Managing Research Out of the Dark? Exploring Implications and Applications of an Objective Model for the Evaluation of Research Practice and Quality

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Abstract

The quality of research is central to scientific organizations. But how to evaluate research practice and quality when managing research? There is not one standard for what "good research" is. In a recent study, we developed a model for evaluating research practice and quality and in this model, there are four core concepts: Credible, Contributory, Communicable, and Conforming. Based on these concepts a model including 32 sub-concepts was developed. The aim of this article is to explore implications and applications of the model using three fundamental perspectives of research management; the process, the organization, and the governance.

Introduction

As soon as one starts talking about research quality, immediately a number of questions come to mind, making it a relevant discussion. How does one know if research is of good quality? When managers or deans try to evaluate the

quality of research, what dimensions should they look at? Is there any way that people can agree on what good research is, and is not?

There are many people in the need of evaluating research. For example, managers evaluate research and development activities in companies, deans evaluate faculty members' research output, editors make publication-decisions in scientific journals, and officials responsible for research foundations decide about funding. In light of this, it is interesting and somewhat surprising to note that there seem to be few widely acknowledged quality standards for research practice, and even fewer definitions of what constitutes good research. Further, there is sometimes confusion between research and development, which according to many people's views – including ours – are different things.[1] A consequence of this is that judges of research quality – research group leaders, management teams, university boards, scholars, funding agencies, journal editors, and journal reviewers – more or less manage research in the dark. They apply values and standards from their own minds, fields, traditions, or disciplines. To apply one's own values is part of the evaluation process, but having generally acknowledged quality standards, instead of developing idiosyncratic ones, is likely to make fairer and more transparent evaluations, shedding light on these processes when managing research.

In our study, we decided to address this lack of widely acknowledged quality standards for research practice, realizing that we first needed to define what research is. The task was performed in a cross-disciplinary team of four senior researchers and one senior modelling expert. In the group, there was extensive academic experience from various research fields, including medicine, dentistry, informatics, educational research, management, strategy, and business modelling. As a result of the study, we developed a comprehensive quality model for evaluating research.[2]

In the remainder of this article, we will first briefly describe the model, then explore possible managerial implications and applications of it by using three fundamental perspectives of research management; the process, the organization, and the governance.

The quality model

There have been considerable discussions in the literature about rethinking knowledge production in general.[3,4] Concepts like "knowing in action" and "situated learning" highlight the importance of taking a variety of factors into consideration when discussing knowledge production.[5,6] One should also remember that a considerable amount of knowledge production takes in corporate research and development (R&D) departments. Our goal, however, is not to distinguish between scientific methods that are "good" or

"bad." Instead, our view is that different scientific methods can be appropriate depending on the area, the researcher's aims, and the research design.

The following four core concepts for evaluating research emerged from our work:

- Credible
- Contributory
- Communicable
- Conforming

The first three aspects, *credible*, *contributory,* and *communicable* have been suggested in previous research and were further developed in our study.[7,8] The fourth aspect, *conforming*, emerged during our work. By "conforming", we mean research that is aligned with regulations, ethics, and sustainability. (This does not mean that the research is necessarily conforming with existing theory.) The four core concepts were divided into sub-concepts and taken together this resulted in a model with 32 defined concepts in total, see Table 1 for a summary.

Table 1. Summary of the model for research quality with its 32 concepts.[9]

RESEARCH QUALITY			
Credible	**Contributory**	**Communicable**	**Conforming**
• Rigorous - Internally Valid - Reliable - Contextual • Consistent • Coherent • Transparent	• Original - Original Idea - Orig. Procedure - Original Result • Relevant - Rel. Research Idea - Applicable Result - Current Idea • Generalizable	• Consumable - Structured - Understandable - Readable • Accessible • Searchable	• Aligned with Regulations • Ethical - Morally Justifiable - Open - Equal Opportunities • Sustainable

Implications for management

It is well-established that it is challenging for managers to know about, and agree on, where knowledge and capabilities are located and created in the organization.[10] When managing research activities, regardless if these are in corporations or academia, one challenge is to know if the research is of high quality. Yet, how should one go about evaluating these activities to find out where to focus, how to prioritize and/or allocate resources of various kinds?

Our model can be seen and used both as a checklist ("are some aspects missed or neglected?") and as a fundamental structure for discussing, comparing, and evaluating the quality of research. The intention of

developing this general framework was to build a platform for the further development of common concepts, defined terms, and criteria for research quality evaluations within and across specific domains. This in turn, would contribute to the improvement of research quality and understanding from three fundamental aspects of research; the process, the organisation, and the governance.

The research process

The model of research quality can be useful in several situations related to the research process. Firstly, when planning, writing proposals, and designing research projects, the framework provides a set of useful dimensions to cover and consider. Secondly, the concepts and sub-concepts in our quality model can be useful in successively evaluating all steps of the research process in specific projects, for example, in the approach to analysis, interpretation, and reporting. Thirdly, it may be used as a systematic guiding principle in different evaluation processes such as reviews. Finally, the model can be used in educational programmes in which students are educated and trained to evaluate their own and others' research processes.

The organisation

If we take a closer look at activities for managing and evaluating research, different contexts and organizational levels can be identified. In more general quality work and the evaluation of research groups, departments, or even universities, the model may be of use in a plethora of settings. We explored the levels of which organizational decision-making takes place as:

- The strategic level (e.g., decisions in executive boards)
- The managerial level (e.g., transformation of strategies in management teams)
- The operational level (e.g., applied management by research leaders or evaluation committees)

The governance

The third aspect of research regards the governmental funding-context of the activities, were the quality model can serve as a basis for determining what a community of managers or scholars agree on as high-quality research. The following examples illustrate three typical and traditional examples:

- Privately funded research (e.g., in corporations)
- Intermediately funded research (e.g., in private foundations)
- Publicly funded research (e.g., in governmental agencies)

Combined implications

These three different aspects can be combined to characterize typical applications or activities of research funders at different organizational levels described as: strategic (decide), managerial (transform), and operational (apply), see Table 2. All these activities can be done or considered at all different parts of the research process.

Table 2. Combined implications, possible applications, and activities related to an objective model for research practice and quality evaluations by type of research governance and funding, and the organizational level.

Organizational level	Type of research governance and funding		
	Industry	*Intermediately*	*Publicly*
Strategic	Decide on overall direction for R & D efforts according to overall strategy of the company.	Decide on overall direction for project calls according to overall aims of the foundation.	Decide on overall direction for research efforts based on political direction for the funding.
Managerial	Transform the direction into focus areas and allocate weights.	Transform the direction into priorities for the dimensions and allocate weights.	Transform the direction into prioritized areas and allocate weights.
Operational	Apply the quality model with weights when initiating and evaluating specific projects.	Apply the quality model with weights when evaluating specific research projects.	Apply the quality model with weights when evaluating project proposals.

Managerial applications

Let us give some specific examples to illustrate how the quality model can be applied when managing in research practice.

Weighting

The model can be used for evaluating research quality, by allocating weights according to needs in the managerial situation. This means that some concepts in the model may be allocated a weight close to zero, if those aspects are seen as having very little impact on the level of research quality. But others might get higher weights, and thus higher impact, all depending on the actual discipline and situation (e.g., ethical aspects may have a relatively high weight in medicine). The purpose of the quality model is to offer a broad and comprehensive model that is suitable for any research domain. When managing and evaluating research, this can help developing a tailor-made model for the specific situation and context.

Governing

Assume that a large university wants to evaluate the quality of its research in a specific domain, using our approach, a very simplified version of the process could look something like this:

1. The university board decides about the overall aims for the university and its research focus, and a president or dean transforms the overall direction into more specific guidelines.
2. An evaluation committee is selected and appointed.
3. The members of the committee discuss the meaning and importance of the four core concepts – *credible, contributory, communicable,* and *conforming* – and the underlying sub-concepts.
4. The committee decides on weights for the concepts, and makes sure that they are in line with what the university believes to be the most important for its research in the specific domain. For example, the committee might agree that research at the university should reach out to the world in a better way than before, but that it does not necessarily have to be conducted using original procedures. In this case, a decision may be made to give *communicable* and its sub-concepts relatively higher weights and the others a standard weight, except *original procedure* that receives a somewhat lower weight.
5. The operationalization of concepts, as well as data collection and analysis on the research group's practices or projects and analysis of the results are based on the different concepts' weights. This will probably create lively discussions on the measures, weights, end results, and rankings. The amount and type of data that are subsequently collected is closely linked to the concepts that have been assigned the highest weights. If *communicable* has been prioritized, publication data of various types could be collected and analyzed in terms of, for example, the number of publications, impact factors, citations etc. But if *credible* has been given

the highest weight, it could be important to collect and analyze data on the research methods applied.

Organizing

Based on the quality model and its implications briefly presented above, we below list possible activities for managers in an organization that decide on research activities and how to evaluate these.

1. Make the overall, strategic aim of research explicit to avoid any misunderstandings.
   Questions to ask: What is the overall purpose? What do we want to achieve? What type of research do we want, and why?
2. Based on the overall aim, look at four core concepts of the model – *Credible, Contributory, Communicable,* and *Conforming* – and sort out the priorities between these aspects of research.
   Questions to ask: What is the priority between the four core concepts? Can we agree on this priority?
3. Work through the quality model and its 32 concepts and allocate weights to the different dimensions.
   Questions to ask: Are the allocated weights in accordance with the overall aim of the organization's research and priorities? Is there alignment of views between key people? What seem to be hotly debated topics in the weighting process, and why?
4. Test run a couple of historically carried out research projects (both "successes" and "failures" to avoid survival bias) and see how they fare in the proposed evaluations.

One way to make evaluation of research activities easier is to conduct the evaluation of the research based on explicit constructs. This way our quality model can serve as a so-called "boundary object" in cumbersome processes of research evaluation.[11]

Processing

The model has several possible applications related to the research process and implications listed above. When planning and designing a research projects, the framework provides a systematic quality checklist. The concepts and sub-concepts in our quality model can be useful in successively evaluating all steps of the research evaluation and education program processes as a systematic approach.

Concluding remarks

A model of research quality has been developed, comprising 32 different concepts that might be used for evaluating research practice and quality.

Several managerial implications and applications of the model were articulated in this article, drawn from parts of the research process, levels of organization, and type of governance. The model seems useful for evaluating industry, intermediately, and publicly funded research. The model also seems suitable for usage at strategic, managerial, and operational organizational decision-making levels.

Taking management of research out of the dark is a complex chore and implicates a systematic approach. The model proposed here offers a way forward and can be a starting-point for discussions about what dimensions are relevant and important to take into consideration when managing research in the situation at hand. The discussion about what dimensions to use and how to weight the different concepts can itself help governing, organizing, and processing research activities, shedding some light on the dark. Here, our quality model serves as a boundary object, or a tool, for explicating and aligning strategic direction and organizational identity.

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