Submission to the Secretary General, Association of Af

ABSTRACT

Brain drain or brain gain?
Global policy on scientific mobility 1990 – 2007: The role of universities

The mobility of scientists is a key aspect of the organization of scientific knowledge production and a great source of political, economic and social debate. The "science for development" model (Drori et al, 2003) identifies managing scientific mobility as a source of tension at national and international levels, especially for policy makers. Educational institutions, specifically those in higher education, recur as key actors in the debate and now appear to have an explicit role in addressing scientific mobility and brain drain.

This study reports on a historical analysis of international policies regarding scientific mobility over the past decades. This analysis is compared to the results of interviews conducted with current policy makers, to understand the tensions surrounding this issue and the pressures for change on higher education. Drawing upon institutional and cultural theory, this study shows an increasing growth and variety of actors involved in shaping the global policy discourse, causing significant fragmentation of the debate. The multiple conceptualizations of scientific mobility make it unrealistic for policy makers to pursue a single policy response and also indicates the wickedness of the issue. Policy documents indicate that universities in developing countries are being pressured to change and respond to the issue of scientific mobility. However, the lack of agreement on the rules of the game undermines coercive and normative mechanisms for change, from the international sphere to the national level.

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Introduction

Classic policy studies of scientific mobility define the issue in terms of its linear relationship to development and economic growth (for example, US House of Representatives, 1977). Despite the broad reservations of some scholars on linear development (for example, see Frank, 1996), the science for development model (Drori et al, 2003) encourages the expansion of the science and technology capacity of universities and the production of more science and engineering graduates (United Nations World Summit, 2005). One of the contentious issues of the science for development model is in the production, retention and mobility of scientists, in disciplines such as chemistry, physics, biology, mathematics and medicine. Mobility of scientists is a pertinent issue for developing countries whose governments are investing in the "science for development" model.

In recent years, there has been a shift in the discourse regarding scientific mobility, from "brain drain" to the idea of "brain circulation" (Meyer, 2003; Johnson and Regets, 1998), which has major consequences for public policy and national institutions (Ackers, 2005a). Some scholars suggest that the mobility of highly skilled scientists is a normal process that should not be stopped, and that the real challenge is therefore to manage it as well as possible (Meyer, 2003). Another facet of the debate is the view that the mobility of scientists is part of the cosmopolitan nature of science and an old norm among scientists. Then there are the differences at the disciplinary and national levels between migration patterns and progression in scientific careers (Ackers, 2005b). Labeled the "expectation of mobility" (Mahroum, 1998), scientists believe they need to spend time working overseas to progress in their careers. The issue is also caught up in the globalization of labour markets generally, the internationalization of higher education and the international encouragement for the "science for development model" (Meyer et al, 1997). The calls for policy makers to respond to scientific mobility and migration are drawn

from the belief that it is important to address issues of reciprocity, balance and differential opportunity (Ackers, 2005a).

There is much discussion at the international level, in the expanding policy discourse, about the role of universities in addressing scientific mobility. There are specific recommendations from international agencies about what universities need to do at the local level to attract and retain scientific talent (for example see United Nations World Summit, 2005; UN Millennium Project Report, 2005; UNCTAD, 2005; InterAcademy Council, 2004; British House of Commons S&T Committee, 2004). Yet, simultaneously there are claims that reliable data are limited and hence the research base for mobility programs and polices are relatively inadequate (Ozden and Schiff, 2005).

In attempting to understand the complexities and tensions inherent in this global policy context, and the pressures on universities to change, the key questions driving this research are:

1. How has the issue of scientific mobility and "brain drain" been conceptualized over recent decades? Where has higher education featured?
2. How is the issue currently being conceptualized? Where does higher education feature in current debates?
3. Is the current conceptualization of this issue (definition and solutions) contributing to pressures for change on higher education?

A note on the theoretical framework and methodology

This paper is drawn from a larger study that considered this issue from two theoretical frameworks, institutional theory (from organizational studies) and cultural theory (focusing on sociological aspects of policy making). This larger study investigated what these available theoretical frameworks could contribute to understanding the process of conceptualization (of scientific mobility) and also the content of the conceptions. As such, it is important to note that results and analysis of this paper are situated in this underlying theoretical framework. As the issue of scientific mobility is one piece of a

broader story about capacity building and institutional development, an institutional framework, such as that developed by Djelic and Quack (2003), is very useful. Djelic and Quack (2003) draw upon DiMaggio and Powell (1983) and engage several levels of analysis between global, national and local processes to study pressures and processes of national institutional change and transnational institution building. In the global policy context for scientific mobility, the number and variety of actors involved (from science ministries, education ministries, universities, associations of universities, national professional academies, international professional academies, international aid agencies, NGOs etc) also suggests that scientific mobility is a story about transnational processes, negotiation of meanings and the development of a global policy discourse, whereby local, national and international institutions are colliding in this transnational space (Djelic and Quack, 2003).

Cultural theory is the second framework through which the global policy context of scientific mobility is viewed. Cultural theory builds out from the institutionalism of Durkheim and also Douglas. It provides a framework that assists in understanding complex policy issues, particularly where there are competing beliefs and contested frames of reference amongst actors. Cultural theorists Douglas (1978) and Thompson et al (1990) present a typology that comprises of four ways of "seeing the world". The "grid-group" typology (Douglas, 1978; Schwarz and Thompson, 1990) classifies perspectives on an issue as either hierarchical, egalitarian, individualist or fatalist, based on the dimensions of "group" (density and transition of social interactions) and "grid" (restrictiveness of institutionalized regulations and rules on social interactions). This typology is a useful analytical tool as it provides a means of organizing the various perspectives and conceptualizations of scientific mobility, as demonstrated later in this paper.

A three-stage multi-method data collection strategy was used to investigate the definitions, meanings, perceptions and tensions surrounding scientific mobility and the role of universities. A historical analysis of policy documents from 1990 to 2007 was produced. This was then compared to data gathered from presentations and interviews

with policy makers and representatives from international organizations, who attended the World Bank's Global Forum on Building Science, Technology and Innovation Capacity in February 2007.

The history of the debate: brain drain or brain gain?

This historical analysis shows that the issue of scientific mobility and the brain drain has been on the international development agenda for many decades. Over the past 40 years, 2264 documents cited scientific mobility or brain drain in the databases of major international donor agencies. Analysis shows the issue of "brain drain" becoming "brain circulation" from 1990 to 2007 (although there is still not agreement on the definition), and an increase in the number and variety of organizations associated with the issue, as demonstrated in Figure 1. by the following stylized representation).

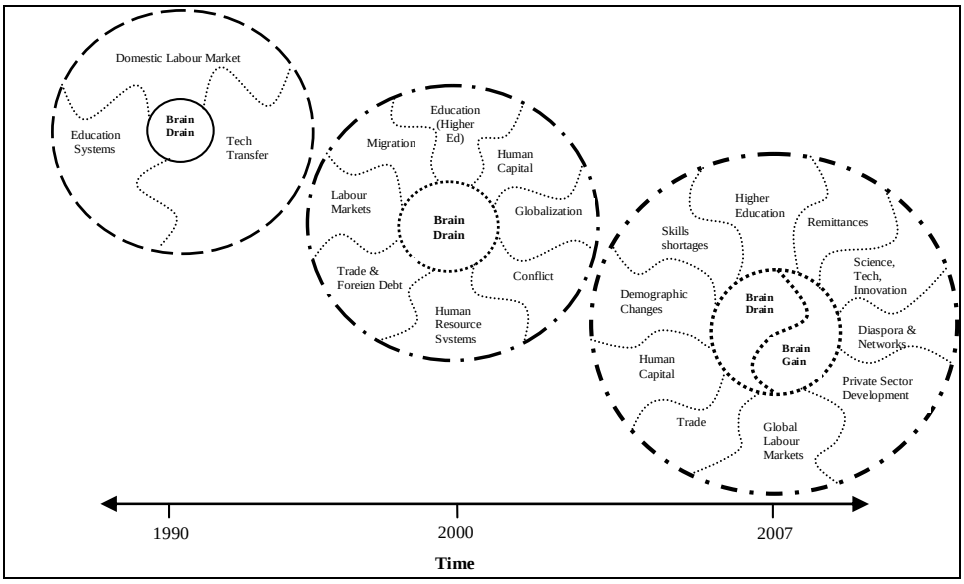

Figure 1. Stylized Representation of Historical Policy Analysis (growth, change and complexity)[1]

[1] This figure is not to scale (circles and internal segments), and is representational only. It is based on the three points in time identified, and does not aim to illustrate a complete historical analysis. The dotted lines emphasize the difficulty in drawing a solid boundary around this issue. In 2007, we see the core definition is split (into brain drain and brain gain); increasing the complexity of the issue and the variety of policy responses.

Today, it seems that the "nationalist" perspective (and therefore conceptualization of the issue as "brain drain") is not as dominant. An internationalist perspective (and therefore more "brain gain") is re-conceptualizing the issue; it may be an unstoppable force yet it also has positive impacts (such as relieving national labour market pressures, remittances, knowledge transfer through diasporas etc).

As the conceptualization of the issue changed, so did the solutions, for the most part. Bhagwati's (1976) proposal of a taxation system (to compensate the sending countries for the losses incurred, and to be collected on skilled emigrants' earnings abroad and redistributed within the country of origin), has drifted from the list of possible solutions, to the point that several actors agree (such as international donor agencies, international agencies and professional academies) that it should be opposed as it would be unworkable and detrimental in today's current period of globalization (where international relationships, networks and linkages are sought). The idea that the brain drain may actually be a brain gain (and therefore not in need of a solution) gained significant momentum after the publishing of Saxenian's (1999) work on Silicon Valley and the activities and contribution of the Indian Diaspora to national development.

The debate today: where do you stand?

In February 2007 at the World Bank's Global Forum on Building Science, Technology and Innovation Capacity, 30 presentations were made of which 14 referred to the brain drain or scientific mobility issues. Brain drain was identified as a development priority in the keynote address of the World Bank President. I held a further 10 semi-structured interviews with key organizations involved in shaping policy relating to scientific mobility. The interviews confirmed the fundamental differences in beliefs regarding this issue and perceptions about the future of the debate. All agreed, however, that universities have a role, although they need "solid pots of money" to implement current recommendations.

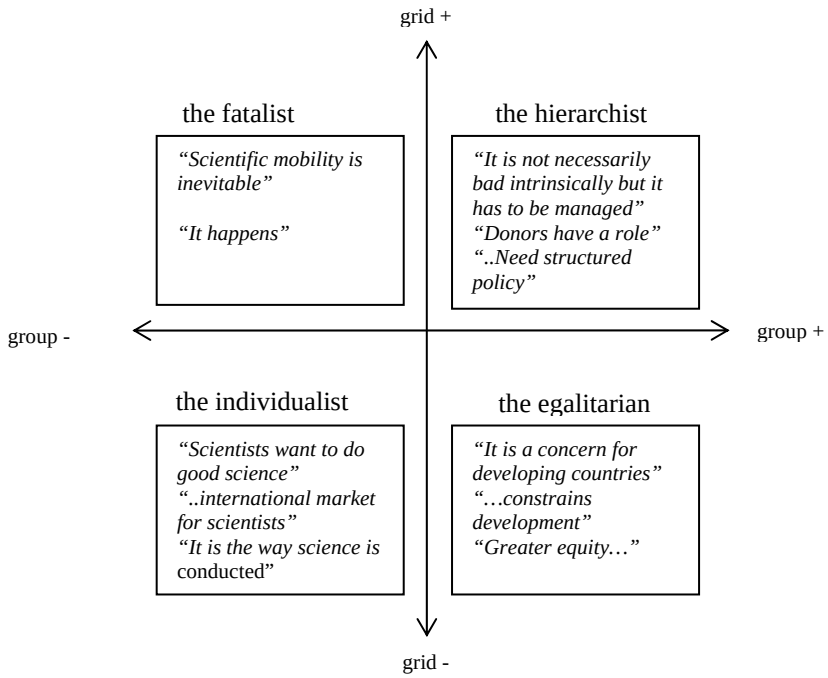

Figure 2. Cultural Theory's Group-Grid applied to the issue of scientific mobility

Figure 2 exemplifies the complexity of this issue today – some of the quotes listed in different quadrants originated from within the same group of actors. Cultural theory assumes "the same four forms of organizing and perceiving are interacting – forever merging, splitting, recombining" (Verweij and Thompson, 2006:5). The historical documentary analysis shows that in 1990 the dominant perspective was that of the egalitarian. The current documentary analysis and interviews show a shift in perspectives and tensions, now between the hierarchical and individualist views. Cultural theory proposes that creating a single policy response is not possible or preferable: "people are arguing from different premises and that since these premised are anchored in different forms of solidarity, they will never agree", even though each perspective needs the other "in order to be sustainable" (Verweij and Thompson, 2006:6).

Universities: part of the problem and part of the solution

So where does higher education feature across the history of this debate? Education is a consistent feature yet its focus and position changes. For example, in 1990, education

systems (all levels) are associated with the issue, and conceived as indirectly being part of the solution as capacity needs to be built across national education systems. In 2000, education is again part of the debate, with the role of higher education and universities in building a critical mass of highly skilled workers and offering scholarships with return clauses a consideration. In 2000, it was believed by some actors that the market cannot be left to create a balanced system of higher education and that governments have an obligation to ensure national development needs are met by supporting basic sciences and humanities education at the tertiary level (Higher Education Taskforce, 2000). By 2000 there was a stronger nationalist argument in contrast to the dominant idea of a global labour market in 2007. In 2007 the role of higher education is far more developed and explicit in the conceptualization the issue and its solutions.

A key area of tension in the data collected for this study is around the policy suggestions relating to changing university structures, values and norms. For example, international donor agencies suggest that universities need to foster a climate where scientific research is valued, particularly within larger society, and hopefully increase the probability of scientists attaining a sense of self-fulfillment. Also, universities should undergo "systematic tuning" and use "strong management" (United Nations Development Group, 2005:89) to ensure new schemes are put in place and stay in place. Yet, there is no information in the policy documents reviewed that describes what systematic tuning involves.

An analysis of the Forum's presentations shows mobility as crucial in being able to access international science and technology activities and networks. Universities provide a mechanism through which developing nations can increase their integration and access to the global economy. Throughout the presentations, the role of universities was tied to building a crucial mass of scientists, providing skills development and delivering training to meet the needs of the nation and also the private sector. In regards to science, if the rules of the science "game" are changing, there appears to be a stronger need and encouragement for universities to respond to these international institutional pressures – as a necessity and also as an opportunity. The concern, often raised from the private

sector, is whether universities and national governments in supporting higher education, have the capacity and ability to respond to such pressures. Responding may require changes to "the ways things are done" - institutionalized practices, structures, norms, and behaviours.

So what does this mean for policy makers?

Although higher education is a constant focus throughout the debate, and has a role regardless of the definition of the issue, there is a lack of detail on the practicalities to implement current recommendations. There is also a surprising lack of financial support, for the number of recommendations and apparent urgency surrounding the issue.

This study showed that there are fundamental differences in perspectives and that these perspectives seem unlikely to change (or unlikely to change quickly). There has been a resurgence in the issue of recent years and yet there is also a tiredness around the circularity of discussions and perceived lack of action from all policy makers at all levels. Policy makers, at the international, regional and national levels, need to recognize that there is no one definition of the problem, and therefore no one policy response available.

The diaspora is constantly cited as a solution to brain drain and part of capacity building, however, the results show this is a complex term used in multiple contexts and therefore needs defining if it is to be the base of policy responses. The results of this study indicate that policy responses to the "brain drain" are impossible and perhaps passé. It seems more appropriate, given the multiple conceptualizations, for policies to focus on fostering relationships and opportunities for collaboration and participation (to ensure universities and scientists in developing countries are in the science "game"). Such policies may indirectly alleviate any age-old "brain drain" concerns.

There are questions surrounding data collection and the role of professional academies. It is difficult to gather data on a multidimensional issue. If more data is needed to develop and implement policies and programs, what data exactly? How is the issue being defined

and how does this impact on what data is collected? And who will fund the collection? In regards to professional academies (in developing and developed countries) could they play a bigger role in the development and delivery of programs? They already have much data, contacts and access to their members and their international counterparts. Their grassroots knowledge and access to scientists could provide immediate results by supporting local (new and existing) linkage programs, assistance for twining arrangements, exchange programs and providing real opportunities for relationship building and collaboration.

Concluding remarks

Recently, scholars of cultural theory have begun to extend the group-grid typology and talk of "wicked problems" in need of "clumsy solutions" (Verweij and Thompson, 2006). Wicked problems (Rittel and Webber, 1973) tend to be characterized by a circularity, contradictory certitudes (people holding fundamentally different perspectives on how the world is) and often the definition of the solution in many ways defines the problem (Rayner, 2006); this is true of the mobility of scientists. For example, to highlight the circularity within the context of scientific mobility, scientists may leave a country because of the standard of scientific and educational resources and institutions. When these institutions are improved, scientists may decide to stay, yet the improved standard of education may make scientists more attractive to countries seeking scientific talent and may in fact provide more opportunities to work abroad. Another circular aspect is that graduating more scientists to build scientific human resource capacity in a country where there are limited job opportunities after graduation may in fact lead to countries training a scientific workforce for other countries (Arocena and Sutz, 2001).

Clumsy solutions (Shapiro, 1988) are policies that are generated in a setting where there is a mix of institutional forms, a recognition that there is not one single definition of, or solution to, the problem, and that each viewpoint (hierarchical, egalitarian, individualism, fatalism) needs active consideration and involvement in the proposed (and consequently "inelegant" or "clumsy") solution. Clumsy solutions recognize that different institutional

arrangements and contradictory certitudes make "elegant" solutions implausible. This study's findings demonstrate the complexities and inherent difficulties in defining this issue and the implausibility of developing a single policy response. Considering scientific mobility as a wicked problem in need of a clumsy solution may provide insights for policy makers and open up new approaches to policy making on this issue.

The global policy context surrounding scientific mobility will remain controversial. It has economic, social and political drivers and impacts at international, national and local levels. Over the years, education has remained a constant feature of the debate and source of tension. Today, the emphasis is strongly on higher education and its explicit and multiple roles: economically in building and retaining staff and securing resources, socially in developing a culture that values science and scientists, and politically in actively working with national and international agencies to become attractive and well-functioning national institutions. Whilst initially it seemed that strong pressures for change (coercive and normative) on universities would be found in the global policy discourse, the data collected for this study shows a far messier issue. Defining the role of universities requires consideration of local and national needs and of course adequate funding and resources. Do universities in developing countries have the capacity and ability to respond to the way science is being conducted[2]? Dr Charles V Kidd once made a poignant statement regarding the global policy context of scientific mobility. Dr Kidd, a long-time student of science policy and science advisor to US President Lyndon B. Johnson, commented that scientific mobility is "…not a problem to be solved, but a situation to be adapted to" (U.S. House of Representatives, 1977: 1066).

[2] This question is a focus of my upcoming PhD research, commencing October 2007 at the Said Business School, University of Oxford.

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