

Interactive comment on “Transnational mobility and the spaces of knowledge production: a comparison of different academic fields” by H. Jöns

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First, I would like to express my gratitude to both referees for engaging with the paper and making some very helpful suggestions for clarification and improvement of the argument. In the following I will respond to the referees' comments point by point.

Referee #1 (RC = referee comment, AR = author's response)

a. RC “The first section that Joens illustrates her research approach in might profit from a more detailed description, because it is a little short sometimes. Reading her abstract, for example, one is insecure, whether the terms ‘research practices’ and ‘motivation’ are used as substitutes (80: 6f and 11) or whether the term ‘research practices’ works as an umbrella term or whether a new, independent research interest is intro-

duced here."

AR The term 'motivation' refers to the reasons of why the scientists went to Germany for a limited period of time. 'Research practice' refers to the actual research work the scientists are pursuing at home and in Germany, i.e. to the nature of their work. The argument is that different types of research practices imply different spatial relations that in turn influence the motivations for and outcomes of academic mobility and collaboration.

b. RC "Furthermore, the conceptual implications of her empirical finding on page 82, lines 10-20 appear a little unrelated to her main research interest that I described above. A more detailed description of the linkage between the investigation of global patterns, motivation and collaborative result, and the actor network approach would be helpful here."

AR The actor-network based conceptualisation of scientific work and interaction applied in the paper makes it possible to include as many relevant elements as possible into the analysis. On the one hand, for example, the scientists are attracted to other places by the access to certain research infrastructure and research objects. These comprise of all sorts of sociomaterial elements which actor-network theory has conventionally designated as 'actants'. On the other hand, the scientists are embedded in different social relations, which also influence their decision to become internationally mobile (e.g., organisational aspects, family background, friendship). While these social relations are often considered as 'social context' in other approaches, the applied actor-network based approach makes it possible to consider all these influencing social and material aspects equally by arguing that the resulting action or outcome is a relational effect of the interplay of all of them. On the individual level, for example, it is possible, as I have done elsewhere (Jöns 2003, 86-91, 280-281 and 356-357), to display individual motivations for and outcomes of academic mobility in the form of heterogeneous 'chains of associations' (Latour 1987, 202-205; Latour 1999, 124f.). These individual 'chains of associations' list all identified influences or results - which are conceptu-

alised as ‘actants’ - next to each other, arguing that it cannot be decided which ‘actant’ would have been most important as it is the whole actor-network that is considered to be responsible for academic mobility and its results. While the findings of the quantitative survey discussed in this paper cannot be displayed in this individualised way, the varying frequencies of responses to certain categories used in the questionnaire indicate which motivations and outcomes are typical, for example, in different academic fields (the categories of the questionnaire were the result of the qualitative interviews that I analysed, *inter alia*, in terms of chains of associations, p. 82, lines 3-9 and Jöns 2003). Based on this understanding, it is also possible to regard the global patterns discussed in the first part of the paper as the result of a complex geography of individual actor-networks and ‘chains of associations’. As referee #1 outlined, my particular interest in the final part of the paper is in which ways the nature of the research work influenced field-specific cultures of academic mobility and interaction. This means that I am focussing on a particular aspect of the wider actor-networks in order to describe the ways in which varying spatial relations of different research practices influence the collaborative patterns - without saying that this is the only aspect that matters.

c. RC “The fourth section describes the motivation of scientists. Joens introduces the most frequent 15 motivations in declining importance. Here, it might be worth reviewing whether another criteria apart from their quantitative representation would be more suitable here. Using groups of related motives might increase readability and a shortening of text is useful, because the motivation are also represented in a separate figure.”

AR Thank you for this remark, which I would be happy to consider in the revisions.

d. RC “In section 6 Joens interprets her findings in terms of their relevance to the actor network theory. She outlines three dimensions: materiality - immateriality, standardisation and abstraction. In my opinion the term standardisation comprises several meanings, which should be distinguished in more detail. Firstly, it is applied to manufactured instruments. This is seen in opposition to social life worlds, which are merely

seen as self referential without general rules. Secondly, standardisation is used to describe the mathematical language, for example, which is used internationally, whereas empirical work appears to be mainly context dependent. Both dichotomies seem to overemphasise the differences between arts and social science and natural sciences. Arts and social sciences appear more place bound and natural sciences are place independent.”

AR This is not the impression I would like to give. Based on recent insights into the nature of scientific practice by historians of sciences, actor-network theorists and feminist science students, I argue that all academic practices are situated in time and space and are thus to some extent place-bound. However, because of varying degrees of materiality, standardisation and abstraction, different practices are characterised by different spatial relations. With standardisation I mean the previous input of work, resources and agreement in order to achieve certain standards regarding methods, theories and equipment (see p. 98). My argument regarding standardisation is that certain practices in the natural sciences are more standardised than other practices in the natural sciences, while there are also similar differences in the social sciences and in the arts and humanities. The research findings, for example, indicate that most practices in the social sciences are more standardised than in the arts and humanities. This can be explained by the use of less standardised methods and a greater meaning of individual language skills in the arts and humanities when compared to most branches of the social sciences (see pp. 93-95).

e. RC “In my opinion, there is a certain movement towards abstraction in social sciences and arts as well.”

AR Yes, I completely agree (see d. above). However, standardisation is different to abstraction. Abstraction as used in this paper refers to the increasing reduction and abstraction of information and resources when producing a new knowledge claim (see p. 100).

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f. RC “In my opinion, language barriers should not be overemphasised, since experts on different field need to learn the necessary language wherever they specialise.”

AR Yes, but the language plays a very different role for expressing oneself. In my experience, writing papers for English-speaking journals in human geography as a non-native speaker often requires the additional check by a native speaker to get the more subtle points across. Recent work in geography has actually confirmed that ‘it is easier for native English speakers to publish in English-language journals’ (Aalbers and Rossi 2007, 284; Paasi 2005). While particular methods and terminologies have to be learned in all fields, the vocabulary necessary for writing papers seems to be much more limited and standardised (or ‘technical’) in fields such as mathematics, physics and chemistry than in history, philosophy and literature studies. This is why it seems to be easier in most branches of the natural sciences to collaborate and to collaborate internationally than in most branches of the arts and humanities.

g. RC “Place bound discourses might partly influence certain fields of discussions in science as well as in arts and social sciences. Although I feel Joen’s distinction along disciplinary lines and scientific is too strong, it might be unwise to change the section on standardisation now. An additional remark in the introduction and conclusion on the limits of the research on scientific practices might be more useful.”

AR Yes, again, I totally agree with the observation that discourses in all disciplines are influenced by place-specific aspects. However, my argument is that the degree to which this is the case varies along certain typical features of research practices. I would like to make sure that this becomes clearer in the respective sections of the paper.

h. RC “This could also include an additional remark on her empirical basis: scientists which were related to the Humboldt foundation. Research practices depend on different funding bodies. International research within the European Union, which is one of the main funding bodies now, is highly influenced by political negotiations in terms of

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the national origin of researchers and of the political targets. This political dimension might be of less importance in Joen's group of scientists. This also leads to more internationally applicable results concerning international mobility of scientists."

AR I agree that the analysis of research stays by Humboldt fellows is attractive because the Humboldt Foundation does not have any quotas in regard to disciplines and countries of origin. It also tries to assess the merit of each individual application, while considering to some extent the scientific standards in the country of origin. These regulations and procedures are indeed very different to those programmes funded by the European Union, and it might be important to add such a remark on pages 85/86. However, I also consider academic mobility in the 1980s, and these exchanges were also shaped by political interests, mainly from the country of origin. For example, in many former Comecon countries, central agencies transferred the applications to the Humboldt Foundation although the Humboldt Foundation has always encouraged unmediated applications by individuals. The argument of 'internationally more applicable results' is therefore a tricky one, but I would support it in the sense that the openness towards applicants from all disciplines and countries helps to identify the world-wide interest in spending a research period in Germany (see p. 86, lines 1-3).

i. RC "In the section on standardisation, however, another point seems to be of major importance. Instruments in experimental science laboratories are hardly mass produced. It might be difficult to call them 'standardised', because the research process and the production of instruments to conduct necessary experiments is go hand in hand. The larger independence of researchers who use large instruments at CERN or other places from the technical development of those instruments might be described with a standardisation process, but in my opinion this example refers much more to the abstraction process than to a standardisation process."

AR Yes, I agree that it is difficult to make this general claim for all "experimental science laboratories" because there are great differences between them. For example, previous research has shown that there are, for example, great differences between

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experiments in chemistry and engineering. In engineering, collaborative experiments often take more than a year, particularly when they aim to develop new technologies that are related to a specific context of application (e.g., cooperation with industrial companies) (see Jöns 2003, 362). In chemistry, laboratory contexts are often so standardised that compounds can easily be exchanged between and analysed in different places, which makes international collaboration much easier (see Jöns 2003, 443-445). High energy physics is, of course, also quite different to other branches of experimental physics (see Jöns 2006). However, based on the quantitative data about collaborative patterns between researchers working in different fields and types of work, it becomes clear that there are statistically significant differences between experimental, empirical, argumentative and theoretical work, which I suggest to explain by different degrees of materiality, standardisation and abstraction. I agree that a close look at different experimental practices would also reveal different degrees of materiality and standardisation. My main concern is that these differences represent important nuances on a continuum between low and high degrees of materiality and immateriality as well as low and high degrees of standardisation, while the extremes (e.g., place-bound / not place-bound, standardised / not standardised) are rather concepts than empirically verifiable realities.

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