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HOW DO UNIVERSITIES DEVELOP INTERACTIVE CAPABILITIES TO PROMOTE SOCIAL INNOVATION AND DEVELOPMENT IN SOUTH AFRICA?

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How do universities develop interactive capabilities to promote social innovation and development in South Africa?

Abstract

Current debate aims to reconceptualise the changing role and missions of the university in development, and to research the ways in which universities can leverage their knowledge resources to the benefit of a broader range of social partners than firms – communities, government, or civil society in general. However, there is insufficient empirical and research evidence to inform how universities in specific contexts develop new capabilities to interact with a broad range of social and economic partners. The paper examines how research universities in South Africa are developing interactive capabilities to support multiple goals of social and economic development. Section 1 describes macro-level policy to promote university interaction across the South African national system of innovation, highlighting a disjuncture between innovation and higher education policy mechanisms that very recently, has shifted so that there is stronger state intervention to promote social innovation and university 'engagement'. Section 2 analyses the institutional conditions that support, limit and incentivise the integration of academic activities in two research universities as they face these challenges.

Introduction

Just as firms are challenged to enhance their absorptive capacity, higher education institutions are challenged to enhance their interactive capabilities to facilitate the transfer of knowledge and technology to address economic and social developmental demands.

The global tendency over the past two decades has been to elaborate a new university mission of interaction with industry, to build linkages between firms and academics to promote innovation and economic development, as well as to extend the reach of the university itself in various forms of commercialization ventures. The promotion of models of the entrepreneurial university from the 1990s has extended also to developing countries, through a widespread process of largely uncontextualised policy borrowing and advocacy by international agencies. In developing countries, the human development challenges and social inequalities are so vast that they highlight the limitations of the dominant entrepreneurial models and of an exclusive economic development role for the university (Arocena and Sutz 2008, Kruss et al 2009, Mwamila and Diyamett 2009).

Current debate in developing countries aims to reconceptualise the changing roles and missions of the university, and to research the ways in which universities can leverage their knowledge resources also to the benefit of a broader range of social partners than firms – communities, government, or civil society in general.

The distinction and connection between the economic and social roles of the university is increasingly under debate, not only in developing countries, but also in advanced economies. In the United Kingdom for example, there is a recent trend towards promoting social engagement as a complement to the growth in university-industry interaction, a reassertion that universities have key roles in social and not only economic development, particularly linked to regional development (Newcastle University 2009, Hart et al 2008, Benneworth and Jongbloed 2009). There is thus an emerging literature debating new models of the developmental university (Brundenius et al 2008) or the civic engaged university (Goddard 2009) or the nature of the third mission, (Goransson et al 2009) or the elaboration of 'fourth helix' (Cooper), that is particularly appropriate for a middle income developing country like South Africa.

However, at this stage, much of this literature tends to a normative mode, elaborating how universities should change (Bond and Paterson 2005). In a review of the multiple roles universities are expected to play in knowledge society discourses, Valimaa and Hoffman (2008: 277) identify a tendency to 'describe higher education from the outside, looking in'. Most often, national and international discourses provide normative expectations of how a higher education system should develop, but few operational arguments as to how to achieve these multiple goals, nor an understanding of the limitations of universities, of the challenges posed to their present structures and the ways in which change is accomplished.

That is, there is insufficient empirical and research evidence to inform how universities in specific contexts develop new capabilities to interact with a broad range of social and economic partners. A university may have excellent academic reputation and research or teaching capacity, but there is no one-to-one relationship between this capacity and

successful social and economic outcomes. Leveraging competencies into interactive capabilities depends on abilities and circumstances (von Tunzelmann 2007). So, a research unit in a university may have considerable competencies in the form of academics with PhDs in a related specialism that represent a potential critical mass of research expertise that could be a basis for interaction with external social and economic partners. However, they may find themselves in imposed circumstances that do not allow them to benefit from this expertise. Some of these circumstances may be external to the university, but of particular concern are the imposed circumstances that are internal to the university – and subject to change. It may be for instance, that prevailing academic incentive systems do not value and reward applied research conducted for firms, or it may be that significant academic groupings resist new social development missions adopted by university leaderships, or it may be that academics lack understanding of external needs and mechanisms of effective interaction with firms or social partners, or the way in which the university is organized internally may militate against effective interaction with external partners.

Firm capability development is informed by an empirical and conceptual literature on the organizational and technical skills, information flows and structures required to support technology transfer and leverage new knowledge whether from suppliers, customers, other firms or universities. There is likewise a vast research literature on university-firm linkages on which to draw, that includes substantial research on the internal organizational and external interface mechanisms that enhance university interaction with firms, such as funding, incentive schemes, technology transfer offices, incubators or contracts offices (see Klitkou et al 2007 for an overview). However, in relation to the university's role in promoting social development, interacting with social partners other than firms, there is considerable scope for new empirical work that analyses universities from the inside looking out. How do universities develop interactive capabilities to promote social innovation and development?

The paper thus examines how research universities in South Africa are developing interactive capabilities to support multiple goals of social and economic development.

It draws on preliminary trends emerging from research in progress, specifically, a large mapping study across the South African higher education sector that investigates the nature and forms of university interaction with a broad range of social partners, including but going beyond firms. The main methodology is to survey individual academics' interactive activity – with which kinds of partners, in relation to what kinds of activity, whether teaching, research or outreach, and using what kinds of channels of interaction, with what kinds of outcomes and constraints. The survey of academics is currently in process, but it will allow the discernment of patterns of interaction in different types of university – research universities, universities of technology, comprehensive universities and rural-based universities.

At the meso level, the study investigates the institutional conditions that support, limit and incentivise academics' interactive capabilities. The analytical tools that guided the empirical investigation were informed by previous work on university-industry interaction in South Africa (Kruss 2005, 2006). The focus is to examine the conceptions of interaction promoted by national and institutional level policy, the internal and external institutional interface structures, and the incentive mechanisms instituted to promote interaction with external social partners. The institutional conditions were investigated empirically through interviews with senior university managers, deans of all faculties, directors of specialized research, teaching and innovation units, and heads of key research centres, alongside an analysis of institutional strategic and reporting documentation. The paper draws on this preliminary data, specifically, on the institutional studies of two research universities. The empirical research is thus reflecting very recent processes, that are themselves dynamic and in flux.

Section 1 describes macro-level policy to promote university interaction across the South African national system of innovation, highlighting a disjuncture between innovation and higher education policy mechanisms that very recently, has shifted so that there is stronger state intervention to promote social innovation and university 'engagement'. Section 2 problematises the ways in which the two research universities respond to these

challenges in terms of their guiding policy frameworks, internal coordination, external interfaces and incentive mechanisms in very similar ways but shaped by distinct institutional cultures. Finally, the implications for leveraging university interactive capabilities are considered.

Section 1. A policy disjuncture and new potential for alignment

What are the policies and mechanisms aimed to promote university interactive capabilities across the South African national system of innovation? Reflecting global trends and national imperatives, new policy frameworks in South Africa after 1994 proposed that higher education institutions, as crucial sites of knowledge production and technological innovation, should become more responsive to social and economic needs. However, the tendency has been for innovation policy mechanisms to focus primarily on universities' responsiveness to economic needs and promoting global competitiveness, and for higher education policy to focus primarily on universities' responsiveness to issues of social justice and promoting the interests of the 'public good'.

New science and technology policy frameworks adopted wholesale the OECD models promoting high technology, frontier 'big' science initiatives. With regard to universities, the White Paper on Science and Technology (1996) identified strategic alliances, networks, partnerships and collaboration between universities and industry as a primary means to reposition higher education to play a new role in economic development. The Department of Science and Technology established funding and incentive mechanisms and new institutions – such as government and industry research co-funding programmes, innovation incentivisation funding programmes, sectoral incubators and technology platforms - to drive university-industry interaction aimed to address the technology achievement problems evident in South Africa. The US paradigm was a strong influence, evident in new policy mechanisms to promote technology transfer, commercialization and incubation in high technology fields of biotechnology, nanotechnology and ICT. New legislation influenced by Bah-Doyle was introduced in 2008 to promote the utilization and commercialization of intellectual property developed from publicly funded research to social and economic benefit, as well as a centralized coordination agency to

stimulate and intensify technological innovation. Hence, there is increased pressure on universities to exploit viable knowledge and technology developed through academic research, and a renewed emphasis on the development of technology transfer offices at all universities.

In stark contrast, higher education discourse in the late 1990s was dominated by a concern with the impact of globalization, the perceived spread of a neo-liberal framework to South African policy making, and the growing global pressure towards marketisation of the university (Cloete et al 2002). Vociferous debate arose around the changing nature of academic roles and the impact of a perceived shift away from basic to applied research on future knowledge generation, influenced by the global debate around Mode 1 and 2 forms of knowledge production (Waghid 2002). There was strong opposition to the 'innovation' agenda, which was seen to be informed by a narrow instrumentalist model of the university - meeting the needs of industry and the labour market for skills and problem solving – and ignoring wider roles such as contributing to critical citizenship (Lange 2003, CHE 2003). The argument was that rather than increasing the university's interaction with the private sector to enhance global competitiveness, engagement is required that will promote the public good and act in the interests of social transformation and those most marginalized and disadvantaged in the past (Subotzky 1998). As opposed to promoting university-industry interaction, an alternative discourse of 'engagement' and responsiveness took root, with debate around the purpose, the partners and the nature of engagement, in line with the transformation agenda of the White Paper on Higher Education (1997:10), that universities should demonstrate 'their commitment to the common good by making available expertise and infrastructure for community service programmes'.

One specific form of engagement promoted was regional collaboration and engagement between local government and their local higher education institutions, particularly in the newly created urban metropoles. A second form focused on changing processes of teaching and learning within the university to promote students' civic awareness and to improve the quality of life of the 'communities' they serve. A practice-oriented debate

emerged, around new more relevant forms of teaching and learning and knowledge transmission in partnership with communities in which students were placed for experiential learning processes. A direct impetus for much of this work was an international funding agency building on the US outreach tradition, strongly influenced by the work of Boyer (1990) on a 'scholarship of engagement', which supported pilot teaching programmes in partner universities to drive the promotion of community service and academic service learning programmes.

Thus, over the past decade, the tendency was for higher education and innovation policy mechanisms to operate on separate, parallel tracks, a dichotimisation and policy misalignment that potentially weakens the national system of innovation.

Over the past three or four years, a shift is evident in a growing realignment of these two parallel tracks. A shift in innovation policy implementation is increasingly evident, away from the predominant 'frontier science' orientation and towards harnessing science and technology for inclusive development. One direct stimulus of the new thrust towards 'broad-based social innovation' was an OECD (2007) critique that the policy mission of 'technology for poverty reduction' had been neglected and poorly implemented. The impact of the global recession and political shifts towards a stronger 'pro-poor' agenda after changes in government in May 2009 meant that the critique fell on fertile ground. There is growing consensus to extend policy implementation to be more inclusive of communities, people and activities in the informal economy, to take into account other forms of indigenous knowledge and to understand the complex social and cultural dynamics that influence the adoption and diffusion of innovation.

At the same time, a shift towards institutionalization of a broader concept of community engagement as integral to academic scholarship is emerging across the higher education system, driven by government appointed coordination and regulatory agencies. A vigorous debate on the relationship between the university and society in a developing country like South Africa is emerging, centering on definitional boundaries, around whether engagement requires new forms of knowledge that differ from traditional

academic modes and around who is defined as 'the community' – at local, regional, national or international levels (Hall 2010). A key driver of change has been an institutional audit process for national higher education systemic quality assurance purposes, which promotes compliance with a vision of a more systematic integration of engagement in relation to the three-fold missions of teaching, research and service.

At the meso and micro-levels, institutions and academics grapple with how to give effect to the growing policy alignment and the integrated developmental mission. Section 2 provides an analysis of the attempts of two top research universities to build interactive capabilities in relation to and aligning both economic and social development agendas.

Section 2. Interactive capability and institutional realignment

How are the two research universities developing interactive capabilities to promote the newly aligned agenda of contributing to economic and social innovation and development, through their teaching, research and service?

The universities are based in large metropolitan areas, are long established and have similar levels of research and teaching competence at the national level, although university 2 has achieved greater international recognition. Both universities have a history of university-firm interaction drawing on their strong science and technology research base, promoted through their research and innovation internal and external interface structures. Their distinct historical trajectories and institutional cultures continue to shape their internal circumstances, so that there are differences evident in their approach and organizational response to the new social development mission. The analysis in this section aims to identify common responses to the challenges, but highlights stark differences where they impact on the development of interactive capabilities.

Drivers of university change

The national quality assurance process was identified as a direct impetus for institutional change and strategic debate since 2006/2007 by all who were interviewed at both research universities. The audit recommendation was that each university should clarify their conceptual framework and institute implementation plans to guide 'community engagement' in a more visible manner. Compliance with national higher education regulatory criteria and its implications for government recognition and funding was thus a direct driver of internal changes in structural, procedural and incentive mechanisms within each university.

Institutional change was driven further by internal processes of strategic realignment accompanying the appointment of new executive leadership that occurred, coincidentally within both universities, a year or two after their audits.

Insertion into institutional power structures

That the universities have taken the challenge to promote 'community engagement' seriously is evident in changes in internal organizational structures at the most senior level. Such change is evident across the higher education system, in a redefinition and reallocation of traditional senior executive leadership portfolios along new lines. Both research universities have appointed a senior executive member with specific responsibility for promoting engagement to provide leadership. Social engagement is further facilitated by strong insertion into central university power structures, in the form of a dedicated senate sub-committee chaired by the executive, and with representation of all faculties, research and student structures.

There are differences in the structuring of formal power and responsibility for promoting engagement through the institution. In university 1, the senate sub-committee tends to operate as a representative structure with each executive dean as a member. Similarly, university 1 reproduces formal structured responsibility for community engagement at faculty level, typically with a dedicated deputy dean position, and increasingly, with formally allocated responsibility at departmental level. At university 2, the senate sub-

committee is structured as an advocacy and promotion group with representation from each faculty. Faculty representatives act very much as individual champions and are not formally inserted into faculty power or reporting structures. Responsibility to promote engagement is decentralized to deans as one aspect of their portfolio. For the most part, deans' strategies are to strengthen existing initiatives by building and supporting cross-cutting academic networks and access funding to promote nascent academic activities.

Direct operational responsibility is assigned to a small dedicated unit. In university 1, a support service department headed by a senior director, encourages academics' interactive activity in relation to teaching, research and service, but within the devolved formal structures of responsibility. At university 2, a small unit located within the institutional planning office plays a brokerage role to monitor and promote activity, and broker relationships working with champions identified throughout the university.

There is consensus amongst all of those interviewed at both universities that the allocation of senior level responsibility has given more weight to the promotion of interaction with external social partners and provides support for operational changes.

A coherent policy and conceptual framework

The significance of a coherent and broadly encompassing conceptual policy framework to guide what counts and is valued as interactive activity within a university, is illustrated in the differential experience of the two universities.

University 2 had a clearly articulated guiding policy and conceptual framework formally endorsed by the university Senate in 2008, that operates as an enabling framework. While there was contestation and debate, the framework provided a set of parameters within which more substantive institutional policies could be developed and defined in greater detail at various levels, to provide support and measure impact. The framework could accommodate and was deepened by a recent process to develop new strategic concept documents endorsed by all university structures up to council level.

Significantly, the core defining concept of the framework adopted was a broader and more inclusive notion than that of 'community engagement' promoted in national policy processes. The guiding concept was '*social responsiveness'*, as integrated into the core academic roles of teaching, research and outreach through engagement with external constituencies at a wide range of levels, and with an emphasis on critical social development. A wide range of partners are recognized and promoted, whether firms, communities, community based organizations and NGOs, government and development agencies, and whether at local, regional, national or international levels.

The broad conceptualization of social responsiveness proceeded from a recognition of the significance of an 'appropriate fit with the desires and capacity of staff and students in the university'. This approach stems from an appreciation of the distinct institutional culture of university 2, characterized by a strong defence of academic freedom, individual accountability and autonomy, with academic opposition to what is perceived as managerial imposition. Leadership proceeded from a desire not to alienate academics, to draw them in through advocacy and to take academic disciplinary differences and existing experiences into account.

The social responsiveness activity reported by the university tends to have a stronger research thrust than a teaching and learning thrust, whether research as a general contribution to public intellectual life or to government policy development or through regional collaboration with other universities and local government or technological innovation to the benefit of impoverished communities. An emergent promotion of a notion of 'social innovation' aims to link high technology knowledge intensive research and academic scholarship to technological solutions that address sustainable human development challenges, and conversely, to channel community based knowledge and innovation back into academic research.

A sound basis to promote interactive capability was thus laid through the adoption of a guiding framework in and of itself, as well as through the encompassing nature of the specific conceptual framework adopted at university 2.

University 1 in contrast, had adopted a formal policy framework prior to the institutional audit, and prior to the creation of new operational structures. It was undergoing a process of policy revision in line with shifting national and institutional priorities, driven by the new institutional leadership in preparation of a new university strategic vision. The university tends to operate through strong institutional regulation, procedure driven processes and highly structured systems of accountability, with generally high levels of academic compliance. The commitment to community engagement was thus accepted at most levels of the university as part of the academic's role. The general consensus however, was that the lack of a widely shared conceptualization of community engagement was a constraint on promoting engagement in a substantive manner, and certainly, in relation to social innovation.

Significantly, the core organizing concept of 'community engagement' adopted in the policy framework to promote the new role of the university was not serving to shift the practices of the past, and tended to reproduce the national policy disjuncture between economic and social innovation thrusts.

The stated university policy aims to integrate teaching, learning and research in such a way that 'societal issues can be addressed through collaborative partnerships with the stakeholder communities'. A strong normative two-fold conceptual distinction is drawn, between forms of community engagement to which scholarship is central and integrated, and those in which it is incidental. The main 'stakeholder communities' identified tend to be limited to historically disadvantaged communities, NGOs or community based organizations, but also government, with a strong *local* orientation relative to the university.

Community service and voluntarism, taking the forms of charity and philanthropy in disadvantaged local communities for both staff and students – and hence, not integrating scholarship - were a strong thrust of activity historically in university 1. This could take the form of volunteer teaching in a poorly resourced school, or collecting resources for a

children's home, for example. There is consensus amongst deans and senior leadership that these forms of community engagement continue to predominate in the present. At the same time, there is a strong drive to create more substantial and meaningful linkages between the core functions of teaching, research and community engagement, with advocacy and promotion of community engagement in relation to teaching and learning. This advocacy extends to the promotion of community engagement in relation to research, but less actively so.

In general, it thus appears that the lack of a shared broad conceptual framework serves to perpetuate a disjuncture between research and innovation activities, and community engagement activities. The prevalence of the view of community engagement as an additional, philanthropic activity unrelated to core academic business tends to constrain the work of the operational unit. There are strong indications that the new strategic vision in the process of elaboration will aim to converge the parallel focus on community engagement and innovation into an integrated, social innovation approach. Existing cases of research that leads to significant social innovations in agriculture or health and empowers local communities provide an important indicator of potential practice in this direction.

The notion of social responsiveness is more inclusive of a wider range of academic activities with a broader range of partners, suited to a broad range of academic disciplines. Hence, it is more possible to promote academic involvement in a social innovation agenda, while the more limited notion of community engagement is more easily separated from core academic activity, and potentially marginalized. The ability of the core concept adopted to organize and mobilise academic support broadly across the university is thus critical for building interactive capability.

Coordination and alignment between internal university structures

If engagement or responsiveness is to be promoted in an integrated manner, then the question is whether the dedicated operational structures are coordinated with existing university structures to promote research and innovation, and teaching and learning – or

do they exist in isolation, placing an optional or additional demand on academics from (yet) another set of structures?

In general, recognition of the significance of alignment and strategic coordination around research and innovation is recent, and appears to be emergent. At university 2 there is evidence of good liaison and a growing collaboration between the internal research promotion structures, in order to support the brokerage role of the social responsiveness structures. However, there is minimal coordination with the university external interface structures that focus on research relationships with firms, which deal with research contracts and Intellectual Property Rights, particularly where interaction is undertaken for profit or commercialization purposes. Likewise at university 1, there is a very loose collaboration with the research structures, both those responsible for internal promotion of research and for promotion of contracts, innovation and technology transfer. There is a well-established university owned private company that serves as an external interface for firms to access the universities intellectual resources, but there is little coordination with community engagement or social innovation activities as yet, and likewise, the university owned private company that offers all short courses to industry remains untapped. These structures have experience in managing relationships with firms but they do not extend systematically to managing relationships with external social partners.

Both universities however have embryonic plans centred on social innovation, that may build on the experience of these interface structures. At university 1, there are plans for community engagement and research structures jointly to develop a social innovation policy focused on technology transfer at community level to address social challenges. At university 2, a new high priority institutional thrust on social innovation is promoted by a university-wide working group and evident in the identification of coordinated high profile cross-disciplinary research, teaching and social awareness initiatives. Accompanying these plans are embryonic external interface mechanisms to promote technology transfer and social innovation specifically. University 2 has a strategic partnership with formal agreements governing collaboration between the four universities in the city region within which it is located. The agreement facilitates interaction with

city and provincial government structures, manifest in specific projects in specific sectors over time. It is also planning to establish a ‘science shop’ in a local township, to connect external community demand with internal research expertise, in an extension of the brokerage role. Similarly, University 1 has utilized a township-based campus that it inherited through a national restructuring process as a dedicated platform for community engagement programmes and activity, with a science and mathematics niche. It has established mechanisms such as professional community-based clinics, and school-based programmes, as bases for service learning and community service programmes. It too, is involved in collaborative projects with local government through institutional agreements, but primarily within the immediate location of the university.

A similar embryonic trend is found with regard to coordination with internal structures to promote more effective teaching and learning and curriculum change. Here, university 1 with its stronger emphasis on inserting community engagement in the curriculum, has more strategically aligned internal relationships. There is strong coordination between the relevant support units, around advocacy and active promotion of academic service learning as well as systematic curriculum review and development processes. At university 2, coordination is more ad hoc, and there are plans for more intensive staff development for service learning programmes that promote community engaged teaching and learning. Both universities have instances of faculties that include a compulsory community engagement module in their programmes, with the content unrelated to the curriculum and not necessarily credit bearing, but aimed at raising student awareness and development as critical citizens.

Dedicated departments coordinate students’ broader civic involvement in social and community projects at both universities, and student welfare structures play a key intermediary role between the universities and external community structures. At university 1, a central role of the community engagement unit is to coordinate student community service and volunteerism, through a brokerage system between external community partners and internal academics or students seeking opportunities to engage.

At university 2, student volunteering, community engagement and activities to promote the development of critical citizens largely takes place outside the formal curriculum, but there are pilot schemes to develop formal certification.

Coordination and alignment across the university at this operational level is perhaps the most critical for building interactive capabilities. A champion of social innovation articulated clearly the implications of a lack of clarity at this 'interface' space:

> It is very unclear what the interface space is. You have the big picture engagement that happens strategically, historically and then you have people who are just passionate about it and have done it for a long time, and then in the middle, there's this dearth of strategy around engagement. That's the missing thing, the more systematized way.

University-wide dissemination and incentive mechanisms

Most existing activities at the 'interspace' take the form of university-wide advocacy mechanisms that have been initiated to promote engaged activity and debate amongst the body of academics. University 1 tends to implement such advocacy activities more systematically, in line with a 'compliance' model shaped by its predominant institutional culture. For example, there are community engagement reporting criteria for each faculty in their annual reports and on websites. In line with the priority to promote integration with scholarship, a formal training course on community engagement is offered for academics. University 2, in line with its diffusion and advocacy model, has instituted high profile annual awards for social responsiveness, akin to teaching and research awards. Other activities include stimulating university-wide debate on social innovation and social responsiveness through a structured process of developing guiding concept papers.

In the same vein, at both universities, individual champions are key drivers of interactive activity and their work as positive role models is promoted. Champions are encouraged to publish peer-reviewed academic publications reflecting on community engagement or responsiveness projects. The universities arrange regular public fora or colloquiua to share best practice, bringing in external social partners. Annual publications showcasing and recognizing the wide range of best practice are intended as an advocacy mechanism.

Systemically at the ‘interspace’, there are few incentive mechanisms or rewards to motivate individual academics or support their attempts to engage with external social partners. Web-based databases of good practice, key documents, training and events, and directories of active academics and their projects are positive examples of attempts to facilitate networking and offer resources to support interaction.

However, there is no centralized dedicated university funding on any significant scale, to promote interaction, particularly for research. University 1 promotes faculty funding from their main budgets for academic service learning programmes, while at university 2, there is discretionary departmental funding for community-based learning programmes. At university 1, there is fairly significant funding to support student community service type projects via a dedicated service department. Social innovation is typically expensive in the extensive time required for building and maintaining relationships, and the additional resources required to support student learning. Lack of institutional funding militates against interactive activity.

A major obstacle to wider academic involvement in engagement or responsiveness activities identified by all those interviewed lies in the criteria for academic reward, whether for promotion or performance appraisal. Academic reputation relies on accredited publications, and academics may resist involvement in any activities that detract from their publishing record, or that are not equally recognized. Inclusion of engagement activities in the criteria for academic reward however, is a controversial and widely debated issue at both universities. There has been limited systemic change in this regard. Recognition is either at the discretion of individual faculties or as an optional inclusion for individual academics in performance criteria. The absence from reward criteria impacts significantly on academic motivation to interact with external partners.

It thus appears that what is missing to build the academic motivation for interactive capability more effectively is a systemic set of support and incentive mechanisms integrated with institutional strategies and structures at various levels.

Section 3. Interactive capabilities and social innovation

South African universities are challenged to create a new developmental mission around a notion of engaged scholarship. Since 1994 they have been well aware of their developmental mission in relation to teaching and learning, to extend wider access to the knowledge and capabilities that can be developed through higher education, and in relation to research and innovation so that knowledge and technology are harnessed in support of economic development. The recent shift is a challenge to transform the historical mission of outreach so that it is integrated with the core of academic scholarship, with knowledge generation, adaptation, diffusion and dissemination, in the interests of the public good. Universities have tended to a dichotomization, where some academics extend their teaching and outreach as critical citizens but unrelated to their core scholarship, and some academics extend their research and teaching to firms for private benefit. The challenge for universities is to align and reconcile these missions, to extend their academic scholarship in the interests of technological innovation in firms *and* to address social need. As one key informant explained the need for a shift amongst researchers and managers in science and technology fields:

> Its more something we do because it's the right thing to do for communities, rather than how do we integrate community challenges with our high tech research and innovation to provide solutions - and that's not yet the fundamental driver.

Of course, there are individual academics that have been involved in such mutually beneficial responsive activity for many years. A number of cases can be cited, such as research projects driven by academic champions to develop post-harvest technologies in partnership with farming communities, or to develop cell phone technology in partnership with communities for health applications, all of which involve the teaching of post-graduate students, academic publications and social innovations that address critical social problems.

The difference now, is that universities as institutions of the national system of innovation are challenged to transform the ways in which they are structured and operate,

in order to develop new interactive capabilities to support the extension of knowledge to the full range of economic and social partners more effectively.

The paper has examined how research universities try to give effect to these challenges, to stretch the normative debate on how universities should contribute to the national system of innovation, with a view from inside universities of what it takes to create the conditions to do so.

Each university has a distinct style to facilitate institutional change, shaped by their historical institutional culture, with one relying on academic compliance with formal procedures and the other relying on a diffusion, brokerage and advocacy model. Despite these differences, a common set of preliminary trends are evident.

The analysis suggests that the research universities are strongly committed to new national goals, but are grappling to develop policies, structures and organizational forms that will enhance interactive capabilities in new ways. A strength is that the universities have accorded the promotion of the social engagement agenda priority in their institutional leadership and decision-making structures at all levels of the university. An institutional strategic policy framework that provides a broad and encompassing core organizing concept to guide substantive policy and procedure is critical. A lack of conceptual clarity can lead to contestation and the perpetuation of old practices. A weakness is that the universities are not sufficiently coordinating and aligning their research, teaching and learning, and outreach operational structures. Nor have they coordinated and aligned the interface mechanisms that support and facilitate external partnerships to promote new opportunities for social and firm innovation, although there are embryonic initiatives. A number of creative mechanisms are initiated for advocacy and dissemination through the university, in order to encourage academics to shift their practices. These rely on stimulating and championing greater involvement, but the core academic reward systems remain unchanged.

A more comprehensive analysis will be possible following systematic comparison of the conditions in research universities with those in other types of South African university, such as universities of technology or rural universities. More significantly, full understanding will depend on systematic empirical evidence of the predominant patterns of interactive activity in a university in relation to teaching, research or outreach and with a range of partners. Nevertheless, the analysis suggests that changing these internal circumstances will make it more possible to leverage academic capacities into interactive capabilities, to give effect to the normative visions of the universities' changing role in social and economic development in the global knowledge economy.

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