
Editorial

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Biographical notes: Gillian Marcelle is an Associate Professor of Strategy and Innovation. She is an active policy and academic research scholar with more than 20 years of experience gained in developed and developing country settings. Her research interests include firm-level capability building and learning, industry dynamics in the telecoms and IT sector, innovation strategies for developing economies and sustainable development. She provides academic leadership for programmes to develop research and policy making capacity in science, technology and innovation and supervises Masters and PhD students. She has established a research group on strategic management of innovation at Wits Business School, which has an active seminar programme and a working paper series (<http://www.wits.ac.za/managinginnovation>).

1 Background

The papers brought together in this special issue of the *International Journal of Technological Learning, Innovation and Development (IJTLID)* were first presented at an academic symposium organised by the Wits University in South Africa in February 2010, 'Innovation for development: frontiers of research, policy and practice'. The aim of that meeting was to explicitly connect the innovation studies agenda to development debates and to offer the specific context of Africa and South Africa as an empirical laboratory for investigating aspects of innovation studies practice at national and regional levels. The symposium provided a platform for knowledge exchange among academics, policy makers and the business community on the interaction among:

- 1 science, technology and innovation activities ('practice')
- 2 public policies to support and enhance innovation activities ('policy')
- 3 the efforts of the academic innovation studies community to study research and innovation practice and policy and to mediate between them ('research') and as a cross-cutting theme
- 4 the relevance and impact of innovation on development ('development').

2 Knowledge production and community building

The symposium and this special issue of *IJTLID* are part of a knowledge production project that includes developing teaching programmes at postgraduate and executive education level. The intention is to generate knowledge about innovation processes and outcomes in developing countries and to provide students with tools to challenge received and conventional wisdom about the role of innovation in development. As these students move through their careers and assume positions of greater responsibility in business, government and civil society, it is expected that they will be able to effect change based on assumptions and mental models shaped through learning programmes. This collective effort can affect the communities in which we live and work.

The scholarship presented in this special issue are the works of scholars who are keen to shape agendas and to perform as agents of change by confronting established categories and prompting a confrontation of ideas and values. If this work is to contribute to change, the context must be fertile. In the view of the author, there are several confluences which are helpful in this regard, including:

- 1 the economic crisis and the reflection that it prompted
- 2 challenges to the established 'hegemonic' theories of economic growth
- 3 innovation is itself on the agenda of firms
- 4 environmental stewardship and intergenerational responsibility have a higher priority
- 5 policy makers are gaining a greater understanding of the importance of learning, capability building and technological upgrading for economic growth, competitiveness and improvements in social services delivery
- 6 increased demand for greater social inclusion within and among countries
- 7 changes in governance of development institutions
- 8 greater solidarity among emerging countries.

This optimism, however, recognises points of resistance and challenges to change including the dominance of existing networks and systems of knowledge production which privileges advanced industrial countries. The strengths of networks in Europe and North America derive from higher levels of resources, critical mass of scholars and established research traditions and values (academic freedom, etc.).

The formal outputs which are codified in this special issue complement the tacit knowledge exchange.

In theory building and agenda development processes, ideas emerge, are contested, take root and are developed further. In a Kuhnian sense, some ideas may become part of a dominant paradigm. To challenge an existing paradigm takes patience and fortitude and is often beyond the emotional and physical capability of scholars functioning at the margin of their disciplines and institution. Operating from the South has a specific set of challenges in terms of paucity of resources, rigid disciplinary boundaries and the propensity of Southern-based scholars to network more with extra-regional partners than within their solidarity zone. By taking a collective approach to this project improves its chances of success.

It is also worth noting that innovation studies as a field is at a point in its cycle of development where it is receiving more acceptance of its tenets and fundamental assumptions about the centrality of innovation to economic and even social life. It is at such points in the cycle where the revolutionary nature of the original ideas and the trenchancy of the critique may itself be muted. Acceptance and influence can morph into cooptation. For example, many multilateral agencies have initiated projects in which innovation is considered to be central to promoting enhanced competitiveness, industrial and technological upgrading and a factor stimulating structural change (UN Millennium Project, 2005; UNIDO, 2005). Worldwide, the innovation studies community is undergoing reflective review of its contribution to knowledge and impact as presented in the SPRU 40th Anniversary Conference and related special issue of research policy (Morlacchi and Martin, 2009). Innovation studies as a discipline has moved from a public sector and R&D focus to one which identifies the firm as the centre of analysis. There is also increasing recognition of the need to specify the conditions under which innovation takes place so that a variety of contexts is taken into account and policy recommendations are relevant for the wealthy world, developing countries as well as at sub-national level within countries (Lundvall, 2005, 2007; UN Millennium Project, 2005).

In parallel, within development studies there has been a call to undertake research that provides a foundation for building a more humane development agenda (Emmerij, 2006). Within development, there is contestation between advocates of a developmental state and proponents of private-sector led models. The need to reduce the disconnection between innovation and entrepreneurship has been recognised as a challenge for development (Lazonick, 2008).

The papers in this special issue share a systems approach, in which a web of interacting and interconnected agents and institutions, including private sector firms, universities, research centres and policy institutions are considered to be central to innovation strategies. As will be discussed, the functioning of this system and its reinvigoration is of concern.

The papers in this special issue focus on the development of the innovation studies field and ask questions about the implications for innovation being increasingly connected to broader development debates. There are many papers in which innovation studies scholars perform as development advocates, and we probe the limits to this role and the impact of the politics of knowledge production in scholarly and policy domains. The papers build on the tradition of Muchie et al. (2003) and Juma (2005, 2007a, 2007b) in which the attempt to frame and align science, technology and innovation with an African development agenda was made explicit.

The insights produced through the scholars' engagement with ideas and empirical analyses have the potential to influence and shape approaches to national policy, strategies at firm level and cultural practices that embed innovation systems.

The papers in the special issue proceed from an underlying assumption based on evidence that innovation strategies matter for development. The scholars have a common focus on considering innovation to be a knowledge-driven process in which learning and capability building play central roles, in this regard, the studies articulate well with the specific strand of innovation studies surveyed in Figueiredo (2006) and with the seminal work of Bell (2007). These papers are part of a broader conversation in which innovation strategies are considered to be important for structural change, international trade performance and productivity and competitiveness enhancement as well as responding to

environmental challenges, rather than being considered only in terms of narrow science and technology perspectives. The papers focus on innovation an imperative for developing countries that seek to balance economic growth with redistribution of wealth and effective provision of essential public goods, such as education, housing and health.

The papers are significant because they make a contribution to knowledge field development and are interdisciplinary. In academia, where disciplinary boundaries are hard-wired and coded, it is often difficult to engage across disciplines where the language and modes of knowledge production are very varied. Starting assumptions can begin with mistrust and there is often an absence of shared understanding or belief in a shared outcome. Definitions of success vary across disciplinary boundaries. The type of networking ability and systems thinking that is required at national level to have a coherent innovation eco-system is also required within higher education. We are still at the proof of concept stage where the benefits of collaboration and the strategies of cooperation and competition are very rudimentary. The proponents of new ways of engagement also have to gain legitimacy in the international and local knowledge production networks that already exist. Communities of practice are built around strong trust relationships and these require many years of gestation and moving through phases. In this field, points of reference include the work of the UN Millennium Project, research from the Globelics network and research programmes of SPRU, the Open University, UNU-MERIT and UN-WIDER to name a few. To proceed even in the face of these difficulties requires risk-taking.

A progressive innovation studies agenda in the opinion of this author needs to involve a genuine systems thinking approach in which private sector firms, institutions, individuals and agencies that may otherwise not be defined as part of the innovation community are engaged. However, that type of multi stakeholder engagement is certainly not without its challenges. If innovation is of value because it has the potential to facilitate balanced, equitable growth that is not environmentally damaging, it is also necessary to understand the conditions under which this potential can be realised. This does require private sector firms to move beyond a narrow profit maximising model and be concerned with social value and intergenerational wealth creation. In summary, the special issue is an important step in developing and deepening a knowledge community that is concerned with the role and impact of innovation for development.

3 Research and advocacy agenda

The agenda for research and advocacy that emerges out of these considerations includes several themes, including the following:

- 1 Innovation and development: setting the agenda
 - Understanding the relevance and potential impact of science, technology and innovation for development.
 - Making connections and explaining persistent disconnection between development and innovation studies communities.
 - Investigating the politics of knowledge production and implications for the innovation and development agenda.
 - Rethinking how innovation can be integrated into the development project.

- Identification of new policy needs and ‘gaps’.
 - Theorising and measuring contribution of innovation to development.
 - Strengthening advocacy for the role of innovation in development.
 - Improving our understanding of the role of innovation as a catalyst for clean technologies and sustainability.
- 2 Dynamics of innovation in developing countries: innovation outcomes
- How has the changing global atlas of knowledge production affected innovation in developing countries?
 - Uncovering invisible innovation activities and systems.
 - Developing alternative measurement of innovation.
 - Providing improved understanding of learning processes for capability building and innovation at the firm level, including sectoral specificities (biotechnology, energy, agriculture, forestry, livestock, natural resources, mining, telecoms, IT, infrastructure, leisure, culture and entertainment).
 - Knowledge and technology acquisition by developing country firms: what core competencies are needed?
 - The role of youth as catalysts of innovation.
 - Are concepts of open innovation applicable to Africa and other developing country contexts? What are the limits to possible success?
 - What are the implications for policymaking?
 - Exploring the potential of ‘open innovation’ models for improving livelihoods in the informal and rural sectors?
 - What intellectual property policies or practices are necessary to support open innovation?
 - Is open innovation and protection of indigenous knowledge systems compatible?
- 3 Generate, promote and support innovation in developing countries: practice and policy
- Building capacity to promote and manage innovation in developing countries.
 - Exploring implications of open innovation systems and networks for the developing world.
 - Cases that explore how developing countries, particularly those in Africa, identify and implement strategic missions or programmes for science, technology and innovation.
 - Review of the approaches by multilateral agencies and bilateral donors.
 - Updates on donor strategies in funding technological capability building.
 - Comparative analysis of various models of funding innovation -is funding of innovation compatible with fiscal conservatism?
 - Is there room for restructuring and redefining public expenditure?
 - What can be learnt from experiments such as the Brazilian effort to negotiate relaxation of public expenditure caps to allocate funds to innovation?

- Private sector firms as funders of innovation in developing countries.
 - Understanding the likely impact of global recessions on private and public sector funding of innovation.
 - Investigating efforts to manage and promote innovation at the city and regional level.
 - Exploring management of innovation as a strategic imperative within firms.
- 4 Knowledge production and circulation: connecting research and teaching
- Developing interdisciplinary approaches to teaching and research on science, technology and innovation for development.
 - Mechanisms for strengthening networks on science, technology and innovation for development.

4 Overview of this special issue

Part 1 of the special issue provides papers that tackle many of the conceptual issues that arise in the knowledge building project and the research agenda discussed in earlier sections of this paper. In particular, the themes of inequality and inclusion feature very prominently as does the call for shedding light on the invisible aspects of innovation practices in developing countries.

4.1 Inclusion

An important contribution is made by Mario Scerri (2012, this journal issue) in his exploration of strategies to integrate systems of innovation thinking and research practice into economics curricula. In presenting his arguments as to why neoclassical treatments occupy such a hegemonic positioning within the economics discipline, this scholar raises important issues that are relevant to more general process of exclusion. At the one level, he states that the lack of prominence of the systems approach is a ‘natural’ process resulting in part from the nature of the neoclassical economics and its inherent simplicity and elegance. However, he urges that the innovation system community take action because what is at stake is policy made on the basis of abstraction from reality. Scerri suggests that neoclassical economics and its variants have crowded out richer sources of insight into social and economic processes that underpin development. Therefore, it is important to mount what Scerri articulates as a disciplinary challenge.

He urges that we draw on the strengths of innovation theorising and capture the moment when considerations of the use and deployment of science and technology are much in vogue. He correctly worries about the location or point of entry from which to mount this challenge and suggests it is necessary to undertake a complete overhaul of economics curricula starting at the undergraduate level. Scerri warns that this challenge will meet with many impediments, not least of these being the hegemony already referred to and secondly, the complexity and ‘untidiness’ of heterodox approaches, including the systems of innovation approach. Although he fears that mounting this challenge from the South is almost impossible, because of the highly uneven global distribution of academic resources, he is still cautiously optimistic based on the ‘signs of the time’. This scholar comments that “the introduction of heterodox programmes in general and systems of

innovation studies in particular, can find a fertile ground... (T)his is due to the decades' long disillusionment with the starkly evident effects of policies emanating from the conventional economic wisdom most prominently exemplified by the structural adjustment programmes imposed since the eighties".

Scerri advises advocates of the system's approach to capitalise on the attributes of innovation itself wherein it "now holds a clear position in the popular conceptualisation of modernity and as the engine of economic progress". He further argues that the widespread awareness of anomalies within existing theory already exists and urges that the next step is taken, which is to dislodge the reproductive core of neoclassical economics. In so doing, the systems of innovation community will be contributing to a Kuhnian paradigm shift rather than remaining on the fringes of a discipline.

Anil Gupta (2012, this journal issue) tackles inclusion from a different perspective. His argument is summed up in the conclusion of his powerful essay in which he states that:

"The time has come to go beyond the boundaries of the conventional organisations, disciplines, sectors and pedagogies. We have to look for platforms that link creative but economically disadvantaged people to learn from sustainable solutions developed at grassroots globally. The 'sink' has to become 'source' and the poor have to become providers." (Gupta this journal issue)

His focus in defining the way forward for innovation and development across the multiple dimensions of research, practice, policy and advocacy is that of grassroots innovators. He points to the absence of treatments of their contribution in mainstream innovation studies literature and the lack of close integration between formal and informal sector innovators. Gupta's approach of facilitating peer-to-peer networking among grassroots innovators has been extraordinarily successful yielding results in a number of sectors, including previously unrecognised terrains such as culinary innovation. He is opposed to approaches to inclusion that treat "economically poor and disadvantaged people as:

- a consumer of public policy of assistance and aid for basic needs
- b consumer of products at low cost made by large corporations [à la Prahalad] or state or other enterprises".

Rather, he is optimistic about the unleashed power of grassroots innovators and innovations particularly when they are combined with knowledge of formal sector institutions and cross national boundaries. Anil Gupta suggests some key roles for government policy and intermediary organisations including scouting for technologies; validation of technological novelty; value addition, and funding. While it is not always explicitly stated, it is clear that there is also a key and critical role to be played by non-state actors and by self-organised initiatives of grassroots innovators themselves. When these elements are combined there is the potential for an accelerated contribution of innovation to development outcomes.

4.2 *Inequality and unevenness*

Abrahams and Pogue (2012, this journal issue) take up the theme of inequality and unevenness, through a careful study of South Africa. At one level, this is an investigation

into regional innovation policy and outcomes and at another it is a critical assessment of whether or not innovation itself produces and/or reinforces inequalities.

The study suggests that the focus of innovation support should be: enhancing community services, small-scale manufacturing, primary and secondary education, alternative energy and effective management of the environment; with particular attention on fostering value-added economic activity in small towns. The scholars also argue that there is a need for distributed institutional development such as locating branches of higher education institutions and national research and science councils in what they term 'less favoured' regions. This approach, the researchers argue, would bring much needed knowledge and skills and ameliorate inequalities.

4.3 Measurement

Judith Sutz (2012, this journal issue) makes several important statements in her essay about the need for improved theoretical understandings of the nature of innovation in developing countries, and in particular, the centrality of learning as a practice through which innovation has materialised. She states that learning is both an input of innovation and a potential outcome of innovation. Sutz suggests that this has wide implications because she concludes that underdevelopment is more likely to be persistent and troubling when there is no opportunity for learning. There is an important link in Sutz's reflections on theorising to measurement and indicator development. She identifies a number of invisible or hidden aspects of innovation in developing countries and makes a number of important recommendations. These include taking care with the definition of research and development activity to avoid the pitfall of rendering invisible all forms of non-formal, non-systematic and informally performed research and development. She makes the important point that these types of processes are commonly used purposefully to "design and produce new products or processes, or to significantly modify existing ones." In addition, Sutz makes the point that when it is known before hand that formal R&D that adheres to international comparisons is likely to be at a low level, measurement activity should pay special attention to other types of knowledge acquisition processes, such as "linkages with other actors that can provide knowledge inputs -other firms, public research institutions, organizations that give technical support, public or private." Sutz suggests that innovation surveys and other measures should explicitly measure knowledge and learning intensity of firms, ought to include measures that attempt to identify "potentially innovative firms" and should "reserve a space for identification of technological demand, linked to questions related to actual policy instruments and those that the respondents may envisage." Finally, this scholar based on practical experience in Uruguay as well as theoretical considerations urges developers of indicators to use innovation surveys to enhance the climate for innovation including by making them more context specific and user friendly.

4.4 Capacity building

Banji Oyeyinka (2012, this journal issue) focuses on the underlying causes of differentiated innovation strategies and outcomes. This scholar argues that initial conditions, particularly in terms of a weak institutional base, are the key factor. He examines the performance of informal and formal institutions and finds them wanting in

terms of their ability to facilitate use of knowledge, technology absorption and product development. His paper offers several options of policy measures and instruments to strengthen capacity of state institutions involved in innovation and economic development.

4.5 Detailed case studies

Part 2 of the special issue consists of papers based on empirical studies that investigate innovation practices and outcomes at a more detailed level. The sectors covered include the agricultural sector in Mexico [Ekboir and Vera-Cruz, (2012), this journal issue], oil palm production in Nigeria and Malaysia [Abiola Adebawale, (2012), this journal issue], alternative energy adoption in South Africa [Maphisa et al., (2012), this journal issue], the ICT sector in India [Mani, 2012), this journal issue] and university and industry cooperation in the area of biotechnology in South Africa [Kruss, (2012), this journal issue]. All of the empirical studies shed light on the specific context and have implications for the underlying processes in other developing countries.

The range of studies presented here point to the rich tradition of detailed studies, some of which are comparative across two developing countries and others that provide single-country cases.

5 Final remarks

The symposium, postgraduate programmes, short courses and journal articles are all different tactics for pursuing a strategy of influencing the development and application of the field of innovation studies, so that it continues to be relevant for development outcomes.

Many of the proponents of this strategy are deeply passionate and committed to the agenda of change. It remains my distinct pleasure to thank all of the scholars who responded to the invitation to present papers at the symposium innovation for development: frontiers of research, policy and practice and particularly to those authors who responded positively to our invitation to publish their papers in this special issue and persisted despite their heavy burdens of work and other pressing concerns. The result would not have been possible without their high quality contributions. I also wish to thank my colleagues Rita Sikhondze and Dee Marco for valuable research assistance and support in editing the volume and communicating with scholars around the world.

In my role as guest editor, I am especially grateful for the enthusiasm of the editor-in-chief of the *Int. J. of Technological Learning, Innovation and Development (IJTLID)*, Paulo N. Figueiredo, and thank him also for his patience and guidance in producing this special issue. I am also grateful to the referees of *IJTLID* for their various suggestions and their helpful and insightful comments on the papers.

It is my hope that the momentum arising from the IFD symposium and the publication programme that has followed will proceed on a multi-polar basis and that we will continue to interact and to share experiences as we build our community and generate useful knowledge. Through our collective engagement, the ambition of creating research and advocacy institutions in the South may be realised.

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