

**INCLUSIVE INNOVATION: AN ARCHITECTURE FOR POLICY
DEVELOPMENT**

Joanna Chataway
J.C.Chataway@open.ac.uk

Rebecca Hanlin
Rebecca.Hanlin@open.ac.uk

Raphael Kaplinsky
Raphael.Kaplinsky@open.ac.uk

March 2013

We are grateful to David Kaplan and Carlota Perez for insightful comments on an earlier draft.

ABSTRACT

The past two decades have been characterised by an increasing uncoupling of economic growth and social and economic development. Outside of China, the numbers living in absolute poverty have remained stubbornly large; in Africa, they have increased substantially. Although this uncoupling has multiple sources, the trajectory of innovation (large in scale, capital intensive in nature and destructive of the environment) has contributed to these outcomes. Reorienting towards a more 'inclusive innovation' path has an important role to play in overcoming exclusion. However, we have only a weak understanding of the definition, nature and dynamics of inclusive innovation and this paper seeks to fill this conceptual gap. It argues that inclusive innovation needs to be understood and developed in the context of a holistic conception of the innovation cycle, the distinction between process and product innovation and the roles played by the poor as both producers and consumer. It further charts the growing interest of private sector actors in inclusive innovation (including, but not confined to TNCs seeking the "fortune at the bottom of the pyramid") and large global funds working in tandem with the private sector and governments. Consideration is also given to the role which growth trajectories play in determining the direction of innovation and in promoting linkages between the globally absolute poor (incomes below \$1pd) and those with discretionary cash incomes living in the margins above \$1pd. The paper concludes with a call for a more holistic and balanced approach to inclusive innovation to be adopted by a range of stakeholders so that resources are deployed most effectively to aid the recoupling of growth and development.

Keywords

Inclusive innovation

Bottom of the pyramid

Frugal innovation

Grass roots community based innovation

Inclusive growth

1. INTRODUCTION

The unfolding of the global financial crisis after 2008 has sharpened the focus of policy discussion on the interrelationship between growth, absolute poverty and inequality. One of the most striking developments has been the uncoupling of economic growth from the incomes of the global absolute poor. As can be seen from Table 1, associated with the rapid growth of the global economy (and particularly China) over the past two decades, the numbers living globally below the Millennium Development Goal \$1.25pd absolute poverty benchmark (hereafter referred to as \$1pd, or MDG1) fell by 339m between 1988-1990 and 2007-2008. This is often taken to indicate progress in global poverty reduction. Yet, the decline in the poverty number in China (516m) exceeded the reduction in the global total (339m). This means that outside of China, the number living globally below MDG1 increased by 177m. Sub-Saharan Africa (SSA) witnessed a more than doubling of its growth over the two decades, and during the 2000s, its growth was almost 50% higher than the global average. Yet, between 1990 and 2008 the number living below MDG1 increased by 59%. In India, the recent growth miracle has been associated with a further 42m people living below MDG1. Strikingly, despite rapid economic growth, there was a more than doubling of the number of the absolutely poor in middle income countries and currently, more than 70% of those living below MDG1 live in this rapidly growing group of economies (Sumner, 2010)

Table 1: GDP Growth Rates and Numbers Living Below MDG1, 1990-2008

	GDP growth p.a (%)		Living below \$1.25 per day (MDG1) (\$2005PPP)	
	1990-2000	2000-2008	1988-90	2007-2008
World	2.9	3.1	1,668	1,329
China	9.9	10.4	724	208
India	5.5	7.0	414	456
SSA	2.2	4.9	224	355

Source: Poverty numbers from Chen and Ravallion (2008) and Sumner (2010). Growth rates from WDI, accessed October 2011

These developments in growth, absolute poverty and inequality highlight the structural character of the dominant growth model in which, in many countries, a significant proportion of the population have been and are excluded from the fruits of growth. This exclusion takes two forms. At the one pole are those with gainful employment or access to land but who have witnessed static, highly variable or declining real incomes or incomes growing less rapidly than fellow citizens at the higher levels of income. At the other pole are those who are wholly outside of income generating activities – the unemployed and the landless.

One of the primary factors which explains why enhanced growth co-exists with, and indeed in some cases causes an increase in both absolute and relative poverty is the dominant trajectory of innovation.¹ Its capital-intensive nature, its scale intensity, its dependence on high-quality networked infrastructure, its reliance on skilled labour and its product portfolio (producing products which meet the needs of the rich) all have the effect of disadvantaging the poor, both as consumers and producers, It also excludes large segments of the population in many countries from productive employment. Moreover, much contemporary technology is also destructive of the environment, not least in relation to its energy-intensity, and this has disproportionately harmful impacts on the global poor.² Whilst innovation is only a partial contributor to the persistence of global poverty it is an important one, and one which is largely neglected in the theorisation of innovation (Cozzens and Kaplinsky, 2009; Lorentzen, 2010).

In earlier papers (Kaplinsky et al., 2009, Kaplinsky, 2013; Cozzens and Kaplinsky, 2009) we have sought to explain the dynamics of innovation which have in the past led to a predominantly exclusionary innovation trajectory. This drew on the theory of induced innovation (factor prices, the nature of demand and the quality and nature of infrastructure), institutional economics (path dependency amongst innovation firms) and the concentration of innovative capabilities (including, but not confined to R&D) in high income markets. In this paper, we turn our attention to the other side of the innovation-poverty coin. We argue that as a consequence of the growing global dispersion of technological capabilities, and of vibrant entrepreneurship and rapidly growing markets in the south, there is an increasingly market and consumer-driven momentum towards new trajectories of innovation. In some cases these new trajectories are producing more inclusive innovations. But if economic growth and development are to be recoupled, there is an acute need to speed up and strengthen this still incipient trend. Therefore in this paper we shift the focus of discussion from the determinants of exclusionary innovation to the factors determining the development of a more inclusionary innovative trajectory.

In the context of the developmental crisis of the dominant growth model, there is burgeoning interest by a variety of parties in the inclusive innovation agenda. However, most of the policy prescriptions are partial – addressing particular products (for example, renewable energy), particular constituencies (for example, excluded women) and particular actors (for example, transnational corporations or civil society organisations). Although each of these specific innovation agendas can point to distinctive policy implications and successful outcomes, what is patently missing is a systemic overview of the multifaceted character of inclusive innovation. Without such a synthetic overview it is difficult to assess the significance of new trajectories of inclusive innovation, to direct scarce resources in the most efficient way, to maximise

¹ Two other primary causal factors are the deepening of the globalisation of value chains and the growing financialisation of the global economy (Kaplinsky, 2013)

² Paraphrasing Schumpeter, Luc Soete graphically refers to this as “gales of destructive creation”

synergies arising from the actions of different actors and to draw on the energies of a wide range of potential innovators.

In Section 2 we chart the origins of concerns with inclusive innovation. Section 3 identifies the importance of the innovation cycle, distinguishing between the differences between and characteristics of product and process innovation. Section 4 explores the role played by the poor as producers, innovators and consumers of innovation, and in Section 5 we explore the synergies between innovation which reaches the very poorest and the not so very poorest of the global population. Section 6 addresses three major constraints to inclusive innovation and this is followed in Section 7 with a discussion of the major potential drivers of inclusive innovation. Section 8 concludes by briefly summarising the argument and addressing the need for policies designed to speed up and deepen the drive to more inclusive forms of innovation,

2: PAST AND RECENT INITIATIVES TO PROMOTE INCLUSIVE INNOVATION

Much of the recent literature on inclusive innovation suggests that this is a new agenda. But in reality a concern with the equity outcomes of innovation goes back at least to the 1950s. It is possible to identify four major strands of analysis in this emerging focus on inclusive innovation – the impact of growth paths on innovation and inclusion; the dynamic of not-for-profit and community-based “innovation from below”; the Schumpeterian motor and profit seeking innovation, which we term “innovation from above”; and the call for innovations in public goods, including those involving public private partnerships. There are of course overlaps between these four strands of thinking and in some cases the implications for inclusive innovation are an implicit rather than an explicit focus of enquiry. Beyond these analytical roots, inclusive innovation is also rapidly entering the policy domain.

Growth paths and inclusive innovation

We are accustomed to think of “innovation” in terms of major breakthroughs such as microelectronics and nanotechnology which build on complex and knowledge intensive processes of structured research and development. However, in reality, the overwhelming character of innovation is that it is incremental in nature and often results from “below the radar” processes of fiddling and adjustment to existing technologies (Hollander, 1965; Katz and Shapiro 1987). Reflecting this process of “neighbouring-innovations”, the evolutionary economics literature (Dosi, 1982; Nelson and Winter, 1982) has tended to focus on these trajectories within firms, and the global value chains literature on the innovation path dependency of chains of firms (addressed as an issue of upgrading – Kaplinsky and Morris, 2001).

However, another pattern of path dependency in innovation is that which reflects sectors rather than firms. The Soviet industrialisation debate of the 1920s, consciously mirrored in debates around India’s and China’s development strategies in the 1950s, posed the choice between specialisation

in the more capital intensive “Department 1” capital goods heavy industries and the more labour intensive “Department 2” light industries producing consumer goods. In the context of the incremental nature of technological change, each of these growth paths will have major implications for the direction of innovation and patterns of exclusion. In general, the labour intensive “Department 2” trajectories adopted in China tended to involve the development of technologies which reinforced more dispersed patterns of industrialisation and a more intensive use of labour than those innovations arising from a the focus on heavy industrialisation in the Soviet Union after the late 1920s and in India until the 1990s. Similar choices, with derived implications for innovation, occurred in relation to the strategic orientation of the agricultural sector. One of the factors often used to explain the differential growth experiences of east Asia and Latin America is that the Asian model relied more heavily on small scale relatively un-mechanised agriculture and its associated innovations, and was therefore more inclusive by nature than the Latin American model (Wade, 1990).

There have been associated debates about the consequences for innovation when countries specialise in capital and scale intensive extractive industries such as base metals and oil and gas. Unlike agricultural soft commodities which lend themselves to a choice of technology – in relation to scale- and factor-intensity, and environmental footprint – the extractive industries involve technologies which are often more rigid and by being more scale- and capital-intensive, consolidate patterns of excluding innovation. For example, the South Africa economy has long been characterised by particularly high levels of unemployment and exclusion. This, it is argued, arose through a combination of an agricultural sector dominated by large scale capital intensive farms (Wilson, 1985) and a mining-industry specialisation which has come to be termed a “minerals-energy complex” (Fine and Rustomjee, 1996), each with an associated patterns of innovation.

The upshot of these literatures and their derived policy discussions is that the choice of growth-path has major implications for economic specialisation. In turn, this specialisation contributes heavily to clustered patterns of technological choice. Moreover, as a consequence of the incremental and path-dependent nature of much innovation and the alignment of National Systems of Innovation institutions to economic structures, the choice of development path at a broad strategic level arises as a major policy agenda affecting the inclusive character of innovation.

Innovation from below and the rise of the AT movement

In early 19th Century England, Robert Owen sought to develop an alternative to the large “satanic mills” which dominated the cotton textile industry, and to organise his mills in ways which empowered the workforce and which supported smaller communities (ranging in size between 500 and 3,000 people). More recently, and with a much greater contemporary impact, Ghandi championed the development and use of small scale labour intensive technologies with his concept of “sarvodayo” appropriate technologies. He argued that the replication of the Soviet growth-path would reinforce, massive

processes of exclusion and sought to promote the choice and development of technologies which were more labour-intensive and small-scale.

Ghandi's ideas were developed by Schumacher whose widely cited work "Small is Beautiful" (Schumacher, 1973) had practical outcomes with the birth of the Intermediate Technology Development Group (ITDG) in 1965, Appropriate Technology International in the USA and similar groups elsewhere. It also led to a flourishing literature focusing Appropriate Technology (Jequier, Carr, McRobey, Kaplinsky, etc). The early challenge of the AT movement was to develop ("invent") more inclusive technologies, but over time it also became concerned with the deployment ("innovation") of these inventions, recognising that innovation took both embodied and disembodied forms. In more recent years the mantle of the bottom-up innovation of ATs has been assumed by the global grassroots movement (Smith, Fressoli and Thomas, 2013), heavily influenced by the community-innovation based Honeybee Network in India (Gupta et al, 2003; <http://steps-centre.org/project/grassroots/>).

Reflecting the spirit of the period in which Schumacher wrote, the widely-cited Sussex Manifesto (SM) of 1970 focused on the nature and trajectory of Research and Development (Singer et al, 1970). The Sussex Manifesto pointed to the overwhelming concentration of R&D in high income economies (estimated at 98% in 1970), and the mirroring trajectory of that part of global R&D which occurred in low income economies. The result of this bias in the innovation system, which reflected the inducements to technological change in high income economies, was the development of technologies which were inappropriate to the needs of the poor. In keeping with the outcome of the SM, the ILO's World Employment Programme in the 1970s led to a series of high-profile country employment reports on Colombia, Sri Lanka and Kenya, each of which flagged the inappropriateness of innovation as an important contributor to the exclusion of the poor from production processes. The ILO's programme was complemented by a series of academic studies on the choice of technology, again highlighting the inappropriateness of innovation trajectories for the poor (Sen, 1962; Bhalla 1974 and 1985; Stewart, 1979) and seeking to promote the development of more inclusive innovations, including those which had implications for the informal sector and for the wider incorporation of women in production. This body of analysis thus simultaneously addressed the macro concerns of the growth-path literature and the microeconomic, firm-level focus of the AT practitioners.

Innovation from above and the Schumpeterian motor

The proponents of appropriate technology and community-based innovation can loosely be described as reflecting the drive for "innovation from below", often undertaken by, or with the active participation of non-governmental organisations (NGOs). By contrast, and of much more recent origin, is the recognition of the role which market-driven and profit-oriented enterprises (including those firms with a global reach) can play in the development of inclusive innovation. We refer to this phenomenon as "innovation from above".

A significant development in the latter part of the 1990s and in the first decade of the 21st Century was the growing interest of the large scale private sector in pro-poor innovation. The seminal contribution was made by Prahalad (Prahalad and Hammond, 2002; Prahalad, 2005). Arguing the case for “inclusive capitalism”, he pointed to the market opportunities open to large firms as a consequence of the rapid rise in incomes at “the bottom of the pyramid (BOP)” (). An important development of Prahalad’s clarion call was the idea of “reverse innovation” promoted by the CEO of General Electric, America’s largest industrial corporation (Immelt et al, 2009). Stimulated by sustained high growth in China and India, in contrast to the slowing of growth in much of the OECD economies, Immelt pointed to a redirection of GE’s innovation, from a previous trajectory of innovating-down from high income to low income markets to one of innovating-up from low income to high income markets. The momentum towards reverse innovation is now strong in the transnational corporation sector and a number of the world’s largest corporations such as Proctor and Gamble, Unilever, Nestles and Philips are all seeking to exploit the market opportunities opened by the growth of low income consumer markets in the south. It is a momentum not confined to the producers of fast moving consumer goods but it is also evident in a range of other sectors such as mobile telecommunications, medical imaging, and tractors and power tillers for the agricultural sector.

Whilst BOP innovation has its primary roots in northern based TNCs, an associated development has been the rise of interest in what has come to be called “frugal innovation” or Jugaad Innovation (Radiou, Prabhu and Ahuja, 2012). The term “frugal innovation” originated in India and refers to systematic attempts made to cut out the luxury and “unnecessary” features of products developed for high income markets. Thus, by applying these principles, Tata in India was able to develop a car selling for less than \$2,500.

But these large firms - whether they be of southern or northern origin – are not the only capitalist profit-seeking enterprises producing more inclusive innovations. There is a largely undocumented process whereby small and medium sized firms, often located in the rural areas and smaller industrial cities and towns in large southern economies, are involved in “below the radar innovation”. Exploiting local markets and using locally available resources, they introduce new products more accessible to the poor and utilise new technologies which are more inclusive of poor producers. Indeed, some innovation scholars question whether in practice inclusive innovation is more centrally located in local SMEs than in global TNCs (George, McGrahan and Prabhu, 2012)

Public goods and public-private partnerships

The “innovation from above” market-oriented and profit-seeking innovations depend on developed and well-functioning markets which not only facilitate efficient information flows between producers and users, but also allow innovators to appropriate the fruits of their investments in developing and introducing new technologies. But some markets are unable to support these processes of appropriation, perhaps because of the non-exhaustability of the products, because of spillovers of benefits from one set of paying users to another set of non-paying users, because of the difficulty of legally defining and then enforcing property rights, or simply because the targeted consumers lack the income required to buy the product. In these cases (Kale et al, 2013), there has been a growing drive towards public-private partnerships in which private sector actors combine with charitable foundations and/or governments to promote the development and adoption of more inclusive innovations. For example, the rapid deployment of insecticide-impregnated bednets helping to prevent malaria involves a combination of such actors. Similarly, global foundations such as Gates and Rockefeller have combined with the private sector to develop drugs which are relevant to the needs of very poor consumers who lack purchasing power, and infectious illnesses characterised by classic public health concerns, such as HIV retroviral drugs (Chataway and Smith, 2006).

The policy domain is rapidly gathering momentum

As we observed in the Introduction, the growing recognition that there has been an uncoupling of growth and poverty eradication has led to awareness of the role which inclusive innovation may play in generating different outcomes. In an edited volume published on inclusive innovation in India in 2007, the World Bank first used the term “inclusive innovation”, defining it as “knowledge creation and absorption efforts that are most relevant to the needs of the poor” (Dutz, 2007: xv).³ The contribution by Utz and Dahlman recognised the key contribution of bottom up grassroots innovation to the wider objective of inclusive innovation (Dutz and Dahlman, 2007). Subsequently, at a World Bank funded Forum on Inclusive Innovation held in Beijing in June 2012 (<http://www.worldbank.org/en/news/feature/2012/06/21/beijing-forum-promotes-inclusive-innovation-for-sustainable-growth>) an emphasis was put on case study examples that highlighted mechanisms to support the development of partnerships and grassroots innovation. Kuznetsov, a senior economist at the Bank, promoted the case for inclusive innovation in inclusive growth strategies, and argued that innovation which was not new to the world but which reflected local circumstances was an important component of inclusive innovation (Kuznetsov, 2011).

The UNDP funded International Policy Center for Inclusive Growth based in Brazil argued that inclusive growth is not just about outcomes (everyone

³ Innovation scholars would take exception to this definition, however, since it refers to the growth of capabilities rather than to the development *and diffusion* of inclusive innovations.

shares in the results of growth) but also has derived implications for processes (everyone is given opportunity to participate in growth process) and hence for innovation. Bilateral aid agencies such as The UK's Department for International Development have also targeted inclusive innovation, but generally as sub-components of individual aid initiatives programmes (for example, health and private sector development) rather than as a comprehensive, integrated and "joined-up" innovation programme. It is significant that whereas *inclusive growth* has become an increasingly prominent concern for some research funding bodies (for example, in the UK), the specific issue of *inclusive innovation* has largely been ignored, save for a short-lived research window opened by the International Development Research Centre (IDRC) on inclusive innovation in the informal sector and with a gender focus.

3. TECHNOLOGY AND TECHNOLOGICAL CHANGE IN THE INNOVATION CYCLE

In Section 1 above we pointed to the growing disjuncture between growth and poverty eradication and pointed to the potential role which inclusive innovation can play in generating a more developmentally positive set of growth outcomes. This was followed in Section 2 by a review of the roots to the burgeoning interest in inclusive innovation and a growing interest amongst policy makers in the potential which inclusive innovation has to promote less excluding patterns of growth.

What emerges from this review is that inclusive innovation is a weakly defined area of enquiry, with multiple roots and little synthetic analysis. There is a lacuna of robust data to support the development of an evidence-based policy agenda and each of the different sets of stakeholders' involvement in inclusive innovation reflects a particular set of interests, often promoted with considerable hype. Consequently there are few, if any, guidelines to allow policymakers (in both the public and private sectors) to weigh up alternative types of inclusive innovation, and to develop a division of labour which allows for an effective response innovation-response to the challenges posed by excluding growth processes. The function of the analysis which follows is to provide an architectural framework in which the different components of inclusive innovation can be assessed.

The innovation cycle within the innovation system

Beginning at the highest level of abstraction, specific innovations need to be set within the context of the innovation cycle which, in turn, is embedded in the innovation system. This is the first element of our inclusive innovation policy framework.

The innovation system refers to the ensemble of actors who are directly and indirectly engaged in the process of innovation. At its centre is the recognition that whilst innovation may surface as the (generally appropriated) output of a particular actor (usually the firm), in reality it emerges from the interrelationship between different actors in the system of innovation. The

range of actors involved in innovation will necessarily vary over time and between sectors and countries. But it will generally be drawn from the private sector (the core innovating unit and its suppliers and customers), state owned institutions responsible for the development of new products and services, research and technology organisations (RTOs) and the educational system. The character of the innovations so produced will reflect the tacit and codified routines which characterise each of these core actors' organisation and the standards and regulations which are defined by external bodies and which affect the parameters of the products and processes which emerge. As will become clear in later discussion, the trajectory of the individual components and the ensemble of actors in the innovation system will have an important bearing on the inclusivity of the innovations which are produced.

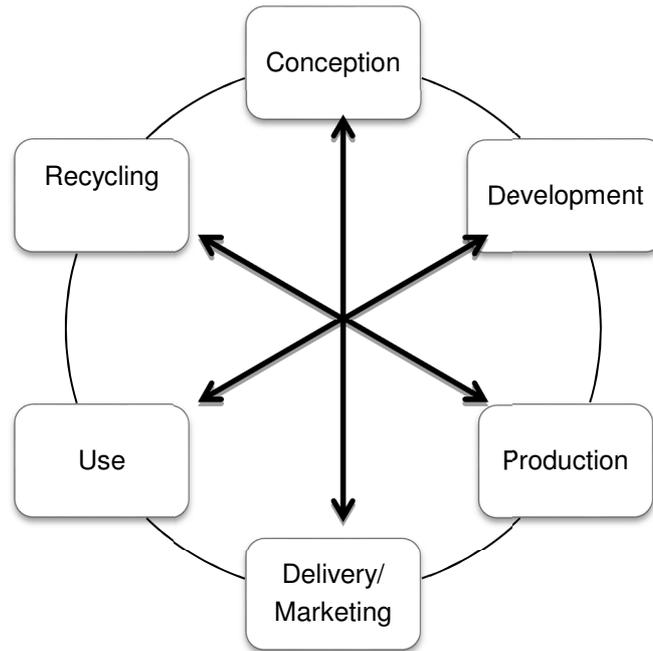
The Innovation Cycle refers to the stages involved in the development and diffusion of a specific innovation and consists of six broad sets of activities (Figure 1). All products – whether they be goods or services – need to be envisioned, that is, conceived. This conception will require some level of development which may be simple (such as water bottle lights)⁴ or involve considerable inputs of basic science and technological development (for example, in the development of malaria vaccines). Beyond development lies the production of the envisioned good or service. But these outputs need to be delivered to the market and as in the case of development and production, this might be a simple process (low cost wooden furniture sold on the roadside) or very complex in nature (embedding malaria bednets in a comprehensive health-care delivery system). Often, particularly in the case of non-traditional products, there will also be a technological component in use. Increasingly, too, it is important to consider the recycling stage of the innovation cycle, both because recycling can be an important source of income for the poor and because the poor are often victims to environmental damage in production and consumption. Each of the components of the innovation cycle, and the interaction between them, poses challenges for inclusive innovation and lend themselves to specific interventions likely to promote more inclusive forms of innovation.

One of the important lessons to be learned from the innovation literature is that this cycle is not necessarily sequential and does not necessarily begin with conception.⁵ Thus Figure 2 only seeks to identify the major sets of functions in the innovation cycle, each of which requires attention in the development of a holistic approach towards inclusive innovation.

Figure 1: The Innovation Cycle

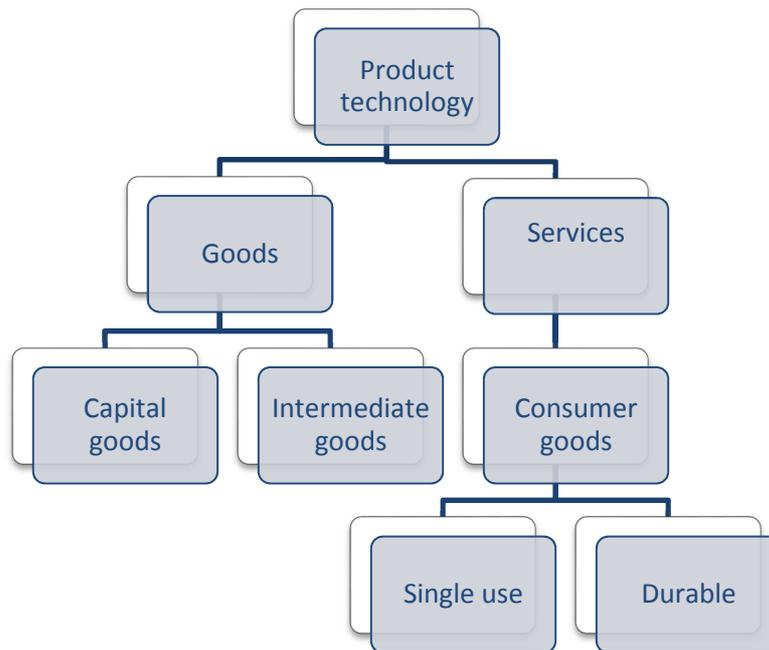
⁴ <http://uk.reuters.com/video/2011/07/11/bringing-light-to-the-poor-one-liter-at?videoid=216968892>

⁵ These are prime concerns in the literature documenting the shift from Mode 1 to Mode 2 innovation systems (Gibbons et al, 1994; Clark, 2009)



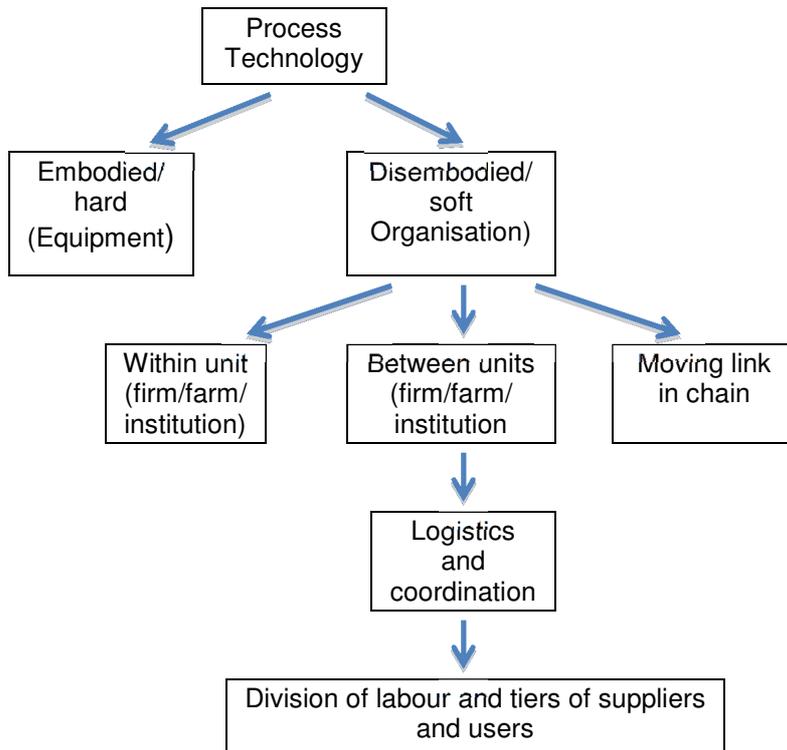
At a step down in the level of abstraction, a distinction can be made between two key components of technological change in the innovation cycle – changes in product and changes in process. Products are an important realm of pro-poor innovation since they may be appropriate or inappropriate to the needs of the poor. Here, as Figure 2 shows, there is an important distinction between physical products and services. In each case these outputs can be decomposed into capital goods (the machinery and services which allow production to occur), intermediate goods (inputs into the production process) and consumer goods and services (products for final use). In turn, consumer goods (but not services) may either be single-use or durable, that is they can be used and reused. By their nature, capital goods are durable, and intermediate goods are largely single-use products.

Figure 2: The different components of product technology



Within process innovation (Figure 3) we can distinguish embodied physical technology from disembodied organisational technology. The former is reflected in equipment and physical inputs, the latter in the way in which these inputs are combined. Disembodied technologies are more complex in the sense that innovation can occur within a particular institution, in the division of labour and coordination between different links in the chain, and in positioning in different links in the chain (“functional upgrading” in the GVC framework – Kaplinsky and Morris, 2001). This “slicing up” of the value chain has particularly important pro-poor implications in low and middle income economies since the separating-out of the unskilled and semi-skilled components of work has led to massive employment creation in some countries, notably in China, but also in Central America and some other developing economies. (On the other hand, it has simultaneously had excluding characteristics through the hollowing out of industrial sectors and the displacement of unskilled and semi-skilled labour in some high income economies). It has also had important gender-distributional implications since much of this relocated labour has involved women who formerly had little access to paid employment

Figure 3: The different components of process technology



4. PRODUCTION BY AND PRODUCTION FOR THE POOR

Ultimately, poverty is a reflection of consumption power. However, because there are a range of complex transfers in economies (for example, between individuals, within families and communities, between regions, and through taxation and social expenditure, from governments) the power of the poor to consume products may only be loosely linked to the participation of the poor in processes of production. This has important implications for innovation which, to meet the needs of the poor, needs to take account both of the types of products which are produced, and the role played by the poor in production and hence in their capacity to earn the incomes which facilitate consumption. It is thus important to distinguish the poor as consumers from the poor as producers, and the links between consumption and production.

The poor as consumers

The archetypical consumer in mainstream economic theory is the individual, seeking to maximise his/her economic welfare. Although mainstream economics is now beginning to recognise that individuals are capable of altruistic behaviour,⁶ it is still largely wedded to the idea of the consumer as an individual. Implicit in this conception of the individual as a consumer is the capacity which individuals have to purchase goods and services. This may be a realistic assumption in high income economies (where in many cases,

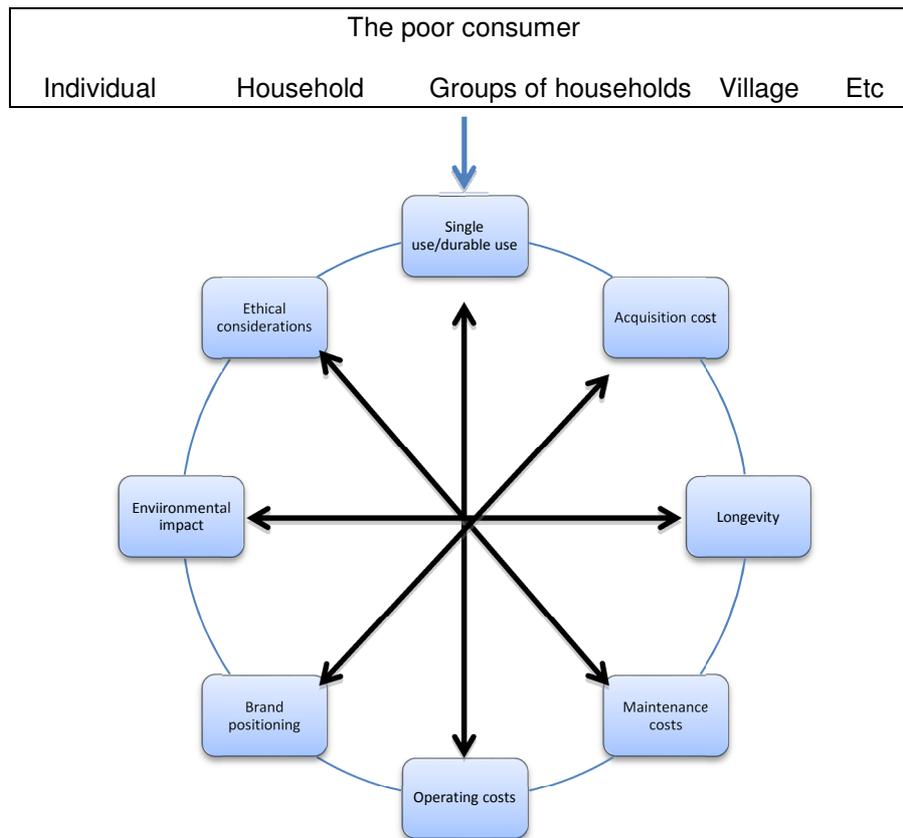
⁶ Amusingly, students of economics were less prone to engage in altruistic behaviour than any other discipline (Frank, Gilovich and Regan, 1996)

children have disposable incomes above the MDG1 \$1pd target), but it is patently not the case with regard to the global poor. Typically, to the extent that this group of consumers purchased goods and services, this will be a household purchase (for example, a single mobile phone rather than a phone for every member of the family), a purchase between households (extended families or neighbours sharing products) and in some cases purchases by villages or community organisations for communal consumption. Clearly, the more inclusive innovations reduce the acquisition cost of products, the more likely consumption decisions will be made at the individual or household level.

Beyond the identity of the consuming unit, inclusive innovation will necessarily need to reflect the demand characteristics of poor consumers. Figure 4 presents nine different product characteristics which may reflect consumer incomes. These are whether the product is for single use or repeated use; the acquisition cost of the product; its longevity (quality as long-life); costs of maintenance (quality as extent of repairs); the operating costs; the brand image provided to the consumer; the impact on the environment; and the extent to which the product embodies characteristics which reflects environmental and ethical considerations.

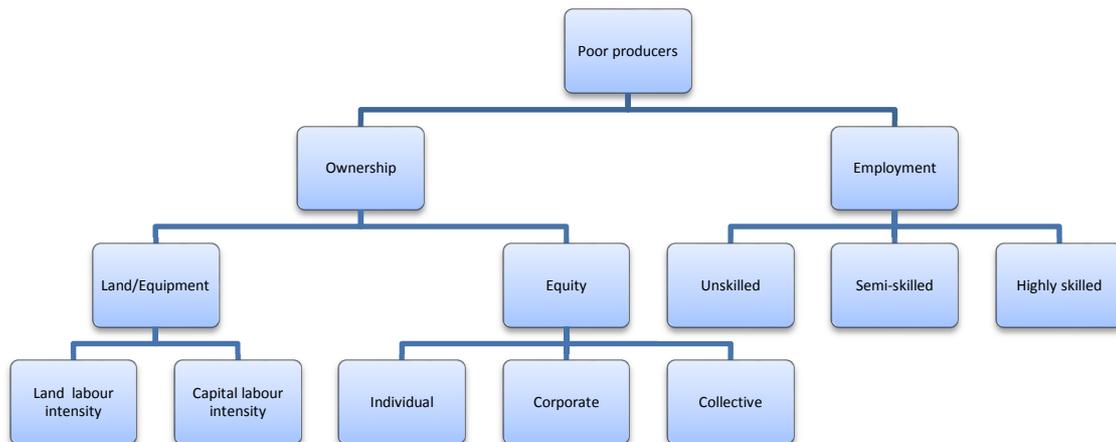
These product characteristics may be interlinked. For example, products with a low acquisition cost and which are affordable to the poor may have high maintenance costs, may not be recyclable, may embody few ethical standards and convey an image of poverty rather than exclusivity. These products would typically be products appropriate for poor consumers. At the other end of the spectrum, products which have very high acquisition costs and which reflect a variety of ethical and environmental standards may have low maintenance and repair costs and are typically the sorts of products consumed by the very rich.

The innovation literature in high income countries has paid increasing attention to the role played by consumers in not just shaping but participating in innovation processes (notably the work of von Hippel, 1976; 2005). There has been no equivalent focus on the role played by consumers in innovation in low and middle income economies, and indeed, the overwhelming character of innovation in these economies is that it is “supply-pushed” rather than demand-pulled (Hall et al, 2007). One of the reasons for this exclusion of consumers is the considerable gap which exists in our understanding of the nature of demand patterns in these economies. The sophisticated marketing exercises undertaken by the private sector in developed country contexts - for example, discrete choice experiments, behavioural economics techniques and future scenario analysis (de Bekker-Grob et al, 2010; Train, 2003) - is generally not mirrored in developing country contexts. Where they are utilised they are seldom directed to understanding the consumption patterns of the very poor.

Figure 4: Poor consumers

The poor as producers

With respect to the income characteristics of producers, there are a number of important issues to be considered (Figure 5). The first relates to the character of ownership. Are those involved in production in any way equity holders in the venture – perhaps through ownership of land, or equipment or equity? Second, what is the nature of this ownership (individual, collective or corporate)? Third, does the character of the productive asset affect the capacity of the poor to be involved in ownership – for example, capital intensive or minimum scale of production may preclude the poor from ownership. Fourth, how does the character of the productive asset affect the capacity of the poor to be involved in production – for example, is it labour intensive; does it require large scale production which precludes decentralised operating units? Fifth, arising from the pattern of work which is generated in production, what is the nature of the skills involved? Is the workforce unskilled, semi-skilled or highly-skilled? As a general rule, inclusive innovation will involve the generation of processes which lend themselves to ownership by small-scale or collective producers, use relatively labour-intensive techniques and utilise unskilled labour.

Figure 5: Poor producers

Putting together the two sets of characteristics (the poor as producers and as consumers), it is possible to identify a generalised schema to assess the relevance of innovation to inclusive growth (Figure 6). The top left quadrant represents innovations which involve the poor as both producers and as consumers. In low income countries this might involve informal sector furniture manufactures, or small scale farmers producing vegetables for local markets. The top right hand quadrant is where poor producers produce products for high income consumers. They may be employed as workers in Foxconn factories assembling iPhones in China, or small scale farmers in Kenya producing flowers and vegetables for European markets. The bottom left hand represents the efforts of TNCs to produce products for “the bottom of the pyramid” markets in the personal hygiene and pharma sectors. Finally, the bottom right hand quadrant represents cases where high income producers produce products for high income consumers, such as Swiss precision watches or high performance luxury cars. Given the increasingly unequal distribution of income in many economies poor producers and poor consumers will not be confined to low income countries, and nor will high income consumers and producers be confined to high income economies. For example, the most rapidly-growing market for German luxury cars and French designer clothes is in China rather than in the high income northern economies. Analogously, there has been an explosion in the number of “thrift-stores” in high income economies as unemployment deepens and as social security systems are weakened.

Figure 6: Innovation for poor-producers and innovation for poor consumers: Some examples

	Poor consumers	Rich consumers
Poor producers	Informal sector furniture Small scale horticulture for roadside markets	Unskilled labour in assembly of iPhones Small scale farmers involved in exportation of flowers
Rich producers	TNCs producing cosmetics and generic drugs for basic diseases	Swiss precision watches Luxury automobiles

5. GOING BEYOND THE OBVIOUS: SECOND ROUND EFFECTS AND SYNERGIES BETWEEN BOP1 AND BOP2 PRODUCTION AND CONSUMPTION

Poverty has a variety of dimensions. One key distinction is that between the relatively income-poor (a function of income distribution) and the absolutely-income poor (a function of real consumption levels). However, income is only one element of poverty and concepts which embrace multidimensional poverty are increasingly penetrating the policy debate (Alkire and Santos, 2010).

In this paper we are largely focusing on the absolutely income-poor. This is reflected in the key MDG target on global poverty which is the percentage of the population living below \$1.25pd in 2005 Purchasing Power Parity dollars. In 2008, they constituted 22.4% of the global population. However a second income category of the global poor is also often utilised, that is, those living above \$1.25 per day, but below \$2.50pd (20.6% of the global population in 2008). We will refer to these two categories of the global poor as BOP1 ("Bottom of the Pyramid") and BOP2 respectively. Table 2 shows the distributional and global numbers of these two income groups in 1990 and 2008. As in Table 1, China is a striking exception – the size of its BOP1 population shrank remarkably over the 19 years, and the size of its BOP2 population fell marginally, illustrating a process of large scale migration out of poverty of the mass of the poor population. South Asia suggests a stubbornly large number remaining in the BOP1 group, with little migration upwards of the BOP2 population into BOP3 and beyond. SSA reflects growing poverty numbers in both BOP1 and BOP2 income groups.

Table @: BOP1 and BOP2, 1990 and 2008 (millions)

	BOP1 (<\$1.25 pd)		BOP2 >\$1.25pd<\$2pd	
	1990	2008	1990	2008
China	683	173	278	222
South Asia	617	571	342	554
SSA	290	386	99	176
World	1,909	1,289	955	1,182

Source: Calculated from Chen and Ravallion, 2012

Note: The variance between the numbers in Table 1 and this table with regard to <\$1.25 pd absolute poverty for India and South Asia arise from the fact that Table 1 contains data for India alone and this table is for South Asia . This non-correspondence of categories is a function of the availability of data in the primary sources.

The distinction between these two groups of the globally poor has important implications for the inclusive innovation discussion. Critically the first group – often referred to as “The Bottom Billion” – represents a category of the global poor with minimal if any financial purchasing power. They live on, or below, the edge of subsistence with virtually no discretionary income beyond the barest minimum required to survive. By contrast, whilst those with incomes above \$1.25pd but below \$2.50pd characteristically suffer from various components of multidimensional poverty (undernourishment, low or no schooling, high morbidity, etc) (Sumner, 2010), they do tend to have some level of discretionary consumption power. The salient conclusions to be drawn from Table 2 is that of a global population of 5.75bn in 2008, 1.3bn were in the “no discretionary income” BOP1 group, and 1.2bn in the BOP2 group which has some measure of discretionary purchasing incomes.

The business literature which sees the opportunity for the private sector to reap “the fortune at the bottom of the pyramid” (a strapline contributed by Prahalad) tends to make no distinction between these two groups of the global poor. They are often loosely lumped together and (drawing on Collier’s widely cited book, Collier 2007) referred to as “the Bottom Billion”.⁷ Yet, to the extent that inclusive pro-poor innovation will be driven by profit-oriented firms – whom Prahalad identified as the key innovation actors - it is more likely that the relevant global poor will be the BOP2 target group (and perhaps even more likely, a BOP3 category, those living above \$2.50pd and below \$4pd).

⁷

In fact, Collier’s widely cited text refers to countries with an average per capita income of less than \$1.25pd, rather than those of the global population living below \$1.25pd. As we noted above, Sumner calculates that more than 70% of those living below \$1.25pd reside in middle income countries which are defined as those with a per capita income of more than \$995 (in 2010 current prices), that is approximately \$3 per day.

As we have seen, it is clear that in both SSA and India, and in many other low income economies, over the past two decades there has been little trickle down from the rich to the poor. This reflects a process of delinkage between the rich and the poor. But does this same pattern of delinkage exist between BOP1 and BOP2 populations, and if it does not, what does this have to say about the process and trajectory of inclusive innovation?

We believe – but this is a largely untested hypothesis – that in most countries, the organic interaction within the poor, that is, between BOP1 and BOP2 populations, is higher than that between the rich and the poor. Informed by earlier analysis of the observed interactions between the formal and informal sectors in the 1970s and 1980s we suggest that are a number of reasons why this might be the case.

First, BOP1 provides cheap wage goods and services for BOP2 workers. This not only contributes to welfare in BOP2, but also keeps down wage rates and fosters growth in the economy at large. Moreover, because BOP2 populations are often involved in small-scale localised production in the immediate environment, this helps to promote localised production systems which encourage the emergence of BOP1 actors into the cash economy. Thus, BOP2 consumers with cash-incomes may be important consumers for emerging BOP1 producers. Second, BOP1 characteristically uses the detritus discarded by the BOP2 sector. Proximity to, and interaction with BOP2, thus fosters both production and consumption in the BOP1 population. Third, BOP2 income recipients characteristically provide transfers to BOP1 relatives. Fourth, there will be externalities in network-intensive public goods sectors such as energy, sanitation and telecoms where the costs of the network are covered by meeting the needs of BOP2 and the benefits spill-over to BOP1. Fifth, there is evidence that because BOP2 people live above the subsistence level, they are more open to adopting riskier and innovative entrepreneurial behaviour than are their BOP1 peers, providing important role models for those in the BOP1 category (Sonne, 2010).

Consequently, for these (and other) reasons, innovation designed to meet the needs of the “second bottom billion” (BOP2) may have a variety of beneficial impacts on the absolutely poor (BOP1). We believe – although this is largely an unresearched area – that this linkage is distinctive and does not reflect the observed absence of trickle down from high income to low income groups in much of the world economy. From the perspective of policy therefore, meeting the needs of the very poorest may to some extent be met by meeting the needs of the not-very-poorest. But this is not to say that meeting the needs of the very poorest will be met by meeting the needs of the very richest (the de fact target of most contemporary growth strategies).

6. THREE CONSTRAINTS TO INCLUSIVE INNOVATION

Before we focus on potential drivers of inclusive innovation it is necessary to consider three constraints which affect their capacity to move this innovative agenda forward. These are the path dependency of the drivers, the constraint of scale and the problems of appropriation. None of these constraints are unique to inclusive innovation, but they do have a particularly important bearing on inclusive innovation.

The constraint of innovation trajectories

Drawing attention to the market potential of the new class of poor consumers Prahalad observed that there were four billion people living at per capita incomes below \$2,000 p.a.. Crucially, and perhaps not surprisingly given that he worked in northern business schools, Prahalad believed that this provided a profitable market opportunity for transnational corporations (TNCs) rather than for the small-scale and locally-owned firms, NGOs and civil society organisations long identified in the appropriate technology and informal sector literature as being key providers for low income consumers. He argued that “[b]y stimulating commerce and development at the bottom of the economic pyramid, [northern-based] MNCs could radically improve the lives of billions of people... Achieving this goal does not require multinationals to spearhead global social development initiatives for charitable purposes. They need only act in their own self interest, for there are enormous business benefits to be gained by entering developing markets” (Prahalad and Hammond, 2002: 4).

But the belief that northern TNCs would be able to grasp this market is an untested assertion. As Christenson’s widely-cited work has pointed out, large firms which dominate industries are often extremely good at hearing the demands of their existing customers, but very poor at hearing those of new customers. His argument is essentially that these weakness arise directly as a consequence of their core strengths, namely that they invested considerable resources in acutely understanding the needs of their core customers. Thus when a new technology arrives which fails to address these known needs effectively, the major innovating firms are dismissive. As Christenson observed of firms like IBM’s who failed to take advantage of the market for PCs with little memory, the previously dominant industry leaders “.....were as well-run as one could expect a firm managed by mortals to be – but that there is something about the way decisions get made in successful organisations what sows the seeds of eventual failure”. They failed precisely because they listened to their existing customers so well – “the logical, competent decisions of management that are critical to the success of their companies are also why they lose their positions of leadership“(Christenson, 1997: xiii). What they patently failed to do was to understand a class of new customers (in IBM’s case, individual rather than corporate and military users).

Northern-based TNCs suffer from another disadvantage in meeting the needs of the global poor. With their roots in high income markets where consumers often have large discretionary incomes, many northern firms are subject to considerable pressures from their customers to “gold plate” their production

processes and to produce products which meet demanding health and safety requirements. As a consequence their value chains are heavily standards intensive, and whilst some standards (such as those required to meet the needs of lean production) are cost saving, in general standards add pecuniary costs to value chains. Because of the very brand names which give these firms a competitive edge in their final markets amongst high income consumers, these northern TNCs are very vulnerable to the reputational damage which might sometimes arise from “frugal-engineered“ products and labour processes paying low wages, using child labour, denying rights of association to trades unions and involving environmental damage. Their southern based competitors face few of these risks and may therefore be able to produce lower cost product accessible to poor consumers.

It is thus an open question whether as a consequence of their innovation trajectories and the markets in which they operate, the leading northern-origin TNCs will be able to exploit this emerging low-income cash market effectively. By contrast, there are a variety of large scale domestic firms in low income economies which recognise the potential for profitability in targeting the needs of low income consumers, and addressing these needs through innovations which involve the use of labour-intensive technologies. A widely-cited example (which is not without its teething problems) is the Tata Nano in India. Using the principles of frugal engineering it produced a basic car priced at less than \$2,500 and aimed at low income consumers moving up from a two-wheeled scooter. This car would not have passed the stringent safety tests in Europe and North America or satisfy the different demands of high income consumers in those countries.

The constraints on innovation imposed by path dependency is not of course limited to the private sector. It is common for many low income economies, particularly ex-colonies, to impose standards and regulations which are defined by high income economies and which are often wholly inappropriate to low income economy environments. These range from relatively minor product specifications to regulatory systems on issues such as intellectual property rights which circumscribe innovation in sectors which are of considerable importance such as pharma. Most urban hospitals in Africa for example use expensive and inappropriate “western” hospital beds. They also apply to some of the charitable funds such as the Global Fund which impose standards which effectively exclude makes Indian and African suppliers.⁸

The constraint of scale

BOP1 and BOP2 markets are often characterised, at least in the early stage, by the small size of their markets. This makes them less attractive to profit-seeking firms who are accustomed to working on a large scale. Another component of this scale constraint is the chicken-and-egg problem involved in the delivery of networked public goods such as sewerage, sanitation and telecoms. That is, that although once the network is developed, the costs of delivery are low, the high costs of production before critical network scale is reached inhibits the rolling out of the network. In these cases, the small size of

⁸

www.open.ac.uk/ikd/projects/industrial-productivity-health-sector-performance/

the early market provides insufficient profit incentive to warrant market led investments in the innovation cycle (that is, from conception, through production and marketing as characterised in Figure 1 above). The same process can be observed in the development of some pro-poor products such as anti-retrovirals and malaria-vaccines. Their development involves an inherently knowledge-intensive process with a long gestation period. Whilst when fully developed and produced in large volumes, these products may provide the opportunity for profitable production, there is a chicken-and-egg problem in overcoming the scale hurdle. It is not surprising therefore that the large pharma TNCs have often neglected a series of diseases which disproportionately affect the global poor, such as malaria (Kale et al, 2013; Moran et al, 2005)

The constraint of appropriation: Public goods for the poor

The third constraint to the innovation of pro-poor products arises in relation to the development and delivery of public goods. These public goods are characterised by two intrinsic factors which inhibit market led innovation actors. On the one hand, they are difficult to appropriate, and on the other hand, they are not used up in consumption. Classic examples of public goods are to be found in the health and sanitation sectors. In fact few products are “pure” public goods, that is that they are inherently inappropriable or non-rivalrous; they are merely *difficult* to appropriate and or to exclude consumers. In these cases it is unlikely that profit-seeking private actors will emerge to meet the needs of the global poor. Either governments will need to step in to fill the gap left by this particular form of market failure or new and innovative alliances of actors will have to emerge.

7. INNOVATION ACTORS: WHO DRIVES THE DEVELOPMENT AND DIFFUSION OF INCLUSIVE INNOVATION?

Returning to the earlier discussion on the origins of the growing interest in inclusive innovation (Section 2), and informed by our reflections on the complexity of the innovation cycle (Section 3), the role played by the poor as producers and consumers (Section 4), the interactions between BOP1 and BOP2 populations (Section 5) and the constraints to inclusive innovation (Section 6), we can identify three key sets of actors involved in the development, promotion and diffusion of inclusive innovation.

The Schumpeterian motor drives the private sector

The “new kid on the block” in this unfolding story is the growing role played by the private sector in inclusive innovation. Until the mid-1990s the primary inclusive innovation actors were not-for-profit NGOs and community based organisations working outside of the market, driven by what might be termed a Schumpeterian-motor. By contrast, over the past two decades inclusive innovation has increasingly become a primary objective for the profit-seeking private sector, driven by a Schumpeterian-motor. Here we can distinguish three major types of private sector actors.

The first set comprises the very large firms, be they northern-based TNCs such as Unilever, General Electric and Philips, or southern origin large firms such as Tata and Godrej from India, Haier and Lenovo in China and MTN in South Africa. These innovators seek to gain rapid scale in multiple markets, and although we have argued that the northern-based TNCs might find it more difficult to penetrate low income markets than their southern-based rivals, these northern and southern firms have much in common. In particular, their objective is to massify production and globalise sales of their inclusive innovations.

The second group of private sector actors are medium sized firms. In southern economies, they are not only targeting their own low income populations but are increasingly seeking to move out of their local markets, often as a result of intense competition in their domestic markets (a primary driver of Chinese private sector involvement in Africa – Kaplinsky and Morris, 2009; Shen, 2013). In northern economies, medium sized firms with a domestic or regional presence (for example, European firms selling into the EU) not only recognise the dynamism of low and middle income markets, but are also confronted by slow growth or stagnation in their established markets. Unlike the very large firms which have considerable experience in global markets, these medium sized firms are confronted by significant knowledge gaps in penetrating low income markets, or in markets in countries which are foreign to their past operations.

Finally, there are the small firms operating in very local markets. Characteristically they are engaged in minor, incremental innovations with a weak science base. But often, because of their origins, their innovations are particularly appropriate for low income consumers or for particular distinctive operating environments. Even more than in the case of medium sized firms, there may be major market failures in the commercialisation of their innovations with missed opportunities to promote the welfare of poor producers and consumers outside of their immediate locale.

Not-for-profit drivers of inclusive innovation

As observed, historically, not-for-profit actors have been the primary drivers of inclusive innovation. They remain a considerable source of inclusive innovation today, even though much of this occurs “below the radar” and does not surface in many of the measures used to measure innovation such as patents, R&D, sales and trade. One set of these innovators are community based organisations working at grassroots levels in both southern economies (for example, the Honeybee network in India (http://www.sristi.org/cms/en/our_network) and northern economies. Particularly in the south, they build on deep local knowledge and informal knowledge systems (Smith, Fressoli and Thomas, 2013; www.steps-centre.org).

The diffusion of the inclusive innovations developed by these community based organisations is aided by the operations of formal sector NGOs and those operating at a global scale. Often these NGOs are focused in particular areas, such as those targeting renewable energy and other technologies

responding to the threats posed by climate change. But others, such as Practical Action (www.practicalaction.org) have a much broader remit and are increasingly focused on the disembodied technologies of delivery and value chain coordination as well as focusing on embodied products.

More recently, we have witnessed the emergence of very large not-for-profit funds such as the Gates Foundation and GAVI. They have predominantly focussed on public goods, and unlike the large and medium scale private sector which has generally targeted innovations at BOP2 populations, these large Funds have focused on inclusive innovations which are of primary and direct importance to BOP1 populations with very little purchasing power. A core component of these types of not-for-profit innovators – particularly in the health sector - is their involvement with governments and the large scale private sector in the form of public-private-partnerships.

Governments and the aid sector as drivers of inclusive innovation

Governments have become increasingly aware of both the need for, and opportunities opened up by inclusive innovation. This applies to governments in the south and governments in the north. Although the range of these interventions is largely uncatalogued, casual empiricism suggests that these interventions are gathering pace, including through support provided for National Systems of Innovation and the provision of funding to enhance the diffusion of inclusive innovations. The aid community has also taken up the challenge. A notable example is the UK's Department for International Development which places considerable emphasis on inclusivity in its aid agenda, albeit with a weak focus on inclusive innovation. Both the World Bank and UNDP are also increasingly emphasising the role which innovation can play in the promotion of more inclusive patterns of development.

8. CONCLUSIONS

In summary, the uncoupling of growth from development has been a primary growth trajectory in virtually all of the global economy over the past two decades, north and south. Despite the rapid growth of output in the south, outside of China, the numbers living in absolute poverty have remained stubbornly large; in Africa they have increased substantially. Although the trajectory of innovation – using increasingly capital intensive, large scale and environmentally damaging technologies to produce goods and services for rich consumers – is only part of this unfolding story, it has a primary role to play in reorienting economic growth in more developmentally satisfactory ways. A key development has been the growth of technological capabilities in the south, and allied to the rapid growth of low and middle income consumer markets in these economies, we have begun to witness a major transition in the market orientation of profit-seeking investment and innovation. An increasing number of private sector actors are targeting inclusive innovation as sources of sales and profit. Allied to this, large scale Development Funds and governments and aid agencies have also begun to direct resources to promote inclusive innovation. and sales.

These are all positive developments, although achieving more developmentally satisfactory outcomes requires considerably more than inclusive innovation. But despite this positive innovation trajectory, there is considerable scope for enhancing the pace and direction of inclusive innovation. Each of the key sets of innovation actors has a limited set of objectives, with a disproportionate focus on BOP2 cash-markets and products developed for individualised consumption. Amongst those actors who have a broader concern with both the market- and non-market driven diffusion of inclusive innovation, there is a weak if not non-existent grasp of the different elements of inclusive innovation, a weakness in introducing joined-up synergistic policies an associated weakness in identifying the “low hanging fruit”, in developing an appropriate and supportive national system of innovation and in directing scarce innovative resources in the most cost-effective way. We believe that the analysis undertaken in this paper will help to clear the muddy waters which have led to the suboptimal development and diffusion of inclusive innovation.

A stronger evidence base is required for private and public actors to promote inclusive innovation effectively. As we noted above, at least by comparison of their understanding of markets in high income economies, there is a deficiency in relevant private sector knowledge bases on low income markets. The gap for public sector actors is even larger, and there is clearly an important role for the research community to play in evidencing the extent, the nature, the inducements to and the obstacles to the development and deployment of inclusive innovation.

Finally, although all of the examples in this paper have referred to the challenges posed in low income southern environments, there has been a process of growing exclusion in the high income northern economies as well. We believe that the architecture which we have presented above applies as much to these high income economies as it does to low income economies,

REFERENCES

- Alkire, S. and Santos, M.A. (2010). "Acute Multidimensional Poverty: A New Index for Developing Countries," OPHI Working Papers ophiwp038, Queen Elizabeth House, University of Oxford
- Anuja Utz and Carl Dahlman (2007) "Promoting Inclusive Innovation", in Dutz, M.A. (ed.) (2007) Unleashing India's Innovation: Toward Sustainable and Inclusive Growth Washington DC: World Bank, pp. 105-128
- de Bekker-Grob, E., Ryan, M. and K. Gerard (2010), "Discrete Choice Experiments in health economics: A review of the literature", Health Economics, Vol. 21, Issue 2
- Bhalla, A. S. (ed.) (1975), Technology and Employment in Industry, Geneva, ILO.
- Bhalla A. S (ed.) (1984), Blending of new and traditional technologies: Case studies, Dublin, Tycooly.
- Carr, M. (ed.) (1985), The AT Reader: Theory and Practice in Appropriate Technology, London: Intermediate Technology Press.
- Chataway, J.C. and L. Smith (2006), "The International AIDS Vaccine Initiative: Is it Getting New Science and Technology to the World's Neglected Majority?", World Development 43.1: 16–30
- Chen, S. and M. Ravallion (2010), "More relatively-poor people in a less absolutely-poor world", Policy Working Paper WPS 6114, Washington: The World Bank.
- Christenson, C. (1997), The Innovator's Dilemma, Cambridge, Mass: Harvard Business School Press.
- Clark, N. (2009), Revisiting Agricultural Science for Development: From Mode 1 to Mode 2, Innogen Working Paper No. 70, February 2009
- Collier, P. (2007), The Bottom Billion: Why the Poorest Countries are Failing and What Can Be Done About It, Oxford: Oxford University Press.
- Cozzens, S.E. and Kaplinsky, R. (2009) "Innovation, poverty and inequality: Cause, coincidence or co-evolution?" In B. Lundvall, K. J. Joseph, C. Chaminade and J. Vang (eds.), Handbook of innovation systems and developing countries: Building domestic capabilities in a global setting. Edward Elgar, 57–82.
- Dosi, G. (1982). "Technological Paradigms and Technological Trajectories – a Suggested Interpretation of the Determinants and Directions of Technical Change." Research Policy 11(3): 147–162
- Dutz, M.A. (2007), Unleashing India's Innovation: Toward Sustainable and Inclusive Growth, Washington DC: World Bank
- Fine, B. and Rustomjee, Z (1996) The Political Economy of South Africa Boulder, CA: Westview Press
- Frank, R.H., T. D. Gilovich and D. T. Regan (1996), "Do Economists Make Bad Citizens?" The Journal of Economic Perspectives, Vol. 10, No. 1 pp. 187-192

- George, G., McGahan, A.M. and Prabhu, J. (2012) "Innovation for inclusive growth: towards a theoretical framework and a research agenda." Journal of Management Studies, 49(4): 661-683
- Gibbons, M, C. Limoges, H. Notwotny; S. Schwartzman, P. Scott, P and M. Trow (1994), The new production of knowledge: The dynamics of science and research in contemporary societies, London: Sage.
- Gupta, A.K., Sinha, R., Koradia, D., R. Patel, M. Parmar, P. Rohit, H. Patel, K. Patel, V.S. Chand, T.J. James, A. Chandan, M. Patel, T.N. Prakash and P. Vivekanandan (2003), Mobilizing grassroots' technological innovations and traditional knowledge, values and institutions: Articulating social and ethical capital", Futures, 35, 975-987.
- Hall, A. N. Clark, and N. Naik, G. (2007), "*Technology supply chain or innovation capacity?: Contrasting experiences of promoting small scale irrigation technology in South Asia*", UNU-MERIT Working Paper #2007-014, Maastricht: UNU
- Sonne, L. 2010, Financing pro-poor entrepreneur-based innovation: A review of existing literature, UNU-MERIT Working Paper 2010-038, Maastricht: UNU
- Hollander, S. (1965), The Sources of Increased Efficiency: a Study of Du Pont Rayon Plants, Cambridge: MIT Press
- Von Hippel, E.A. (2005), Democratizing Innovation, Cambridge, Mass.: MIT Press
- <http://www.worldbank.org/en/news/2012/06/21/beijing-forum-promotes-inclusive-innovation-for-sustainable-growth>
- Immelt, J., V. Govindarajan and C. Trimble (2009), "How GE is Disrupting Itself", Harvard Business Review, October, pp. 56-65.
- Jequier N (1976) (ed), Appropriate Technology: Problems and Promises, Paris, OECD Development Centre.
- Kaplinsky R (1990), The Economies of Small: Appropriate Technology in a Changing World, London: Intermediate Technology Press
- Kaplinsky, R. (2011), "Schumacher meets Schumpeter: Appropriate technology below the radar", Research Policy, Vol. 40, No. 2, pp.193-203.
- Kaplinsky, R. (2013 forthcoming), Innovation for pro-poor growth: From redistribution with growth to redistribution through growth" in A. Cornia and F. Stewart, Essays in Honour of Sir Richard Jolly.
- Kaplinsky, R; Chataway, J; Hanlin, R; Clark, N; Kale, D; Muraguri, L; Papaioannou, T; Robbins, P and Wamae, W. (2009). "Below the radar: What does innovation in emerging economies have to offer other low-income economies?", International Journal of Technology Management and Sustainable Development, Vol. 8 (3), pp. 177–197.
- Kaplinsky, R. and M. Morris (2001), A Handbook for Value Chain Research, [http://asiandrivers.open.ac.uk/documents/Value chain Handbook RK MM Nov 2001.pdf](http://asiandrivers.open.ac.uk/documents/Value%20chain%20Handbook%20RK%20MM%20Nov%202001.pdf)
- Kaplinsky, R. and M. Morris (2009), "Chinese FDI in SSA: Engaging with Large Dragons", European Journal of Development Research, Vol. 24, No. 1. 2009, pp. 551-569

- Kaplinsky, R. and M. Morris (2011), "Chinese FDI in SSA: Engaging with Large Dragons", European Journal of Development Research, Vol. 24, No. 1. 2009, pp. 551-569.
- Katz, M. L. and C. Shapiro (1987): "R&D rivalry with licensing and imitation", American Economic Review, 77 (3): 402-2420.
- Kale, D., R. Hanlin, and J. C. Chataway (2013), "New drugs and health technologies for low income populations: Will the private sector meet the needs of low income populations in developing countries?" Innovation and Development Vol. 3 (1) forthcoming
- Lorentzen, J. (2010) "Low-income countries and innovation studies: a review of recent literature", African Journal of Science, Technology, Innovation and Development, Vol. 2(3), pp. 46-81
- Moran, M., A. Ropars, J. Guzman, J. Diaz and C. Garrison (2005). The New Landscape of Neglected Disease Drug Development. Wellcome Trust, London School of Economics and Political Science, London.
- Nelson, R. R. and S. G. Winter (1982), An Evolutionary Theory of Economic Growth: Boston, Harvard University Press
- Prahalad, C.K. (2005), The Fortune at the Bottom of the Pyramid: Eradicating Poverty Through Profits, Upper Saddle River, NJ: Pearson Education/Wharton School Publishing
- Prahalad, C.K. and Hammond, A. (2002), 'Serving the World's Poor Profitably', Harvard Business Review, 80, pp. 4–11.
- Radiou, N., J. Prabhu and S Ahuja (2012), Jugaad Innovation: Think Frugal, Be Flexible, Generate Breakthrough Growth, Chichester: Wiley and Sons.
- Schumacher, E.F. (1973), Small is Beautiful: Economics as if people mattered, Blond and Briggs Ltd
- Sen A. K. (1968), The Choice of Techniques, Oxford: Blackwell , 3rd Edition.
- Shen, X. (2013), "Private Chinese Investment in Africa: Myths and Realities", Policy Research Working Paper WPS 6311, Washington: The World Bank
- Singer, H., C. Cooper, R. C. Desai, C. Freeman, O. Gish, S. Hall and G. Oldham (1970), The Sussex Manifesto: Science and technology for Developing Countries during the Second Development Decade, IDS Reprints No. 101, Brighton: Institute of Development Studies
- Smith, A., M. Fressoli and H. Thomas (2013 forthcoming), Grassroots innovation movements: Challenges and contributions", Journal of Cleaner Production (in press)
- Stewart, F. (1979), Technology and Underdevelopment, London, Macmillan, 2nd edition.
- Sumner, A. (2010), Global Poverty and the New Bottom Billion: What if Three-Quarters of the World's Poor Live in Middle Income Countries?, mimeo, Brighton: Institute of Development Studies.
- Train, K. (2003), Discrete Choice Methods, Cambridge University Press
- Wade, R. (1990), Governing the Market: Economic Theory and the Role of Government in East Asian Industrialization, Princeton (NJ): Princeton University Press.

Wilson F. (1985), "A Century of Agriculture, 1866-1966," in M. Wilson and L. Thompson (eds.) Oxford History of South Africa, Vol. 2, Oxford: Oxford University Press, 104-171