The University in National Development:
the Role of Use-Inspired Research.
Proposed Comparative Case Studies of Community-Engaged University Research.

by Professor David Cooper,
Department of Sociology, University of Cape Town[1]

Background

South Africa post-1994 has moved from a closed to an open economy; from a state of siege to a constitutional democracy. These massive shifts occur in the context of what is termed (below) a global Third Capitalist Industrial Revolution. They take on a special character in South Africa given its legacy of racial division and deliberate class stratification and underdevelopment of sectors of society.

Science, technology, and innovation rather than the older forms of capital and labour, are increasingly becoming major drivers of global economic growth and well-being. In this context of global scaffolding of the South African research system, my research has since 2000 focused on understanding the role of what I term 'use-inspired research' (also below) by universities, in enhancing the socio-economic-cultural development of our society i.e. mapping knowledge in relation to what might be termed the *social responsiveness* role of universities, or put another way, the scholarship of engagement of universities.

Over the past decade my research has been based on case studies in the Western Cape of South Africa, of university research groups (centres and units), most of which have embodied relationships based on what has been termed by Etzkowitz and others (e.g. Etzkowitz and Leydessdorff 1999) as 'Triple Helix' relations U-I-G: University-Industry-Government research linkages. As described below, most of the research literature internationally has focused on how U(niversities) have increasingly become engaged with I(ndustry), with G(overnment) providing a supportive framework. What is missing however in most international studies, is an investigation and theorisation of how Universities might become better engaged with what I term Civil Society (CS) – particularly with respect to research relations of U with local and regional government bodies, community and civic organisations, labour and other non-governmental organisations etc. I argue that this 'Fourth Helix' of U-CS research relations is a crucial element needed *alongside* and as complement to the Triple Helix of U-I-G relations which have mushroomed internationally and in South Africa since the post-1970s, new global industrial revolution (Figure 2 below). This vital component of U-CS, it is hypothesised, is necessary to enhance community development at a local and regional level, to ensure that economic growth takes on a form of greater equity and redistribution – fundamental for developing countries like South Africa, if they are to increase the

[1] This summary of my current research ideas and activities is an edited extract from a short document, submitted to the Fulbright Scholar Program, in application for its special New Century Scholars Programme through which some of these perspectives might be further investigated via a specific research project into community-engaged scholarship.

economic well-being of the mass of their citizens and overcome serious problems of social and political conflict .

My current book (2009) is based on nearly a decade of research into primarily U-I-G research relations with respect to some South African universities. My data collection methods have been based on rich case study data (from in-depth interviews and documents) of 11 research groupings, spread across the four universities including universities of technology of the Western Cape, and collected over a period of eight years since 2000. The mode of data collection is fairly unique for qualitative case studies: the original interviews, with director and some researchers of each research centre or unit, were undertaken in 2000, while I was convenor of a new Masters programme in Higher Education Studies.[2] Then as part of a follow-up project funded by the Knowledge Systems Group of the Human Sciences Research Council of South Africa, each of the 11 research centres/units were re-interviewed early in 2005, and then again revisited for interviews and documentary updates again early in 2007. This fascinating material, unlike most qualitative studies, thus provides a *historical* profile of the changing nature of these 11 research groupings over the period 2000-2005-2007 – showing how, usually quite unexpectedly, some research centres and units significantly enhanced their research activities while others experienced serious problems. Moreover, this study across time provides valuable insight into the factors which are *blocking* (or sometimes enhancing) the development of *Use-Inspired Research* at our South African universities.

'Grounded Theory' – Perspectives from the Western Cape Case Studies

During this period of nearly a decade of research tracing the trajectories of these 11 research groupings, I have developed a number of theoretical perspectives – essentially 'grounded theory' linked to the analysis of the cases – in order to make sense of my data. One perspective is influenced by the work of Donald Stokes (1997) on UIBR (Use-Inspired Basic Research): I argue that especially since the 1980s at research-intensive universities internationally (e.g. MIT, Stanford, Harvard, Oxford and Cambridge) and also more recently at some South African universities, there has been a significant shift to include *Use-Inspired Research* – both Use-Inspired Basic Research (UIBR) and Pure Applied Research (PAR) - alongside the historical dominance of Pure Basic Research (PBR).

[2] The Masters programme in 'Policy Analysis, Leadership and Management' (PALM) in Higher Eduction Studies, the first of its kind in South Africa, was based at the Centre for the Study of Higher Education (CSHE) of the University of the Western Cape, with links to the University of Stellenbosch and University of Cape Town (my own university); I served as convernor during 2001-2004. The first phase of my research in 2000-1 was funded by TIPS (Trade and Industrial Policy Secretariat, South Africa) in association with IDRC (International Development Research Centre, Canada).

Figure 1

Research is inspired by:

		Considerations of Use?	
		No	**Yes**
Quest for Fundamental Understanding?	**Yes**	Pure Basic Research [Neils Bohr] **PBR**	Use-Inspired Basic Research [Louis Pasteur] **UIBR**
	No		Pure Applied Research [Thomas Edison] **PAR**

Quadrant Model of Scientific Research (Stokes, 1997: 73, Figure 3-5).

A second perspective derives from the work of Henry Etzkowitz (e.g. Etzkowitz, 2002). I argue that we are seeing internationally at universities including in South Africa, the emergence of a 3rd Mission of universities: a mission to contribute to socio-economic and cultural development of society, particularly via UIBR and PAR. Thus following Etzkowitz, I assert that in the 19th and early 20th century we saw the emergence of a 'First Academic Revolution' which linked the earlier 1st Mission of *teaching* to a 2nd Mission of *research* (focusing on PBR). And now since the last quarter of the 20th century, we have been seeing in universities globally the emergence of a 'Second Academic Revolution' - the addition to the 1st/2nd Missions, of a new 3rd Mission, research contributing to societal development (in the form of both UIBR and PAR). My empirical material supports the hypothesis of such a Second Academic Revolution, albeit in complicated and diverse ways, as evident in the case studies of research centres and units of universities of the Western Cape.

A third perspective derives from diverse sociological theories of 'Globalisation'. I argue that this emerging global Second Academic Revolution is itself linked after the 1970s, to what I term a Third Capitalist Industrial Revolution: the latter, driven forward by Transnational Corporations (TNCs), involves new cutting-edge technologies (see the 'new technological regime', Figure 2), which are rooted in university-based research e.g. the ICT technologies are inconceivable without university-based modern physics on electronics, the biotechnologies are impossible without microbiology theories on genetics. The new Third Industrial Revolution is itself thus closely linked to the Second Academic Revolution at universities (see Figure 2): this post-1970s industrial revolution is interconnected with a 'knowledge society' in which university-based research plays a vital role, unlike the First and even Second Industrial Revolutions, whose technologies were not crucially rooted in university-based theoretical knowledge. Moreover, the evidence suggests (internationally and also for the research centres and units as case studies in the Western Cape), that TNCs and industry in general, seek out UIBR (rooted in PBR) from research intensive universities (MIT, Oxford etc., also UCT and Stellenbosch in the Western Cape) more so than PAR (the latter is often more dominant in universities of technology, as evidenced by my case material).

Figure 2

The three 'great transformations' or industrial revolutions

Capitalist industrial revolution	Major technologies ('technological regime')	Capitalist form of economic organisation	
First (1770s/1780s) (led by Britain)	Initially textile machinery, iron working, water power, pottery, etc. Later steam engines, railways etc. from 1830s	Small family firm	
Second (1870s/1880s) (led by Germany)	Initially electricity and chemicals, steel etc. Later automobiles, aircraft, synthetic materials etc. from 1920s	National share-holding corporation	
Third (1970s/1980s) (led by USA)	Initially ICT, biotechnology, optical fibres, nanotechnology etc. Later?	(Truly?)Transnational corporations-cum-network	Second academic revolution[3]

See also Cooper 2006.

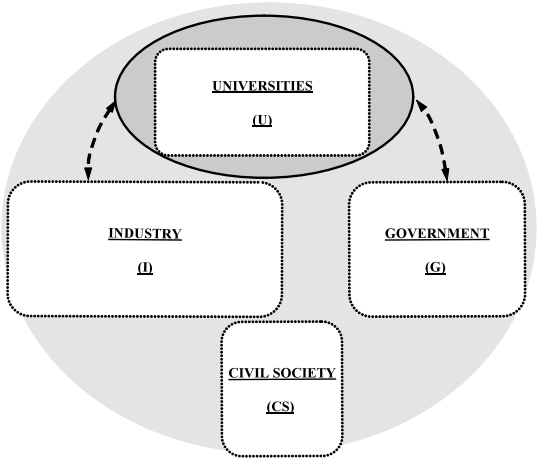
A final perspective is based on the idea that there is a serious omission, 'an absence', in the international literature on Research Policy and Science & Technology studies; there is very little reference to what might I have termed above as U-CS (University-Civil Society) research relations. I argue that the *major discourse* with respect to research policy, internationally and in South Africa, now revolves around the idea of 'NSIs' (National Systems of Innovation), and how Triple Helix U-I-G research relationships need to be the central focus of national policy initiatives to enhance each country's NSI (e.g. Etzkowitx and Ledesdorff, 1999,). However I suggest that this concept of the Triple Helix treats as peripheral or absent the Fourth Helix - community-engaged scholarship – with reference to University-Civil Society relationships.[4] The Triple Helix approach thus fails to address how our South African universities (and other universities especially in developing countries) might enhance their research work linked to the needs of CS structures, like community organisations, trade unions, local government bodies etc. Internationally, especially in 'northern' countries, the Fourth Helix (U-CS) of research relations is generally treated as an 'orphan' alongside the dominant U-I-G research relations of the Triple Helix (see my proposed Figure 3).

[3] The first academic revolution of the 1800s, which joined the 2nd Mission (Pure Basic Research) to the earlier 1st Mission of feudal universities (teaching), is not shown in this figure because it did not play a fundamental role in the first or second industrial revolutions of the early and late 1800s respectively (it did nonetheless play a minor role, as argued in Cooper 2009, Chapters 3-5 in comparision with the second academic revolution which is fundamental to the third industrial revolution).

[4] See for example Etzkowitz and Zhou (2006), who underplay the importance of the idea of a 'Fourth Helix' alongside their Triple Helix.

Figure 3:

Triple Helix (U-I-G) and 'orphan' Fourth Helix (U-CS) research relations, associated with 3rd Mission of U's (socio-economic development)



Nonetheless, issues pertaining to a Fourth Helix of research relations have recently begun to emerge more strongly in public debates about the role of university research in South Africa – about our universities and the 'public good'- with respect to how university research centres/units might serve the needs of the mass of poor people within civil society?

Proposed Research:
Comparative Case studies of Community-Engaged University Research Groups.

I therefore propose that what is needed is a project of international scholars to undertake comparative case study research, into existing best-practices of community-engaged university research groups. My own research has thrown up a set of research groupings and issues in the Western Cape, with respect to what might be termed the 'scholarship of engagement'. It is hoped that collaborative arrangements may emerge between a number of researchers internationally, to carry forward such investigations.[5]

[5] I am hoping that the 2009 Fulbright NCS (New Century Scholar) group of about 30 international scholars of which I am a part - focusing on its NCS theme of "The University as Innovation Driver and Knowledge Centre" – will during its deliberations over the period May 2009-April 2010, be able to treat the scholarship of engagement with respect to U-CS relations as one important sub-theme of its work.

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