an approximate copy of the original idea), *adding* (adding elements to the original idea), *subtraction* (removing elements from the original idea), and *alteration* (radically changing the original idea). These modes represent different degrees of alteration of the original idea on a continuum from none/low (copying) to moderate (adding and subtraction) to high (alteration). *Rejection* is also a possible handling of an idea but is not a form of translation since nothing is done with the idea.

Actors cannot, however, undertake a translation independent from the source. The construction of indicators sets limits to local translations. In the following, I develop a set of analytical categories for analysing why specific translation modes are used. Drawing upon both the sociology of numbers and translation theory, I specify how the *actionability* and *legitimacy* of an indicator adds to the likelihood of different translation modes. Simply put, the more *actionable* and *legitimate* an indicator is in the eyes of the translator, the more likely a low level of alteration of the original idea (i.e. the

copying mode of translation). In contrast, the less *actionable* and *legitimate* an indicator is, the more likely a high level of alteration (or simply a rejection) of the original idea. Furthermore, when engaging with other forms of translation than copying (and rejection), the ways in which actors chose to translate indicators should be seen as attempts at boosting the *actionability* and/or *legitimacy* of an indicator. In other words, when actors engage in translation, they do so to make the original indicator more useful (actionability) and more appropriate (legitimacy) for their purpose.

3.1 Actionability

If the construction of an indicator makes it possible, in the eyes of the actor, to act on the indicator to achieve certain strategic aims, I call it *actionability*. Inspired by evaluation use theories, this concept is similar to the *utility test*: the extent to which a study (or indicator) 'provides explicit and practical direction on matters they can do something about' (Weiss and Bucuvalas 1980: 308). In the sociology of numbers, we also find the claim that numbers need to be seen as useful for solving specific problems (Espeland and Stevens 2008). The concept is a good match with the pragmatic institutionalist perspective of Røvik, which emphasizes that actors (also) use ideas as instruments to solve specific problems. The idea is similar to what March and Olsen (1989) call 'the logic of consequentiality', a logic that emphasizes the rational-instrumental intentions and considerations of expected consequences of different actions (March and Olsen 1989).

Actionability hinges on actors who believe it is possible to achieve desirable results by using the indicator. Actors' interpretations of 'desirable results' could, of course, be seen in the light of what targets are regarded as legitimate (the other analytical category) to strive for in the context. However, with this analytical category, I focus on how actors themselves refer to their reasoning concerning the indicator in terms of the possible instrumental effects they consider when deciding upon a course of action.³

3.2 Legitimacy

When actors see an indicator as good and right, I call it *legitimacy*. An indicator has legitimacy when actors believe that a measure accurately captures the phenomena it purports to measure. This dimension is similar to part of the *truth test*, which Weiss and Bucuvalas (1980) find to be important to the extent of evaluation use: namely, the research quality (which in this case translates to indicator quality). Legitimacy is thus partly about the number's first-order accuracy in capturing the phenomenon. The quantification literature also underscores the importance of a quality aspect for the authority of numbers. However, in this literature, quality is not just a matter of scientific, objective accuracy but depends on subjective interpretations by actors involved in the use (or non-use) of the indicator (Espeland and Stevens 2008). From this perspective, quality is therefore not something that can be objectively determined but will, in the case of scientometrics, depend on the epistemic traditions of the discipline under evaluation (Ochsner, Hug and Galleron 2017).

Legitimacy also relates to the more broadly perceived appropriateness of using the indicator. This line of thinking is supported by what March and Olsen (1989) calls 'the logic of appropriateness'. The historical association between, on the one hand, using numbers and, on the other hand, rationality and objectivity (Espeland and Stevens 2008) generally underpins the *legitimacy* of quantitative indicators. Nevertheless, universities are organizations with complex

tasks and a wide range of outputs and difficult-to-measure outcomes (Olsen 2007). Some actors might thus find quantitative indicators inherently problematic.

4. Data and methods

This article is based on interviews and documents collected in 2016 and early 2017 as part of a Nordic research project on the consequences of changes in management at Nordic universities. Even though all eight Danish universities share most of the same basic organizational structures, some of which are regulated by the University Act, they also differ substantially from one another. The two universities in this study differ in key organizational characteristics, and thus together display at least some of the breadth of managerial reactions to the BRI. The UCPH is an old, flagship university established in 1479 and is among the highest-ranked universities in Denmark (at the time of interviews). AAU is a newer, mostly regional university, established in 1974, and ranks medium–low compared with other Danish universities.⁴ To enhance further the breadth in managerial reactions, faculties/departments of social science and natural science were included as cases in both universities. Other studies point to the importance of academic fields and disciplines in the reactions to bibliometric indicators (Aagaard 2015). Furthermore, the empirical observation that the BRI was indeed received so differently between these two universities makes it an interesting comparison. However, I do not claim that this is a representative sample of how Danish universities translated the BRI. Such a sample is unnecessary, since my aim is to explore how PRFS can have very different effects depending on local conditions and managerial reactions.

Twenty-eight interviews were carried out: 15 at AAU and 13 at UCPH. Ten respondents had top management experience as vice chancellors, deans, or university directors; seven were middle managers (department heads, section heads, faculty heads, or study line heads), and the rest were senior staff members (associate or full professors). In addition, an employee at the Danish Agency for Science, Technology, and Innovation, which has been involved in running the BRI from the time of its inception, was interviewed.

The interviews were carried out as part of a research project on general changes in governance and management and their consequences. However, because we knew from the outset that the BRI was probably going to be an important theme, we included questions about the BRI in all interviews. The data are thus both rich on the BRI and the more general organizational context, which allows for a context-sensitive analysis of why the universities translated the BRI differently.

The analysis is based mainly on the experiences of managers who have been important in the decision-making process surrounding the BRI's implementation. Decision-making on use would obviously be collective to some extent, but with the management reform in 2003, managers on all levels were empowered considerably, now being appointed instead of elected. In addition, all former bodies of academic influence was changed from decision-making bodies to advisory bodies (Degn and Sørensen 2015). Furthermore, most of the managers did not themselves speak of decisions on indicator use as collective but instead emphasized that it was their own decision. Although the decisions on BRI use took place up to 6 years prior to the interviews, we managed to interview at least one key decision maker at both university and faculty levels in most cases (exceptions will be noted in the analysis).

5. Analysis

This section analyses the local translations of the BRI at AAU and UCPH using the concepts of *actionability* and *legitimacy* from the theoretical framework.

5.1 Aalborg University

When the BRI and the revised PRFS system were introduced in 2010, it was clear to AAU's management that this called for an immediate response. The upper management at AAU was convinced that the financial incentives were substantial and suspected that the financial incentives of the BRI would continue to grow: 'The ministry, I think, or at least there was an idea, some feared it, and some thought it sounded really interesting, if all research funds was distributed bibliometrically' (upper-level manager, DK19). The management clearly felt that it could use the new PRFS system as an instrument for dealing with the low level of research funding at the university. High *actionability* was thus an important explanation for the management's decision to introduce the national PRFS system directly into the budgetary model for allocating funding to the lower levels. At the same time, the revised PRFS also had a somewhat high *legitimacy* because the university already had a similar system in place for allocating funding according to research performance (though this university-level system was simpler and, in terms of data collection, more time-consuming). Bibliometrics-based funding distribution was thus in line with existing routines. This also fit the more general view of the upper-level management at the time, which was committed to creating internal competition (i.e. it was seen as fair that those who performed well should receive even more support). This mechanism was also reported as possibly important in a study of local responses to the Australian PRFS (Gläser et al. 2010). Nevertheless, the *legitimacy* of the BRI's technical construction was questioned, stressing that good research did not necessarily have to be published in an international, peer-reviewed journal. These concerns seem to have been trumped by the indicator's *actionability* and its *legitimacy* stemming from the more general normative support for performance-based funding.

However, the national PRFS was not implemented without alteration. The management made the new university budgetary model distribute *all* research funding, not just new money added to the system (as in the national system). This was a substantial amplification of the financial incentives in the national PRFS. In fact, when the PRFS was introduced in 2010, it led to a 20-fold increase in the financial redistribution (Aagaard 2016). This decision was driven by a perceived need to proactively meet the expectations that the financial incentives would grow even bigger in the future: 'Well, it's a bit like steering a freighter. We all know that if you need to change course, it takes time' (upper-level manager, DK19). The ministry official confirmed that there was, in fact, talk of making more funding depend on the BRI during the negotiations concerning its construction (interview, ministry official, DK28). Introducing the national PRFS model locally thus involved some translation. This translation involved an element of choice (to let the model distribute all research funding) as well as some necessary aspects (in the national PRFS, funding was only redistributed within each main scientific field). When creating a budgetary model that allowed faculties to compete for funding, the management needed to abandon this 'discipline neutrality'. These two translations can best be described as *subtraction*. The sophisticated elimination of competition between scientific areas and the tempering effect of only allocating a small share of

funding on basis of the PRFS was removed from the model, as it was translated to the university context. However, this translation could be said to amplify the competitive incentives of the original indicator system, making it, in effect, a far more radical system. The management thus sought to boost the indicator's *actionability*. In a sense, the translation of the indicator was from a system intended to improve research quality to a *budget maximization tool*.

The decision to introduce the national PRFS, and especially the BRI, in the university budgetary model had a substantial impact at the Faculty of Social Science. As one faculty manager put it, 'What has pushed the publication activities most is the BRI system' (manager, DK7). The effect was felt all the way down at the departmental level and among researchers. However, when the PRFS model was introduced in the university's budgetary model in 2010, the management at the time did not implement it at the faculty level immediately, probably due to resistance among faculty members and because the management itself did not find it appropriate.⁵ However, less than a year later, when a new management was in place (after the term of the former dean came to an end), its position changed dramatically, and it chose to introduce the PRFS model. According to the new management, it became clear that the Faculty of Social Sciences was losing money to the other faculties—which was perhaps unclear to the former management, since the financial year had not yet ended when the new management took over. Time had thus proven the need for action. The realization that this was the case caused people at the faculty to regard the university budgetary model as having a disciplinary or punitive function. The solution was easy, since they could simply implement the university model through the *copying* mode of translation, which is what they did. The university model thus had high degree of *actionability*.

The management did acknowledge that focus on the BRI could have some negative effects, such as a disincentive to publish in more practitioner-directed outlets and to engage with society more broadly. However, the BRI gained some *legitimacy* regardless for another reason. As another manager put it, 'My position is that, if that is what the Danish state wants, then this is what the Danish state is going to get' (manager, DK2).

When the management introduced the university model at the faculty, it hoped that this would boost the faculty's budget. This strategy succeeded, according to the management, as the budget rose significantly in the following years, proving that using the budgetary model was an effective management tool. However, the model also gained *legitimacy* over time in another way, emphasizing a new translation of the original idea. Namely, in the eyes of management, the budgetary model brought transparency to local funding distribution. A simple model now replaced the former practice of annual negotiations between departments and the faculty. Over time, the budgetary model thus became an instrument of transparency in addition to an instrument of budget maximization.

The introduction of the new budgetary model at the faculty level had huge consequences at the Department of Sociology and Social Work. As one manager said, 'There was money for each BRI point earned, and you could see it directly in the departmental budget' (manager, DK7). Therefore, the model had very high *actionability*. One could, as mentioned above, imagine different ways of translating the faculty model at the departmental level. The way in which the management decided to translate the model was by making it mandatory for each researcher to produce (a given number of) BRI points over the course of 2 years, implying both the *subtraction* and *addition* translation modes: *subtraction* because the financial

incentives were removed and *addition* because incentives were replaced with more specific performance demands.

The empirical material is less well suited for analysing the motivations behind the original choice of translation mode, since we did not interview the managers in charge at the time of implementation. However, it was clear that current management did not view it as necessary to connect the faculty budgetary model to financial incentives at the departmental level. In the experience of both the management and rank-and-file academics, catering to each researcher's commitment to the departmental budget and the demands for each researcher to produce BRI points biannually was enough for the BRI to make a huge impact. Some interviewees reported that people who were termed the '0-researchers' (people who produced no articles that qualified for BRI points) were quickly eliminated. Producing articles that qualified for BRI points simply became vital. Nevertheless, researchers were also aware of some of the negative effects of this focus on BRI publications: it discourages broad dissemination, and the performance demands induce stress in low performers.

At the Faculty of Engineering and Science, the introduction of the PRFS system in the university budgetary model had much less pronounced consequences. The addition of the BRI in the budgetary model was not emphasized as something that led to big changes either in the finances or publication behaviour at lower levels even though the model was actually implemented through the *copying* mode of translation.⁶ At the Department of Chemistry and Bioscience, it was much the same story. Including the BRI in the budgetary model did not lead the departmental management to make formal demands for researchers to produce BRI points. When asked directly about the importance of the BRI, the management clearly confused the BRI model with journal impact factor or other bibliometric indicators. This probably reflects that journal impact factor is so institutionalized in the natural sciences that the management did not regard the BRI as a valid or relevant measure.

Not long before the interviews were carried out, use of the national PRFS took an interesting turn at AAU. Because the budgetary model caused large annual fluctuations in funding for sub-units, the university's upper-level management decided to freeze the model for a period from 2016 to 2018. Nevertheless, it was also clear that the management was not ruling out reconnecting the BRI to the budgetary model again in the future.

5.2 University of Copenhagen

At UCPH, the reception of the revised PRFS occurred very differently. The upper-level management did not regard it as important to react to the BRI and never used the BRI as an incentive (for instance by using it in the university budgetary model). The experience was that fluctuations in BRI performance did not substantially affect the university's budget. Furthermore, the management did not express concerns that the state would adjust the BRI's distribution level in the future, as was the worry at AAU. In other words, the *actionability* of the BRI was perceived as low. Furthermore, concerning *legitimacy*, the upper-level management already perceived international publishing as the norm at UCPH. In this regard, the BRI was insufficiently fine grained to serve as an incentive. Instead, the management mentioned citations and university rankings as important indicators to follow. In this manner, the BRI, being a national Danish indicator, was perhaps seen as too parochial to concern UCPH, which would like to see itself as a global competitor.

Thus, both *actionability* and *legitimacy* were perceived as low, and the BRI was *rejected*.

Nevertheless, when introduced, the BRI did gain some attention at the Faculty of Social Science, in spite of its having been rejected at the university level. However, instead of *copying* the national model, the faculty chose to implement the model through the *addition* mode of translation, in which the management added a third level of the most prestigious journals. At a glance, this might seem puzzling, since there was no internal pressure to implement the national PRFS. However, management still found it important to incentivize international publication. To this end, the BRI offered a system that better accommodated the special publication patterns of the social sciences, which gave the BRI some *legitimacy*. The management also though found that the BRI, with only two categories, was too broad a categorization to indicate high-quality publications. The management therefore introduced its own third level, consisting of a very few high-impact journals (as determined by the management, following advice from the departments). In so doing, the management actively boosted the *legitimacy* of the BRI by engaging in translation of the original indicator. It used this adjusted indicator in the faculty budgetary model to distribute a small share of funding to the departments. Interestingly, after a few years, the same management stopped using the BRI entirely. As one manager explained, 'It's my understanding, that it's simply so much on the agenda with all researchers, publishing internationally and thinking about publication outlets (...) therefore, it's not important to have a financial incentive to strengthen attention [on publication]' (manager, DK8). In short, the BRI was no longer seen as *actionable*.

In any case, the management and researchers more or less ignored the BRI during the time it was included in the budgetary model at the Department of Sociology. Although there have been a few somewhat technical discussions regarding the BRI (e.g. regarding the right placement of journals on the two levels), researchers did not significantly base their publication decisions on the BRI, and managers did not push for compliance. First, no financial or other incentive systems have been implemented at the departmental level, making *actionability* low. The BRI, with its adjusted level, only distributed a small percentage of funding from faculty to department. Second, researchers in particular felt that the BRI was an inappropriate tool. This was not really articulated in any technical criticism of the indicator but instead took the form of a more general distaste for simple quantitative measures of publication performance. This was combined with a more general mentality of belonging to an academic elite that need not abide by externally imposed rules. Although the management did not completely share this position, it is clear that the management was aware of and felt sympathy with this general sentiment among researchers, and thus did not push for compliance. Furthermore, there is external pressure *not* to conform to the BRI. Instead of perceiving the ministry as performing external pressure, academics find that this comes from the international academic community. For instance, in hiring committees, international members do not regard the BRI as a legitimate measure, since it is a purely Danish system of publication performance. For all these reasons, the BRI's *legitimacy* was very low at the departmental level. Interestingly, it did not seem that anybody, either in the management or among researchers, was aware of the removal of the BRI from the faculty budgetary model. This highlights a lack of information in addition to direct opposition as an explanation for the decoupling (Orton and Weick 1990) between faculty and department.

In the Faculty of Science, the BRI gained very little importance. The faculty followed the lead of the university management and

ignored the BRI in its budgetary model. The same was the case at the Department of Chemistry. First, there were no financial incentives to use the BRI model on either levels, meaning that the *actionability* was perceived as very low. Second, it was clear that both the management and researchers in the natural science disciplines regarded the BRI model as flawed. The BRI was simply incapable of distinguishing highly cited journals such as *Nature* and *Science* from less prestigious ones, which could all be included in Level 2. For researchers in the natural sciences, journal impact factor was, and had long been, the gold standard for journal evaluation. Therefore, *legitimacy* was perceived as very low.

6. Discussion

As should be clear from the analysis, the BRI was translated very differently in different universities, scientific areas, and levels inside universities. I have analysed managerial decision-making surrounding BRI implementation as dependent upon assessments of the BRI's *actionability* and *legitimacy*. This analysis has emphasized the very specific sensemaking of the managers in charge of BRI implementation. In this section, I discuss a range of background factors that have led managers to make divergent judgments with regard to *actionability* and *legitimacy*. In so doing, I seek to acquire a better understanding of the organizational, environmental, and indicator-specific factors that condition managerial reactions to the BRI.

6.1 Factors conditioning actionability

6.1.1 Financial incentives

Financial incentives associated with the BRI were an important source of the BRI's *actionability* and thus among the explanations for why the BRI was used in some places rather than others. Clearly, money talks.

While the basic financial incentive was, of course, the same across the various universities, interpretations of its importance differed. One reason is that the relative gains of boosting BRI performance were perceived differently. The upper-level management at UCPH was under the impression that publishing internationally was already the norm and that it was therefore not useful to incentivize this behaviour, while the management at AAU was convinced that there was room for improvement regarding international publishing (this also relates to *problem definition*, discussed below). It is also relevant to consider whether the relative financial gains of boosting performance differed across academic areas. While we could not obtain university-level data on funding distribution across academic areas, national data show that the natural sciences received 49% of its research funding from external sources in 2016, while this figure was just got 28% for the social sciences.⁷ This indicates that the basic funding, part of which is distributed by the BRI, is of relatively greater importance in the social sciences than in the natural sciences.

As the UCPH social science faculty case reveals, financial incentives were an unnecessary condition for using the BRI. They were, however, of huge importance at the social science faculty and departments at AAU, where the level of redistribution of the BRI was many times that of the national model. In these cases, financial incentives were probably part of the explanation for a tight coupling between the levels, from the university level down to the departmental level. It seems that tying funding to indicators can have a disciplinary effect. However, even though the redistribution of funding at the Faculty of Engineering and Science/Department of Chemistry

and Bioscience was many times that of the national system, the BRI never became important here. As with the UCPH social science case, this indicates that financial incentives are not a universal explanation for adoption or rejection.

An important finding is that upper-level managers can condition lower-level implementation by translating the indicator to either *increase* or *decrease* financial incentives. In the cases in which the management chose to increase the model's incentives, the BRI in some cases became a tool for *budget maximization*. Thus, instead of being a tool for solving a performance problem (see *problem definition*) or a tool to promote quality, which was the intention of the ministry, it became a tool for securing income. Money became a goal in itself.

6.1.2 Problem definition

Problem definitions were also important for the indicator's *actionability*. If the BRI could be interpreted as a solution to a specific problem, it was useful to the management. One of these 'problems' was, of course, linked to the expected financial consequences of (not) introducing the BRI locally, as discussed above. However, performance also seems to be a problem in its own right, regardless of financial considerations. For instance, at the social science faculty at UCPH, the BRI was introduced to boost performance in terms of international publications, with the twist being to also reward publishing in 'elite' journals, despite no financial incentives to do so. The BRI was seen as useful regardless. Another interesting finding is that the BRI, and the entire PRFS, turned out to be useful for the management at the social science faculty at AAU in creating *transparency* for departmental-level budget allocations. In this case, the original purpose of the BRI, as a tool for strengthening research quality, was translated into being a tool for *transparency*.

Changes in problem definitions also led to changes in translation. When the management of the social science faculty at UCPH no longer perceived international publishing as a problem, it rejected the BRI. Similarly, when the radical translation of the BRI at the university level of AAU turned out to be counterproductive, since it resulted in great fluctuations in the funding available to the different units from year to year, it was terminated (at least temporarily). In this case, the budgetary model itself became a problem.

6.2 Factors conditioning legitimacy

6.2.1 Indicator competition—and epistemic differences between scientific fields

An important explanation for the differences in the *legitimacy* assigned to the BRI between scientific fields and universities is the degree of competition from other (valid) indicators. Prior to the BRI, there were no bibliometric indicators available that adequately considered the publication outlets in the SSH and that provided good coverage of all the outlets from these areas. This changed with the BRI. Lack of competition was thus probably one reason why, despite considerable criticism of the indicator's technical validity, the BRI was used heavily in the social science faculties/departments. The SSH never had access to a system that allowed for quantitative commensuration, without suffering from coverage problems. The allure in the 'objectivity' of numbers (Porter 1995), which Kaare Aagaard found in his study on the effects of the Norwegian BRI (Aagaard 2015), thus has probably been an important factor in the indicator's appeal.

However, in the natural science faculties/departments, there was already a formidable competitor in the journal impact factor. This had been a gold standard for decades in evaluating research publications in these fields and has been able to discriminate between good and bad journals in a much more detailed manner than can the two-level BRI. Therefore, while the BRI as a specific type of research evaluation (i.e. a system for quantified commensuration of a pool of journals) might enjoy general legitimacy within the natural sciences, the existence of a better system rendered the BRI illegitimate. In other words, the BRI simply matched better the epistemic practices of the social sciences than the natural sciences.⁸ This is interesting and represents a differentiating trait of the BRI, given that most bibliometric research evaluation systems are based on natural science dissemination traditions (Ochsner et al. 2017). This is the case for the Research Assessment Exercise (RAE), the UK performance-based research funding system, which has severely challenged departments within the social sciences and humanities (SSH) (Morris 2010). However, probably due to the much greater financial incentives in the RAE and due to the unit of evaluation being the individual department (Hicks 2012), it has been difficult for social science and humanities to translate or decouple from the system.

Competition between different kinds of indicators was also a factor at the university level. In the case of UCPH, the upper-level management rejected the BRI while emphasizing the importance of international university rankings (without, however, using them for budget allocation purposes). This indicates that yet another indicator for research (and university) evaluation is competing for legitimacy. The finding could be explained in part by the notion of a *plurality of evaluative landscapes* (Brandtner 2017). According to Brandtner, the strong, isomorphic reactions, for instance found in studies on law school 'reactivity' to rankings (Sauder and Espeland 2009), may be compromised when there is greater plurality in a field when it comes to the criteria used for making evaluations. In this case, one need not endure the lack of legitimacy of a single—though dominant—indicator but can choose from among several options (i.e. BRI, journal impact factor, and university rankings). This plurality is also highlighted by Woelert and McKenzie in explaining why some Australian universities added a 'quality' dimension—often citation or journal impact factor data—to the simple publication count in the national model (Woelert and McKenzie 2018).

6.2.2 Identity and culture

AAU and the UCPH are very different in terms of their organizational identities and cultures. Many respondents from UCPH refer to the university and the researchers in it as 'anarchistic' and somewhat elitist. The university has a centuries' old history of academic autonomy and of seeing itself as *the* flagship university in Denmark. This is probably an important reason for its preoccupation with internationally accepted research evaluation systems, such as university rankings and journal impact factor, rather than the BRI. The university sees itself as competing with other flagship universities around the world, and the BRI, as a Danish indicator, is therefore considered too parochial to matter. In contrast, AAU was established in the 1970s, just after the start of state intervention in university matters (Degn and Sørensen 2015; Hansen 2017). A culture of adhering to state/upper-level demands without too much resistance seems more widespread at AAU than in UCPH (Lind and Aagaard 2017). As many actors at AAU expressed, the university is seen as a product of the surrounding society and is thus more

dependent on being seen as legitimate by national actors. It is therefore not a coincidence that one of the managers at the social science faculty at AAU, as quoted above, refers to the state's wishes as a reason for compliance with the national resource allocation model.

These differences in identity and culture also relate to—perhaps both as cause and consequence of—the implementation of a comprehensive management reform in 2003, in which all academic leaders went from being elected to being appointed. This change to a more managerial system is still being implemented at both universities through a very long transformation process but has been harder and more deeply implemented at AAU than at UCPH (Lind and Aagaard 2017). The management at AAU thus probably felt more able and freer than at UCPH to carry out a hard implementation of a performance management system that was unpopular among many researchers.

7. Conclusion

While Richard Whitley has emphasized how systems of evaluation can be either strong or weak (Whitley 2007), this study has shown that, to some extent, local managers *make* national systems strong or weak. Based on their assessments of *actionability* and *legitimacy*, managers decide whether they should copy, modify, or reject the BRI. As a result, numbers in general and quantitative research evaluation systems in particular are not always powerful. They are dependent upon people who believe that they are somehow relevant to, useful in, or suitable for the context in which they operate. Managers are indeed, as suggested by Kaare Aagaard, the 'missing link' between PRFS systems and their effects (Aagaard 2015).

However, we should not regard managers as autonomous decision makers on BRI use. As shown above, a range of factors condition their reactions. These include the *financial incentives* of the BRI and local *problem definitions* when assessing the *actionability* of the BRI as well as *indicator competition* and *identity and culture* when assessing the *legitimacy* of the BRI. Nevertheless, we should not interpret these background conditions as deterministic. While the background factors are grounded in 'objective' conditions, they are also subject to considerable interpretation. For example, while the BRI has the same financial consequences for all universities (i.e. the value of one BRI point is the same at all universities), managers' interpretations of the relative importance of the incentives differ substantially between universities (at the university level). Similarly, while *problem definitions* might have their background in measurable performance, with AAU, as noted above, having a lower performance on, for instance, university rankings than UCPH, they are also defined and made into 'problems' by managers. Managers' interpretations of *indicator competition* are deeply rooted in their respective scientific fields and associated epistemic characteristics. Here, there is perhaps less room for the managers' own interpretations because scientific field differences are so embedded in international scientific standards, and not, as some of the other factors, in local conditions. Finally, regarding *identity and culture*, the legitimacy of using measures such as the BRI is conditioned by the existing culture and the development of *de facto* hierarchies following a management reform.

Based on the evaluation of *actionability* and *legitimacy*, managers undertook a range of translations of the BRI. These were both translations of the *how* and the *why*. Regarding *how*, for example, managers removed the disciplinary neutrality, introduced a new third BRI level,

and used the BRI for individual-level performance demands. Regarding *why*, managers translated the BRI from a research quality tool to an instrument for *budget maximization* or *transparency*. The BRI was thus sometimes used quite differently from the way in which it was originally intended. While there is no straightforward connection between *actionability/legitimacy* and translation, it seems clear that when both are low, as in the case of the natural science faculty/department at UCPH, the BRI is *rejected*. In contrast, when both *actionability* and *legitimacy* are high, as in the social science faculty/department at AAU, the BRI is *copied*. However, there are many examples in between these extremes, and it may be impossible to determine *a priori* whether *actionability* trumps *legitimacy* or vice versa, since this is highly context dependent.

The examples given throughout the analysis and discussion in which managers have changed their original translation of the BRI at a given time highlight an interesting dynamic. There seems to be a feedback loop from experiences with the initial implementation of the PRFS/BRI to re-implementation or rejection. PRFSs are still relatively new phenomena in most European countries and universities are thus still experimenting with managing these national systems of research funding. Thus, while Diana Hicks rightly emphasizes that national PRFS are dynamic, often being re-evaluated and changed or tweaked (Hicks 2012), the same can be said for university implementation. Managers look at the consequences of their translations of the BRI, both in terms of *actionability* and *legitimacy*, and react in relation to these. This is perhaps not a surprising finding, but it does underscore that local translations of PRFS are dynamic and under constant re-evaluation. It may be more surprising though to note the manner in which managers seem to react much more to this local implementation feedback than to changes in the national PRFS. While the BRI has been adjusted regularly (e.g. the steadily rising level of redistribution and, as of 2012, also allowing book series and conference proceedings to be registered as Level 2)⁹ (interview, ministry official, DK28), this is not what has prompted local change. Instead, it is the experiences with local implementation that have led to local changes. This points to the local manager, and the local context, as an even more important link between PRFS's and their effects than has previously been demonstrated in studies on PRFSs.

Notes

1. While Woelert and McKenzie (2018) argue that 'universities overwhelmingly replicate the major national PBRF indicators internally', their article reveals quite major differences and alterations in the ways in which publication indicators in particular are used locally (while other indicators, e.g. external research funding acquisition, are more directly copied).
2. Following the interviews and data collection, a third level was introduced. Now the BRI groups reviewing each field can either use this level, placing a maximum of 2.5% of world production here, or they can choose not to use the third level and instead place up to 22.5% on the second level. Furthermore, the entire PRFS is currently under revision.
3. As Røvik emphasizes, intentions cannot always be boiled down to either constructivist or rationalist perspectives on action (if only one had more sources, more time, more sophisticated theories, etc.). Instead, they are often simply ambiguous or might argue with both logics simultaneously (Røvik 2007).
4. University of Copenhagen: Times Higher Education World University Ranking 2015–2016: 82, Academic Ranking of World Universities 2015: 35, QS World University Rankings: 69.

- Aalborg University: Times Higher Education World University Ranking 2015–2016: 201–250, Academic Ranking of World Universities 2015: 301–400, QS World University Rankings: 356.
5. We did not manage to interview the management from the time of PRFS implementation. As a result, the information relies on the new management.
 6. We did not manage to get detailed information on the use of the university budgetary model in the faculty budgetary model for the Faculty of Engineering and Science. However, even when asked directly, the management did not comment upon the BRI as an important indicator for its work.
 7. 'R&D expenses by sector, main scientific area, and funding type, 2016', Research and development statistics, Statistics Denmark.
 8. There are differences in epistemic practices between sub-disciplines, also within the broad categories of natural science and social science, which might affect publication and citation behaviour (Cetina 1999; Gläser et al. 2010). However, these possible differences have not surfaced in this study, where the focus has been on managers' decisions on various levels, rather than micro-level differences between academic sub-disciplines.
 9. When books were introduced on Level 2, Level 1 yielded 5 points, while Level 2 yielded 8 points (all books yielded 5 points before the change).

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