ABSTRACT. This paper examines the role of industry in the support of academic infrastructure, in particular university research equipment. Although the United Kingdom provides the framework for discussion the described situation should be a familiar one in most countries. The argument is constructed around the perceptions, opinions and positions of universities, government and industry. Drawing on results from a survey of academic departments the equipment situation at UK universities is outlined. Following that the position of the Government attempting to attract industrial support for university research equipment is discussed. And finally, industry's views of where the demarcation between public and private responsibility lies are presented.

1. Introduction

The 'triple helix' in its second dimension identifies the mutual influences of the public, private and academic spheres (Leydesdorff and Etzkowitz, 1996). One such interaction takes place in terms of exchange of resources (from industry) in return for research performed or people trained. Government often mediates this process, either directly, through brokerage or incentives for co-operation, or indirectly, by sponsoring research and training in the expectation that industry (and hence the regional and national economy) will benefit. Studies of such interactions have tended to focus upon the inputs and outputs, while neglecting the infrastructure necessary to support such relations. Furthermore, the usage of such infrastructure may provide a focal point around which new modes of knowledge production coalesce (Gibbons, et al., 1994) In this paper the role of industry in the support of academic infrastructure, in particular university research equipment is examined.

The context of this analysis is the debate during the past three years about where responsibility lies for remedying a perceived deficit in the provision of research equipment in UK universities. The situation should be a familiar one in most countries, arising from the inability of traditional funding sources to keep pace with the growth in demand for ever more sophisticated scientific instrumentation.

Equipment had been an issue since the late 1980s when the first of several studies aiming to determine the extent of the problem were undertaken (Georghiou, et al., 1989; Georghiou, et al., 1992). Most recently, during 1995/96 the UK's association of universities, the Committee of Vice-Chancellors and Principals (CVCP), aware of anecdotal evidence about a growing equipment crisis commissioned from PREST and CASR a study of the stock, value, state, condition of and
funding sources for research equipment in UK universities (Georghiou, et al., 1996).

Drawing on results of the latest study,³ this paper reviews a recent episode in which universities identified a major problem, government responded in part with policies designed to draw in industrial support, while industry made it clear where it sees the demarcation between public and private responsibility.

2. Universities’ perspective: “We have a problem”

The question of whether a sufficiently high level of access to state-of-the-art equipment is provided in universities inevitably involves discussing two inter-related issues. One is the quantity as measured by the number and value of purchased research instruments in this case during the five financial years 1990-95 and the other is the quality, that is, the state, condition and age of research instrumentation.

As regards quantity our study found that in the 973 responding University departments, 7,640 equipment items costing £14k upwards were acquired in the past five years, at a total cost of £294 million. Among 22 cost centres (a cost centre is the administrative equivalent of a discipline) Chemistry accounted for the largest spend at 19 percent of the total, followed by Physics and Biosciences at 14 percent each. The highest mean cost per item was in Mineral, metallurgy and materials engineering at £73.6k. This cost centre was also the most equipment intensive at £48k per member of academic staff, followed by Chemistry at £40k and Physics at £29k. The findings confirmed the growing equipment intensity of fields such as biosciences and earth sciences.

In terms of quality, however, the picture presented by our respondents was somewhat less optimistic. For example, when asked to estimate the capability of their department’s research equipment to enable their investigators to pursue their current major research interests, they considered only just over half of the national stock (54 percent) to be ‘very good’ or ‘good’ while 17 percent was considered to be ‘poor’ or ‘very poor.’

A more detailed item-by-item study in selected cost centres revealed that nearly one-fifth of the studied stock of instruments (19 percent) was considered to be state-of-the-art, 35 percent very good, 36 percent adequate to meet research needs and 9 percent no longer adequate for research in the department. Obsolescence appeared to be the main reason for equipment being no longer adequate for research purposes (64 percent of responses). The survey also confirmed earlier findings that there is a positive ‘sophistication’ effect whereby the real price of equipment required to remain at the forefront of science is rising, despite the productivity gains from innovations in key components, notably electronics (Georghiou and Halfpenny, 1996).

Equipment was funded mainly from public sources, with block funding to universities and research council grants accounting for two thirds (65 percent) of the total. Charities had tripled their spend in a five year period to rise to 13 percent, well ahead of a stable industrial share of 8 percent.

Departments in all cost centres and universities were asked whether there are any areas of current research in which investigators in the department were unable to perform or delayed in performing critical experiments due to lack of research equipment and equipment funding. We found that 79 percent of the departments reported equipment deficiencies preventing them conducting major experiments and hampering their overall research performance. Despite some variation between different cost centres, the situation seemed to be serious in most research and equipment intensive areas of university life.

Given that there clearly is a research equipment problem in UK universities the question arises as to what would be the cost of bringing the academic equipment base up to date to enable investigators to undertake research for which they expect to be funded in the next five years. In order to estimate this cost we asked departments what additional five items of research equipment, costing £14k or more, were most needed to pursue their planned research. Respondents were reminded that their answers should be consistent with their university’s and department’s financial forecasts and research plans and compatible with current Government policies of research funding, assessment and selectivity. In addition to identify-