

# Research groups as communities of practice—a case study of four high-performing research groups

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**Abstract** The aim of this paper is to investigate the organization of research in high-performing research groups in an age of increasing competition and pressure from outside and within higher-education institutions. To explore how researchers navigate such pressures and demands, the practice and perceptions of four high-performing research groups in Denmark and the Netherlands are examined, and the extent to which these groups can be understood as “communities of practice” or if they are displaying “team”-like characteristics is discussed. Previous studies have shown the benefits of communities of practice for organizational performance, and the present study demonstrates that the successful groups do indeed share many characteristics with such communities. A central argument of the paper is, however, also that incentive structures, inherent in many new policy initiatives that are meant to foster excellence in science, are more directed at “team-like” organization by focusing on, e.g., formally organized work processes, predefined goals, milestones, work packages, and hierarchically organized consortia. The potential implications of this are discussed.

**Keywords** Research groups · Practice · Communities of practice · Performance

## Introduction

In the age of “academic capitalism” (Slaughter and Leslie 1997) and the context of what has recently been termed “the accelerated academy” (LSE Impact Blog 2017; Vostal 2016), the

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practice of research seems to be under pressure. Demands for publication and other measurable output, funding schemes with an increased focus on excellence (Sørensen et al. 2015; Langfeldt et al. 2015; OECD 2014), and the promotion of large, collective grants instead of small, individual grants (Bloch and Sørensen 2015) are the conditions for most researchers today; conditions that are bound to impact the way research are being organized, perceived, and conducted in practice.

The pressures of academic capitalism and the accelerated academy tend to push towards more formal structures, and processes of research and project management tools are increasingly used as a (legitimizing) strategy for organizations (Fowler et al. 2015). Larger grants and consortia building tend to necessitate the establishment of more formalized organizations, and project funding may also be seen as a driver of more goal-oriented research practice (Ylijoki 2003).

However, instead of lamenting the loss of the “slow practice” of academia, the ambition of the present paper is to see what we might learn from research groups that are successfully navigating the landscape of the accelerated academy and academic capitalism, i.e., high-performing research groups. To this end, we adopt a practice perspective, which enables a focus on “the way in which work gets done and [...] knowledge is created” (Seely Brown and Duguid 2001). “Being an academic” is considered an ongoing practice wherein people engage in activities, taking place in an institutional setting. To understand the practices of researchers in high-performing research groups, we analyze the extent to which these groups can be understood as *communities of practice* (Lave and Wenger 1991), i.e., “a collection of people who engage on an ongoing basis in some common endeavour” (Eckert 2006), or if they are displaying *team*-like characteristics (Storck and Hill 2000), something the increased focus on projects and funding structures might encourage.

Previous studies of high-performing research groups have investigated the importance and dynamics of leadership in such groups (e.g., Verbree et al. 2012), but there is still a knowledge gap when it comes to understanding the shared practices of researchers and research leaders, and the interactions and routines that constitute the academic work in high-performing research groups (Felt et al. 2013). The aim of the present paper is to add a new perspective to existing studies of what enhances performance in research groups (e.g., studies that looked into (gender) composition, size, and age of the group (Joshi 2014; Bland and Ruffin 1992; Horta and Lacy 2011), the degree of collegiality and group culture (Ramsden 1994; Edgar and Geare 2013; Park et al. 2017), or structural factors (Smeby and Try 2005; Dunbar and Lewis 1998)).

In order to better understand the practice of knowledge production in high-performing research groups, we will therefore in the following analyze how four high-performing research groups from Denmark and the Netherlands organize their research. Using literature from the fields of situated learning theory, practice theory, and group dynamics, we will argue that successful research groups might perhaps better be understood as communities of practice, than as formal organizational entities, as e.g., teams or more traditional work groups (see also Tight 2004, 2008). The implications of this perspective on research groups are discussed throughout the paper, and in the concluding discussion.

## Methods and case descriptions

In this study, we draw on data from three different ethnographic studies of research groups.

At a Danish university, observation studies and interviews were carried out in two different research groups within the natural sciences as part of the project “Contextualizing and

measuring research performance (CoRe).” The aim of this project was to learn more about how high-performing research groups are organized and practice science.

Based on bibliometric data, two high-performing research groups were selected and observations were carried out from August 2014 to January 2015 in the two groups.<sup>1</sup> Observations of group meetings and “everyday life” in the group were carried out, including observations of meetings between group members or with a group leader, social events within the group, and observations on informal work life (weekly or more over a period of 4 months). In both groups, informal interviews with group members at different career stages and different nationalities were conducted, as well as a more formal semi-structured interview with each research leader, and focus group interviews with group members (five in one group and one in the other) on, e.g., publication practices.

The first of the two Danish groups is a research group within the field of chemistry. It is a large group with around 30 members (including BA, MA, and PhD students). The group was established in the 1980s and measured by bibliometric measurements; this group belongs to the world elite within its field (the leader of the group is, e.g., according to Thomson Reuters’ database among the top 1% most cited researchers within chemistry). The second of the Danish groups is a group within theoretical physics. This group also performs above world average within its field. It consists of a research leader, four post docs, four PhD students, and three MA students.

The Dutch material is generated from two projects. In the first project, the development and use of performance indicators and research evaluation in biomedicine were analyzed, as well as the ways in which indicators interact with biomedical knowledge production on the shop floor.<sup>2</sup> The project sampled discrete research groups at two Dutch university medical centers, operating across institutionalized distinctions between basic, translational, and clinical research. This was translated into case studies of research groups in molecular cell biology, surgical oncology, and medical statistics. At each group, semi-structured interviews were held with researchers at different career stages and of different nationalities, with technicians, group leaders, heads of departments, and quality managers. In addition, observations of meetings, laboratory work, and presentations were carried out. We had full-time access for a month at each group. Fieldwork took place over an 8-month period from September 2012 until April 2013. The material for the current article is taken from fieldwork at a molecular cell biology lab.

The second Dutch project we draw on is based on a qualitative research project on practices of (self-)evaluation of researchers at an internationally acclaimed Dutch social scientific research group.<sup>3</sup> This project focused on the ways in which evaluation practices differ between tenure and temporary staff and how researchers with temporary contracts negotiate their position in the research group and position themselves in the academic labor market. The research group was selected based on their success in project grant funding and the international prominence of its group leader, and it consists of one professor, five associate professors, eight assistant professors, two lecturers, four post docs, and eight PhD students. Fieldwork was undertaken in the group from November 2014 to April 2015, where interviews with the group

<sup>1</sup> This study was conducted by Lise Degn and Mads P. Sørensen, and data from this project has also been used in Young et al. (2016).

<sup>2</sup> This study was carried out by Sarah de Rijcke and Alex Rushforth, and findings from this project were also published in Rushforth and De Rijcke (2015) and Müller and De Rijcke (forthcoming).

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members and group leader as well as observations of research seminars and group meetings were carried out.

### Analytical strategy

In order to explore the extent to which our case groups resemble communities of practice, rather than formal teams, we need to specify the criteria used to identify characteristics of either configuration. To do this, we address the key differences between the two organizational forms put forward by Storck and Hill (2000) and Lesser and Storck (2001) and the three characteristics of communities of practice identified by Wenger (1998), and clarify how these differences are identified in the empirical data.

The first criterion to be investigated is the *orientation* of the group. Where teams operate in relation to organizationally defined goals, communities of practice tend to define their own purpose (Storck and Hill 2000, p. 69; Lesser and Storck 2001, p. 832). This is examined by looking at the articulation of an “ethos” of the group—what Wenger identifies as the *shared domain of interest*. What do group members refer to as distinct and central features of their group, and how is this related to their practice? Perceptions of success and talent are a vital parameter here, as it indicates whether external indicators of success determine the groups’ goals (teams) or whether internal indicators are seen to be more important (communities of practice).

The second criterion explored is the *formalization of the relationships*—what Wenger identifies as *relational behavior*. Team relationships are established by the organization, whereas relations in a community of practice are formed around practice (Lesser and Storck 2001, p. 832). This is explored in the empirical data by investigating how members enter (and leave) the group and the inclusion and exclusion criteria involved in this selection (e.g., formal competences, entry-level requirement, cultural fit). The formation of relations after entry is explored by looking at the composition and positioning of group members (e.g., in smaller work groups/individually, the social cohesion of the group). The argument is that a high degree of formalized entry-level requirements, “top-down”-determined composition, and formalized inclusion and exclusion criteria within the groups indicates team characteristics, where the reverse indicates community of practice characteristics.

The third characteristic identified by Wenger (2000) is that members of a community of practice are literally practitioners, not merely sharing interests, but *sharing practice*. This shared practice is encoded in a shared language, routines, tools, and stories. We explore this through an analysis of *the workings* and *authority relations* of the group. In relation to the *workings of the group*, the assumption is that teams depend on defined processes and reporting, whereas communities define their own routines, processes, and stories from which their practice develops (Lesser and Storck 2001, p. 832; Storck and Hill 2000, p. 69). This is examined by analyzing the meaning that group members assign to the organization and processes of the group, more specifically looking at the manner in which the groups work with research ideas (e.g., top-down or bottom-up idea generation), the perception of risk and risk management, and the articulations of “process-building” (e.g., formalized processes or practice-based processes). We also investigate *sharing practice* by examining authority relations/constructions. Conceptions of authority speak to the shared language and norms of the group, and in teams, authority relations are defined by organizational structure or decree, where authority in communities of practice emerges through interaction (Storck and Hill 2000, p. 68; Lesser and Storck 2001, p. 832). We therefore investigate such factors as internal group

hierarchy and the criteria on which this is built (e.g., seniority, informal status perceptions). On this dimension, hierarchical relations and reliance on predetermined (organizationally defined) categories of authority would indicate team characteristics, whereas more informal and “practice-based” orientation in the authority relations indicates community of practice characteristics.

## **Analysis**

### **Shared domain of interest**

This section will address how the groups narrate their “ethos” and the interest that is shared, i.e., how the epistemic field is defined. Particularly, this section focuses on how practice intertwines with identity construction, i.e., on “who we are” relates to “what we do.” Also, perceptions of talent and success within the groups are analyzed.

### **Group identity**

When looking at how the groups narrate “who they are as a group,” it becomes clear that this “identity” is linked closely to the research practices of the groups. The actual practice is naturally not similar across the groups due to different epistemic content and scientific methods, but the abstract construction of identity through practice is nonetheless very alike. All four groups focus on freedom and teamwork.

“We have this culture of teamwork together with intellectual freedom to try different things. The work is much more creative, for we are not necessarily following a strict project that your boss told you to do. You are following some discovery that you made yourself and an idea. You always have a team with whom you can discuss the good and bad results and also share the workload so things go much faster” (Post doc, chemistry group)

On the surface, the four research groups work with ideas in different ways. In the Danish chemistry group and the Dutch biomedical research group, the ideas for projects are the result of bottom-up processes, where either both the students and junior staff have ideas individually or they arise as a result of—often informal—discussions in the group.

In the Danish theoretical physics group, the ideas and projects to some extent come from the group leader, who delegates or proposes them to students or junior staff, a practice which is somewhat related to the relatively high theoretical diversity among the group members. However, this group is also perceived by its members as being very “free” in terms of idea generation and many of its members mention having a very high degree of freedom to pursue their own ideas.

“I could speak to him [the group leader] like we were on equal footing in some sense, and discuss on a very equal level and he allowed me to get, to do whatever I wanted actually, and that’s how we, he works. [He] just gives you a lot of ideas and then you are allowed to go wherever you want with that.” (PhD student, physics group)

The group leader confirms this practice by stating that he prefers to remove himself from the creative and productive process of the work:

“[...] I mean, it is only when they get to the point where it is to be written up as an article, that I actually go through it and read the stuff for real. Otherwise I do the more... you can call it ‘sanity checks’, that if they come to me and say: ‘I get this and this’, then I say: ‘Can’t you just show me what you get, if you do this and this, because my intuition tells me that it should go that way’ (...) and then when (...) all that fits, then I basically have faith that they will do it right” (Group leader, physics group)

A very important characteristic in all groups is thus that the group members are free to pursue ideas and to work on their projects. As one of the Danish post docs describes it, this freedom was articulated by the group leader very soon after he had joined the group:

“[...] he just said like, if you have ten crazy ideas just try all of them and if just one of them works, we have a nice publication. That is cool. That is kind of his philosophy so you can try whatever you want and then later also build up a little team of people helping you there” (Post doc, chemistry group)

In the Dutch social science group, the epistemic field and the research methods are quite diverse, as was the case in the Danish theoretical physics group. One could expect that this would make it harder to establish a shared domain of interest, but this does not seem to be the case. Both groups have a clear ontological and epistemological position, or a clear “research problem” or “research tradition” that is not questioned. Everyone agrees on the main object of research. However, there are differences in the disciplinary backgrounds and methodological and theoretical approaches researchers in the groups take towards the core theme. The group leader of the social scientific group characterizes all research in the group as quantitative, and in that sense, everyone is similar. However, they use a range of tools—from surveys to panel data to large datasets scraped from social media—to approach their object of research, which reflects diversity. These different approaches and the freedom to venture into new methodological areas very much characterize the practice of the group. The group leader explains it in this way:

“I don’t think we have very fundamental discussions about very disparaging ideas and epistemologies and questions like ‘what is good science and what is bad science?’. We used to have more diversity within the institute than we have now, and in a way that is nice, that you do not in each discussion need to answer the question ‘is this a research question one can answer?’, ‘can you measure reality?’. That gives space to discuss other things. (...) In terms of methods, there is nobody that says ‘you should do this or that’: I recently got a PhD-student who in his first study did interviews (...)so I think choice of methods is dependent on the question you want to answer. (...) a very broad range of survey-research and experiments, and indeed also more physiological measurements and things that really happen in the lab (...) but then again there is also an observation study going on.” (Group leader, social science group)

As a result, freedom is found in the creativity of finding one’s own niche—or way of approaching the core problem of the group. It is however not productive to go beyond this core problem or engage with the fundamental epistemological and ontological basis of the community. In that sense, in none of the four cases are there theoretical or methodological “science wars.”

The descriptions and articulations of a practice of freedom and trust, as we see above, indicate that the case groups are more identity- than task-oriented. There seems to be more

focus on “how we do things” than on “the thing that we do,” meaning also that the group is assigned meaning and value that go beyond the task at hand. The group members in the present study are largely free to pursue original ideas, instead of carrying out the assigned task from the group leader, and there is a high degree of collegiality and teamwork in the groups. This corresponds with Storck and Hill’ (2000) study of what they referred to as “strategic communities of practice.”

## Constructions of talent

Turning the spotlight on how the groups deal with selecting and introducing new members to their groups, we find particular constructions of talent and ideas about the ideal composition of a successful group. The groups—both leaders and members—tend to operate with a somewhat indistinct perception of talent, which transcends more instrumental notions of “high-performing” researchers defined by bibliometric measures or the ability to attract funding. Talent is, in the eyes of the group leaders, a more diffuse notion, which is more contingent on the preferred role in the scientific process (technical vs. creative), and motivation and drive, than on “objective” measures of achievement. As one group leader puts it: “I don’t look at what their grades are, that means less to me. It means much more to me that they have the competencies that are important to this group” (group leader, chemistry group).

This perception of talent, based more on motivation, drive, and “fit” with the groups rather than on quantified measures of academic performance, is also found among the group members in three out of four groups, where it has become a part of daily discourse and self-perceptions. This is excluding the biomedical group—in biomedicine, receptiveness towards metrics is rather high (De Bellis 2009; Rushforth and de Rijcke 2015).

The freedom to select group members based on internally constructed criteria for talent or excellence (which might be decoupled from grades, etc.) is, however, to some degree hindered by the structures and formal regulations of the institutions surrounding the research groups. An example of this is the increasing importance of the top talent program of the Dutch science foundation for funding PhD students. Increasingly, such funding schemes demand that only candidates with top grades can be accepted as doctoral students.

On the other hand, in the Dutch social science group, the success of the group in terms of excellence funding also creates freedom to determine who is granted the positions. In externally funded projects, group leaders have the authority to hire for a position themselves, rather than a broader department selection committee. In the case of the Danish groups, however, PhD candidates are still subjected to institutional assessment even when hired onto externally funded projects.

The groups in the present study can thus be described as having developed their own “practice-based” criteria for expertise, a set of collective competences, and a commitment to a shared domain of interest, which allows for a construction of a distinct identity or “ethos,” a key feature of communities of practice. Through, e.g., the articulation of a culture of freedom, they enhance their feelings of (intrinsic) motivation (Ryan and Deci 2000), but also of teamwork, which seems to strengthen the internal cohesion of the group. The shared interest can also be understood to be very enculturated within the individual member; there is freedom within the groups to follow “niche” paths, but there is also a clear understanding that one does not step too far away from the joint path. We therefore see, interestingly, that even the groups with the least amount of mutuality in their domain (varied interests and methods) find an identity which goes beyond the “task” at hand, e.g., in a particular project, by articulating more “abstract” notions of “how we do things here.” The groups thus seem to be less goal-oriented than organizational teams, and even though externally defined

parameters of success are valued and integrated into their discourse, internally defined criteria of talent and success are also key factors in the maintenance of the groups.

### **Relations and relational behavior**

The second aspect of communities of practice that we focus on in this paper is *relational behavior*, i.e., how members engage in joint activities and build relationships. Here we will look into questions on the formation of relations (linking new members to the group, criteria related to this process) and the maintenance of these relations (nursing group members).

### **Establishment and maintenance of relations**

In all four case groups, we see a structure reminiscent of apprenticeship or peer learning (Lave and Wenger 1991), where, e.g., BA or MA students are either closely connected to the group leader (by way of giving them interesting and relevant projects and helping them) or to senior students (master or PhD students, by attaching them to projects). An MA student explains:

“I just felt like that if I ended up here they would really like, I would not just be a student standing in the corner, and then just like do something that they already like knew the answers to. Like I would really like be a part of a project, and I would get some responsibility, and that was also really important for me” (Master student, chemistry group)

A PhD student in the same group reflects on the ways in which students are integrated in the group, and values the collaboration and sharing of knowledge:

“It’s not unusual in other groups that you put a bachelor to reproduce something that’s already known for example (...). But if you are a part of a project that is running, then you have an older student that really has a motivation to help you. If you are not really helping that person with the project but just doing something of your own, then the older student has less motivation. And in a perfect world of course they will help you anyway, but of course if you are there to help another person with a project and to help each other, there will be more collaboration and sharing of knowledge, so I think it’s a very good way of integrating the students that join” (PhD student, chemistry group)

In the social science group, there is the same feeling of community among PhD students, which goes beyond the formal collaborations. One of them tells us:

“People really care about each other, they support each other, it’s not just... it goes beyond the working... the being nice co-workers, it goes beyond that, also caring for each other. People helping each other. If somebody’s writing a paper and you need help, people come and help you, it’s very nice.

I: Is there a lot of competition going on between PhDs?

R: I don’t feel it. I mean you know there’s competition maybe thinking more for the future, for whoever wants employment. There’s ten, and maybe only one or two can get... You know there’s competition because there HAS to be competition, but there’s not really practiced competition.” (PhD student, social science group)

In the biomedical and the theoretical physics groups, the research focus is more diverse, which means that the individual group members tend to work on very different projects and there is less cooperation. However, in these groups, the group leader tends to take over the role as “peer learner” or partner, which results in a very high degree of contact between group leader and group members. The theoretical physics group also has a tradition for peer-reviewing papers for each other (in a quite formalized fashion), which is taken very seriously by all members.

Another key aspect of the relational dimension is that group members in all groups are given additional responsibilities that enhance their non-scientific skills, e.g., coordinating a lab move, taking care of equipment, and organizing teaching, social, and academic events. Even if this has little to do with the scientific work in the group, many group members reflect on the positive effects this has on their way of thinking—the *practice*, in the terminology of this paper.

These elements of the practice of the groups can be seen as an example of “legitimate peripheral participation” (Lave and Wenger 1991), a process where newcomers to a community of practice work their way to the center of this community by going from carrying out simple but legitimate tasks that are vital to the community, to holding the responsibility for more complex, central tasks while moving towards the center of the community. The motivation for learning (performing) in this situation is “participating in authentic activities that move one towards becoming more central to a community of practice” (Barab and Plucker 2002).

Demonstrating another facet of the legitimate peripheral participation of the groups, we see, e.g., in the Dutch molecular biology group, how the group leader provides a “protected space” (Whitley 2014) for talented young researchers during their PhD project. This is characteristic of all four research groups that they give PhD students a protected space for the duration of their project, e.g., by ensuring that they receive ample care and supervision and do not have to worry about funding and receive ample care and supervision. As such, they also have room to take on risky projects and occasionally fail:

[Name of PhD-student] does not yet have any papers of her own. Her type of research is very innovative and risky, she tells me over a conversation in the office. She has worked on a project for over a year, but that material is now literally and metaphorically ‘parked’ in the fridge. It is a failed experiment, and will not result in a paper. (Fieldnotes 04 sept 2012). (...)

“[Name of PhD-student] is excellent. Her experiments are a bit slow to catch on. But they will. There will be papers out of her work. She is a better author than I am.” (From fieldnotes taken during yearly appraisal group leader with head of department, 26 sept 2012, molecular group)

By building such a protected space into the relational fabric of the groups, newcomers may feel more secure in actually participating in the practice of the group, rather than choose “risk-free” tasks or ideas, which would not add anything to the collective competence or performance of the group. Legitimate peripheral participation and the securing of this participation may thus be seen as a process wherein the specific practice of the group is learned.

Regarding competition, most group members deny feeling competition within the groups. Internal competition is viewed as negative whereas external competition is seen as positive and as a source of inclusion. As a social science PhD student put it: “They told me that before ‘you should be very competitive here’, some years ago. In a bad way. But now you wouldn’t feel

any competition” (PhD student, social science group). Indeed, others in the group explained that some years ago there was a very internally competitive PhD cohort, which was perceived as a problem by senior members. They therefore took action to avoid internal competition in the future. In the current PhD and post doc cohort, the competition is much more positive and focused on others outside the group.

### **Inclusion and exclusion—social connections to the groups**

When looking at the relations and relational behavior of the groups, it is also important to address the inclusion and exclusion criteria of the groups, and the way in which members feel socially connected with the research group. This illuminates both the degree of formalization of the group and the constructions of talent and practice in the groups.

When it comes to exclusion criteria, negative personality traits are the only visible and articulated dimension in the groups.

“We had a guy (...) And he applied to become a project student, but he didn’t fit into the atmosphere. (...) P: From what I heard he didn’t really do any work anyway so. That is basically what I heard and I think [name of the group leader] didn’t want a freeloader, when we also had some space shortage” (Master and PhD student, chemistry group)

The criteria for inclusion in the same group, however, are very closely linked to the perceptions of the group as a whole and the group’s interests. The group’s interests and relations are seen to be as important as individual interests are. This becomes very apparent in the following situation: Some years back, two group members argued for weeks over who would be the first author of a paper that had grown out of a common research project. The group leader asked the authors to find a solution, which did not happen. In order to end the conflict and the growing tensions within the group, the group leader finally told them they had 24 h to solve the problem—otherwise, he would throw the paper in the garbage can and prohibit publication of it. The researchers then settled the matter and published the paper in a good journal within the field. The group leader explained his strategy in this way: “... to me it was more important to calm down the internal tensions in the group than to publish one more paper. The environment in the group was more important to me than the paper.”

In all four groups, the group leaders and senior members all do a large amount of relational work, i.e., attempts to maintain positive relations within the group. However, what that work entails differs greatly. In the Danish chemistry group, relational work is primarily focused on maintaining the protected space around students, e.g., by ensuring that they do not need to secure funding by themselves, and by having a high degree of support for career planning and networking. In the Dutch social science group, relational work is done by the group leader through helping his staff members to stay within the group, by “patch working” jobs, helping them to move to a lectureship position within the department or helping them in grant proposals to extend their stay in the research group.

We also see relational work in the ways that students, be it BA, MA, or PhD students, are relatively shielded from daily troubles, in the creation of a protected space in which they can do their research work with a relatively high level of supervision and a strong focus on their own projects.

As the analysis above demonstrates, the case groups show many signs of strong relations and an active effort to maintain and shield these relations from (negative) competition. We see a large amount of relational work that resembles legitimate peripheral participation, which indicates a focus on socialization, enculturation, and learning rather than organizational goals,

e.g., research goals or performance defined externally. Another finding is that most members of the groups are active in the maintenance of these relations.

### **Shared practice**

The final dimension that we investigate in this analysis is *the shared practice* of the groups. This naturally has to do with the work (that the members work on “the same thing”), but is also related to the shared meaning surrounding this work and the way that it is organized. As mentioned earlier, focus here is thus on the authority relation (hierarchy and criteria for assigning authority) and the processes and routines of the group (selection and working with research ideas, perceptions of risk, and “process-building”).

### **Authority relations**

A key difference between communities and teams is, as mentioned, the construction of authority relations and whether they are defined by structure, or emerge through interaction (Storck and Hill 2000). In the case groups, we see that the perceptions of talent and the practical organization of the group are largely decoupled from notions of seniority. Senior group members are not necessarily put in charge of projects: the responsibility follows the idea rather than a notion of hierarchy. The following quote is representative of the rest of our material:

“I think it’s about, it’s not about how, what degree you have. It’s about what you can do, or how much you can do. If you can do more, you do more, if you can do better you will do better. If you can’t, you just do something else..” (post doc, chemistry group)

This finding indicates that the formal, externally defined authority structures mean less than the internally constructed and practice-related structures. To further illuminate this point—i.e., the formation of authority structures through practice-related stories—we turn our attention to the idea process and view it in connection with authority.

As we have seen, the research groups are characterized by a high degree of freedom to pursue individual ideas and the responsibility for selecting ideas are to a high degree placed with students and junior staff. The downside to this could be a high degree of personal risk, e.g., if ideas turn out to be bad, or unrealizable. This is mitigated, e.g., in the Danish chemistry group by organizing the work around smaller projects, and the group members are usually attached to several projects at the same time. These short projects heighten the motivation of younger researchers to try out new ideas, knowing that multiple projects reduce personal risk of not getting anything published:

“[...] giving you freedom, is probably one of the most important (things). But on the other hand he [the group leader] is also good at, you know, if you start getting a bit lost and you don’t have anything to succeed, he will also give you a project that is more or less working, so you can try your own stuff on the side and then you have something, so you are sure to get a publication” (PhD student, chemistry group)

In the theoretical physics group, a slightly different practice unfolds, as the group leader tends to select ideas for the youngest students, while the freedom to select and work on one’s own ideas comes with academic age. When asked about the practice of giving bachelor students

“untried” ideas to work on for their bachelor project, the group leader reflects on the relation between motivating students and reducing risk:

“It is resource demanding, enormously, and it is not only resource demanding, sometimes it actually also demands more of the students, than we need to. Because, obviously, when students, like the ones you have seen here, they sit with a project which is completely their own, and no one has done anything like it before, and we sit all excited saying: ‘Then you will be the first one to do it’ (...) That also means that they are all alone in it (...) and the fact that I don’t even know what the result will be is exciting, but there is also an element of uncertainty in a project, compared to posing an assignment. So I’m not sure I will keep it as a principle in the future, but for the talented students it is a great motivational factor” (group leader, physics group)

Within the social science group, a similar freedom in trying out things is also found. Group members develop side-projects often with a master student and/or work with a small amount of departmental seed-money (about 5000 Euro) for new projects. In this way, group members can try out different methodological approaches and are very productive in terms of output and efficient in preparing for larger grant applications, in which they further develop some of these initial seed-funded ideas.

It seems that all groups have a wide variety of active projects, and these can also be understood as safety nets. If one project is not successful, there are always others. This is related to the creation of a protected space for group members, which, as described above, leads to identification and heightened motivation among members. It is however also a strategy and form of organizing the epistemic work that caters to the increased publication pressure in academia. Working one big project is a much more risky strategy than dividing attention across a series of smaller projects of which at least one or two will always turn out to be publishable. The organization and practice of the groups thus resonate well with some of the demands in an “accelerated academy,” which focuses on excellence in terms of amount of output: numbers of publications, citations, patents, etc. (de Rijcke et al. 2015; Sørensen et al. 2015). Certain types of work (e.g., book publishing) might be abandoned for activities that are recognized as valuable in evaluation systems (Laudel and Gläser 2006; Hammarfelt and de Rijcke 2015).

In this final part of the analysis, we have seen that the case groups tend to organize their shared practice around internally defined authority structures, following perceptions of scientific relevance and excellence, rather than seniority or other “objectively” defined categories. Responsibility for the scientific process is also delegated to the members of the groups, rather than being the sole responsibility of the group leader. This seems to heighten the sense of responsibility and motivation among the members. This delegation of responsibility and freedom however takes place within the “safety net” of multiple projects, which emphasizes what we here have termed “care” for individual members.

## Discussion and conclusions

In the previous sections, we have analyzed the practice of successful research groups in the Netherlands and Denmark, in order to better understand what holds them together, and what the characteristics of their relations and organization are. We have demonstrated that the

successful research groups studied here bear stronger resemblance to *communities of practice*, rather than formal work teams on a number of parameters.

First, we have demonstrated that the groups in this study seem to be more oriented towards group identity and the interest that binds the group together, than towards specific tasks or goals. The groups have developed specific criteria for excellence and talent, and their group identity is largely upheld by notions of teamwork and freedom.

Secondly, the analysis revealed that all groups in the study had a structure much like legitimate peripheral participation, where students and junior members of the groups for example were given non-scientific, but essential tasks that connected them to the group and its practice, or were connected to peers or the research leader to enhance peer learning. We have argued that this indicates a focus on socialization, enculturation, and learning, rather than—or as a means to—reaching organizational goals.

Finally, the analysis has shown that the groups of the present study tend towards defining their own criteria for authority, and that these criteria are decoupled from, e.g., notions of seniority. Delegated and shared responsibility are in the groups a vital part of the practice and the risk management strategy, which we have argued heightens the motivation and sense of communality. In the concluding section, we will discuss the implications of these findings, and where this study might take us in the future.

The aim of the present study was to explore how successful and high-performing research groups navigated the demands of “academic capitalism” (Slaughter and Leslie 1997) and “accelerated academy” (LSE Impact Blog 2017; Vostal 2016), and thus what we might learn from them about the practice of research. Viewed from the outside, the groups studied are all labeled as excellent by a variety of actors, both in terms of “scientific excellence” (peer recognition) and “research excellence” (research output) (Sørensen et al. 2015). They are evaluated positively in national assessment exercises, their articles are often accepted in prestigious journals and their work is cited more often than the average in their respective fields, and funding committees often positively award their proposals. Viewed from the inside, some of the key features of these high-performing research groups are, as mentioned above, a high degree of enculturation and shared epistemic and ontological principals, peer learning, openness and freedom, a high degree of relational work by the group leader, and feelings of community among researchers—characteristics, which closely resemble those used to describe communities of practice.

We thus see four groups that have achieved success in the system of accelerated academy, measured on external as well as internal criteria. This may perhaps not be surprising, as previous studies show that communities of practice may have significant positive impact on organizational performance (Wenger et al. 2002; Schenkel and Teigland 2008; Storck and Hill 2000; Fontaine and Millen 2004), e.g., by enhancing a stronger sense of cohesion in the group and an increased willingness to share knowledge and be innovative. However, as argued in the introduction to this paper, many of the policy initiatives aimed at fostering excellence can be seen as conducive to work teams rather than communities of practice, because they have a strong focus on formally organized work processes, predefined goals, milestones, work packages, and hierarchically organized consortia. As we have shown in this paper, some of the most successful groups actually display practice that is more similar to community practice and, indeed, occasionally, actively work to fend off some of the “team-like” inputs. The groups thus seem to be navigating the demands of their surrounding by integrating features from the accelerated academy into their academic practice, e.g., the focus on smaller projects that might yield fast and publishable results, but in a way that supports the identity of the groups and the

culture of academic work, e.g., by framing the organization of work in smaller projects as risk management and care work. The groups—and particularly the group leaders—can thereby be seen as active “academic capitalists,” but also as working actively to shield their actual practice from this.

A central point that should be discussed here, however, is whether or not the groups in this study are exactly *able* to do this because of their success, the argument being that they have achieved the economic solidity and academic position and reputation, which renders them immune to many of the demands of the excellence era, and enables them to build and maintain community of practice-like characteristics, or if community of practice traits are the reason that these groups have been successful in the first place. The present study cannot provide a full answer to this question of causality, as it does not follow the groups over time, and any stories of “becoming” are naturally colored by the success of the present. However, the analysis demonstrates that these traits at the very least help the groups maintain a strong position within their fields, and thus *stay* high-performing. These traits then help the groups interpret and make sense of the demands of a changing academy.

Our study has put the spotlight on some of these potentially conflicting logics of organization that influence how research is carried out, and has illustrated how further research is needed to examine, e.g., how and to what degree community of practice traits can be purposefully built into academic fields and organizational contexts, and how funding schemes could be designed in order to support the formation of communities of practice. This would probably require a much stronger focus on socialization rather than training, on relational work rather than efficiency, e.g., by supporting the internal constructions of entry requirements, and/or by providing broader, non-specific grants, which would enable risk management and innovation in groups.

Also, the results point to the organizational/institutional responsibilities in the quest for excellence. By highlighting, e.g., how the groups tend to operate with specific criteria for excellence and talent developed within the group, and not institutionally defined criteria of excellence and talent (e.g., entry-level requirements for doctoral students), the study demonstrates that the research institutions might benefit from looking to their strategies for achieving excellence and if these are conducive to teams rather than communities of practice. Also the drive for “projectification” of the research institutions (Fowler et al. 2015) can be problematized by the results of the present study, and highlights the need for critical self-reflection within the research institutions.

## References

- Barab, S. A., & Plucker, J. A. (2002). Smart people or smart contexts? Cognition, ability, and talent development in an age of situated approaches to knowing and learning. *Educational Psychologist*, 37(3), 165–182.
- Bland, C. J., & Ruffin, M. T. (1992). Characteristics of a productive research environment: literature review. *Academic Medicine*, 67(6), 385–397.
- Bloch, C., & Sorensen, M. P. (2015). The size of research funding: trends and implications. *Science and Public Policy*, 42(1), 30–43.
- De Bellis, N. (2009). *Bibliometrics and citation analysis: from the science citation index to cybermetrics*. Scarecrow Press.
- de Rijcke, S., Wouters, P. F., Rushforth, A. D., Franssen, T. P., & Hammarfelt, B. (2015). Evaluation practices and effects of indicator use—a literature review. *Research Evaluation*. <https://doi.org/10.1093/reseval/rvv038>.
- Dunbar, H., & Lewis, D. R. (1998). Determinants of research productivity in higher education. *Research in Higher Education*, 39(6), 607–631.

- Eckert, P. (2006). Communities of practice. In K. Brown (Ed.), *Encyclopedia of language & linguistics* (2nd ed., pp. 683–685). Oxford: Elsevier.
- Edgar, F., & Geare, A. (2013). Factors influencing university research performance. *Studies in Higher Education*, 38(5), 774–792.
- Felt, U., Igelsböck, J., Schikowitz, A., & Völker, T. (2013). Growing into what? The (un-) disciplined socialisation of early stage researchers in transdisciplinary research. *Higher Education*, 65(4), 511–524.
- Fontaine, M. A., & Millen, D. R. (2004). Understanding the benefits and impact of communities of practice. In P. Hildreth & C. Kimble (Eds.), *Knowledge networks: innovation through communities of practice* (pp. 1–13). Hershey, PA: Idea Group.
- Fowler, N., Lindahl, M., & Sköold, D. (2015). The projectification of university research. *International Journal of Managing Projects in Business*, 8(1), 9–32.
- Hammarfelt, B., & de Rijcke, S. (2015). Accountability in context: effects of research evaluation systems on publication practices, disciplinary norms, and individual working routines in the faculty of Arts at Uppsala University. *Research Evaluation*, 24(1), 63–77.
- Horta, H., & Lacy, T. A. (2011). How does size matter for science? Exploring the effects of research unit size on academics' scientific productivity and information exchange behaviors. *Science and Public Policy*, 38(6), 449.
- Joshi, A. (2014). By whom and when is women's expertise recognized? The interactive effects of gender and education in science and engineering teams. *Administrative Science Quarterly*, 59(2), 202–239.
- Langfeldt, L., Benner, M., Sivertsen, G., Kristiansen, E. H., Aksnes, D. W., Borlaug, S. R., Foss Hansen, H., Kallerud, E., & Pelkonen, A. (2015). Excellence and growth dynamics: a comparative study of the Matthew effect. *Science and Public Policy*. <https://doi.org/10.1093/scipol/scu083>.
- Laudel, G., & Gläser, J. (2006). Tensions between evaluations and communication practices. *Journal of Higher Education Policy and Management*, 28(3), 289–295.
- Lave J., & Wenger, E. (1991). *Situated learning: legitimate peripheral participation*. Cambridge university press.
- Lesser, E. L., & Storck, J. (2001). Communities of practice and organizational performance. *IBM Systems Journal*, 40(4), 831.
- LSE Impact Blog. (2017)The accelerated academy. Retrieved at: <http://blogs.lse.ac.uk/impactofsocialsciences/the-accelerated-academy-series/>
- OECD. (2014). *Promoting research excellence: new approaches to funding*. Paris: OECD.
- Park, J. J., Choe, N. H., Schallert, D. L., & Forbis, A. K. (2017). The chemical engineering research laboratory as context for graduate students' training: the role of lab structure and cultural climate in collaborative work. *Learning, Culture and Social Interaction*. <https://doi.org/10.1016/j.lcsi.2017.04.001>.
- Ramsden, P. (1994). Describing and explaining research productivity. *Higher Education*, 28(2), 207–226.
- Rushforth, A., & de Rijcke, S. (2015). Accounting for impact? The journal impact factor and the making of biomedical research in the Netherlands. *Minerva*, 53(2), 117–139.
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68.
- Schenkel, A., & Teigland, R. (2008). Improved organizational performance through communities of practice. *Journal of Knowledge Management*, 12(1), 106–118.
- Seely Brown, J., & Duguid, P. (2001). Knowledge and organization: a social-practice perspective. *Organization Science*, 12(2), 198–213.
- Slaughter, S., & Leslie, L. L. (1997). *Academic capitalism: politics, policies, and the entrepreneurial university*. Baltimore: The Johns Hopkins University Press.
- Smeby, J. C., & Try, S. (2005). Departmental contexts and faculty research activity in Norway. *Research in Higher Education*, 46(6), 593–619.
- Sørensen, M. P., Bloch, C., & Young, M. (2015). Excellence in the knowledge-based economy: from scientific to research excellence. *European Journal of Higher Education*. <https://doi.org/10.1080/21568235.2015.1015106>.
- Storck, J., & Hill, P. A. (2000). Knowledge diffusion through “strategic communities”. In E. L. Lesser, M. A. Fontaine, & J. A. Slusher (Eds.), *Knowledge and communities* (pp. 65–83). Butterworth-Heinemann.
- Tight, M. (2004). Research into higher education: an a-theoretical community of practice? *Higher Education Research & Development*, 23(4), 395–411.
- Tight, M. (2008). Higher education research as tribe, territory and/or community: a co-citation analysis. *Higher Education*, 55(5), 593–605.
- Verbree, M., Van der Weijden, I., & Van den Besselaar, P. (2012). Academic leadership of high-performing research groups. *Creativity and Leadership in Science, Technology, and Innovation*.
- Vostal, F. (2016). *Accelerating academia: the changing structure of academic time*. Springer.
- Wenger, E. (1998). *Communities of practice: learning, meaning, and identity*. Cambridge university press.
- Wenger, E. (2000). Communities of practice and social learning systems. *Organization*, 7(2), 225–246.

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- Wenger, E., McDermott, R., & Snyder, B. (2002). *Cultivating communities of practice*. Boston: Harvard Business School.
- Whitley, R. (2014). How do institutional changes affect scientific innovations? The effects of shifts in authority relationships, protected space, and flexibility. In R. Whitley & J. Gläser (eds.) *Organizational transformation and scientific change: the impact of institutional restructuring on universities and intellectual innovation* (Research in the Sociology of Organizations, Volume 42)(pp.367–406). Emerald Group Publishing Limited.
- Ylijoki, O. H. (2003). Entangled in academic capitalism? A case-study on changing ideals and practices of university research. *Higher Education*, 45(3), 307–335.
- Young, M., Sørensen, M. P., Bloch, C., & Degn, L. (2016, 2016). Systemic rejection: political pressures seen from the science system. *Higher Education*. <https://doi.org/10.1007/s10734-016-0059-z>.