THE "MEANING" OF CITATION IN THE CONTEXT OF A SCIENTIFICALLY PERIPHERAL COUNTRY

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This paper reports an investigation into the referencing pattern of Brazilian agricultural scientists. The study was based on the use of both quantitative data—citations appearing in a sizeable sample of articles published by these scientists—and qualitative data—interviews with a large number of scientists who authored the source papers. The aim was to explore the extent to which citation counts may be taken as valid indicators of the quality, influence or impact of published scientific knowledge in the general context of a scientifically peripheral country. The findings presented confirm the view that in this context, citation patterns are significantly influenced by factors "external" to the scientific realm and, thus, reflect neither simply the quality, influence nor even the impact of the research work referred to.

Introduction

Citation counts have tended to be treated as a reliable indicator of the quality of scientific output, to the extent that they could be considered a measure of scientific progress, and not simply of scientific productivity as are paper counts. This stance has been justified by the correlation of citation counts with various other indices of "quality" such as Nobel laureate counts and peer evaluation. The underlying assumption of the use of references as a measure of quality is that "the research a scientist cites in producing his own papers represents a roughly valid indicator of influence on his work." Thus, citations to a document are taken as indicating its influence on the research reported in citing papers. It still remains to be seen whether in fact quality may be conflated with influence in this way. However, most sociologists of science have been concerned to test the assumption that citations reflect the influence of one scientist upon another. The point has been disputed on the basis that "the use of citation patterns as an index of lines of intellectual influence, clearly involves a theory of citing which is far from being satisfactorily..."
elaborated." Attention has been called to the fact that little is known about how scientists decide to cite papers in their work and why they choose to cite particular papers rather than others. It has also been suggested that the conceptual confusion surrounding the use of citation counts may be avoided by viewing these as a measure of the impact, rather than quality, of scientific publications. This contribution is valuable because it recognises that social factors play a role in shaping citation patterns in science.

These considerations notwithstanding, there remains a consensus that "citations are very often a visible record of genuine influence", although it is now generally accepted that citations reflect actual influence rather than potential influence, and represent an approximate measure at that. Yet it is becoming increasingly clear that citations are not always or solely a reflection of the influence of a particular piece of research on another group of researchers. As Edge argues, "the giving of citations is only one aspect of the behaviour of scientists; and if, in any instance, the citation picture is to be accepted as the most accurate available representation of the real events, it can only be because it is well supported by other evidences". Thus, precisely because social factors mediate citation behaviour in science, it is advisable to use data additional to those derived from citation counts when measuring the quality of scientific output. In particular, it is advisable to use qualitative data derived from face-to-face interviews if we are to be sure of exactly what citations measure and what, therefore, we may safely conclude from citation counts. This means that the analyst must have some first hand experience of the scientific endeavour under study. It also means, as Mulkay amongst others have argued, that "if we are to study in detail the operation of scientific communities, we must have the active cooperation of participants". Of course, all of this renders the validation of citation counts a potentially laborious process but, I would argue, the effort involved can be easily justified where there is reason to believe that the pattern of formal communication in science — as reflected in the publication and citation of scientific papers — does not fully reveal the network of influence operating, or the quality of cited (and uncited) research work.

To date, analyses of the social factors which shape the citation behaviour of scientists have been based on studies of science in the developed/industrialized countries. In so much as these countries are “advanced” in terms of scientific output (this is not true of all industrialized countries), we may consider them to be at the centre of scientific endeavour globally. By contrast, all of the developing/less developed countries (with the possible exception of India) are on the “periphery” of the international scientific community. Existing studies of science in the latter suggest that the formal communication patterns of scientists working in developing countries is heavily influenced by their being on the periphery. If this is indeed