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PDPs as social technology innovators in global health: Operating Above and Below the Radar.

3 main messages

- PDPs constitute social technology innovations which promote, develop and aim to distribute physical technologies to those who need them and they need to be evaluated on this basis;
- More attention needs to be paid to PDP's organisation and management. Incorporating this type of analysis into evaluation may reinforce engagement in types of collaboration important to health systems development and strengthening;
- PDPs can use their distinctiveness to capture and use 'Below the Radar' networks and knowledge to further develop social and physical technologies in the interests of global health.

Abstract

PDP success rests on an ability to create new science and technology but it also depends on the creation of new organisational structures and cultures which can successfully develop appropriate technology and products and get them to those who need them. One of the main reasons PDPs are supported and funded is that they constitute a 'social technology' innovation. As such they work both with 'above the radar' established and formal mechanisms for developing new products and with 'below the radar' networks, organisations and physical technologies in developing countries so that products are appropriate, understood and accepted and can be made accessible to those who need them. We argue that thinking about PDPs in this light provides a useful framework for evaluation.

Introduction

Global product development partnerships are often characterised as 'technology push' initiatives aimed at providing new science and technology based products for neglected diseases applying the best science and technology to meet global health needs. Yet this characterisation is only a partial description of many PDPs. It is also possible to view PDPs themselves as innovations developing novel networks, new ways of dividing labour and relevant management and organisational skills to serve global health objectives. Looking at PDPs in this light, we can see them as social technology innovations designed to develop and distribute physical technologies in the shape of new products and drugs.

PDPs develop new medicines or medical equipment for people in developing countries who lack the economic resource and political clout to demand and access

effective products. Yet it is now well established that new technologies and products alone are not enough. Highly complex manufacturing and access problems need also to be resolved. This set of issues is difficult in large part because the answers are not standard. Whereas an AIDS vaccine may have in theory widespread global or regional applications, distributional and access issues involve numerous local factors which need addressing. Moreover, for technologies and products to be successful they must be appropriate to local conditions and need to be demanded locally. Local demand involves not only appreciation for the product but also for the means of distribution. Thus, PDPs need to engage with and contribute to local organisations, institutions and individuals which have and are building political voice. It is PDPs' ability to combine product development with this targeted and efficient approach to working locally in developing countries with health, community and development organisations which makes them distinctive.

Section 1. PDPs as social technologies

Richard Nelson defines social technologies by using an analogy to the limitations of written recipes for food preparation:

...a recipe characterisation of what needs to be done represses the fact that many economic activities involve multiple actors, and require some kind of a coordinating mechanism to assure that the various aspects of the recipe are performed in the relationships to each other needed to make the recipe work. The standard notion of a recipe is mute about how this is to be done.... [We] propose that it might be useful to call the recipe aspect of an activity its "physical" technology, and the way work is divided and coordinated its "social" technology (Nelson, 2008:11)

During the 1990s it was widely perceived that neither the public, nor private nor NGO sectors alone could develop new technologies and make them accessible to the world's poor who needed them. The hope was that the imbalance in spending on health R&D, in favour of the world's wealthy, could be partially rectified via the creation of new organisations which would bring a range of actors together to work effectively around specific disease and health agendas. Whilst the recipes for doing this may have been understood (bringing together the power of public and private sectors in technological innovation and the private and NGO sectors in distribution) creating and managing the organisations that could divide and manage the work was an entirely different matter. We are only now beginning to see analysis of the different organisational forms operating under the PDP umbrella and the various modes of working that resulted in the effort to create social technologies for neglected disease.

Using the concept of social technologies highlights a number of shortcomings in other ways of looking at the intractable issues involved in addressing neglected diseases. One powerful strand of argument for instance views the problem as one of incentives and investment. According to this argument if enough money is pumped into the area of neglected diseases and if the right incentives are created, the problem will be solved. In a previous Global Forum for Health Research Review, Orsenigo et al make clear the limitations of this approach (Orsenigo, 2008). Using the example of IAVI Orsenigo et al argue that PDPs are both innovation integrators, providing a hub for science and technology development and brokers amongst the plethora of health and development stakeholders needed to put potential product

candidates through clinical trials and to ensure widespread access should a safe and efficient product be the outcome. Thus PDPs go well beyond classic measures for addressing 'market failure'. They are necessary attempts to address 'social technology failure'. This argument is developed in further articles which provide more detail about the way in which IAVI fashions itself in both roles (Chataway et al 2007, Chataway et al 2009).

It is the combination of these two sets of activities around concrete product development agendas which is, in part at least, why PDPs have attracted widespread support and have secured financial resource; PDPs bring together a range of actors in public, private and NGO sectors with a targeted mission of introducing, developing and making accessible new technologies and treatments to those who need them in poor countries. Their efforts have had to include support for new science, technology and product development and a range of brokering and capacity building activities around defined product development activities including clinical trials.

This is PDP's social technology innovation and this is why PDPs are widely considered appropriate vehicles for the development new physical technologies. Other public, private and charity organisations can undertake activities in discrete bits of the value chain and have specific capabilities but PDPs introduced a coherent organisational, management and cultural approach to bringing together innovation and development under one organisational banner in a targeted way that moved things forward more rapidly than the alternatives (Moran et al, 2005).

PDPs may share characteristics but they are not of course identical. For example IAVI and the Malaria Vaccine Initiative (MVI) are similar in overall goal and mission: both are PDPs aiming to develop and make accessible to poor people in developing countries vaccines for major neglected diseases. Both have been based around clinical trials. However, their social technology histories differ and IAVI and MVI behave differently in their integrator and broker roles. These social technology differences are becoming more accentuated as their respective success in developing new physical technologies becomes more apparent.

In some respects IAVI and MVI seem to be moving in opposite directions with IAVI moving in a more 'integrator' fashion – increasingly becoming identified with particular scientific approaches (rather than a very broad umbrella) and increasing commitments to basic science in the US and Europe. In MVI on the other hand we see a move towards addressing delivery issues and health systems strengthening (development and broker issues) and working more closely with a variety of UN, multilateral and bilateral agencies. In some senses IAVI maintains its virtual pharma company identity and MVI is moving away from thatⁱ.

The reasons for this divergence include the stage of scientific progress. The scientific challenges effecting both AIDS and malaria vaccine research are immense but at present malaria vaccine researchers have been able to make more headway than AIDS vaccine researchers. Second each organisation has evolved a different history or 'institutional logic' (DiMaggio, 1997) whereby different norms, values and cultures vie for attention and come to dominate. The implication is that there are different ways IAVI and MVI could take to approach the problems affecting the science and reaching its intended goal; there is not one way of successfully engaging in vaccine development for infectious diseases such as AIDS and malaria and outcomes in

decisions about how to tackle problems are influenced by technical factors but also by a organisation's history, structure and culture.

Section 2. Using PDP social technology for better outcomes and Below the Radar Innovation

An analogous and useful way of looking at the roles of PDPs can be taken from work by Gardner et al who argue that improving access to essential products and services requires three forms of innovation: technological, social and adaptiveⁱⁱ. Adaptive means "involving both providers and communities to contextualise the adoption of goods and services to local settings" (Gardner et al, 2007).

It is now well established that successful innovation is in most cases 'non-linear' that it often involves numerous interactions between consumers and users (and of course patients). Adaptation then is not a passive phenomenon but often requires active interaction and communication between those who produce and those who use products and technologiesⁱⁱⁱ. This adaptation can be around modification of physical technology (feedback and knowledge from local consumers which help improve the recipe) or in social technology (new ways of dividing and conducting work which can facilitate the development and the distribution of technologies).

Many PDPs, including MVI and IAVI are in a good position to learn about local contexts and innovate in the area of social technologies on the basis of local knowledge. This social technology will be invaluable in devising plans for the production, distribution, acceptance and use of new treatments and drugs. It is clear from many studies that have been carried out that vaccines and other drugs are rejected because not enough resource is devoted to understanding local contexts (Leach and Fairhead 2007). Moreover, the structure of local distribution channels impacts significantly on the way drugs and treatments are consumed (Mackintosh and Mujinja, 2008). Thus, by using their connections and networks which span local contexts and global product development, PDPs can hopefully give rise to social technology innovations which will contribute to making new products and technologies more accessible. By using their existing social technology innovation (existing networks and new working partnerships) to generate further useful social technologies.

PDPs can also use their distinctive networks, ethos and orientation to input into physical technology development. As mentioned previously it is now widely accepted that most innovation is relatively non-linear with many feedback loops between different stages of product development. Most companies now innovate on the basis of this analysis and have ongoing communication with their users and consumers. They know their customer base and innovate accordingly.

Although the feedback loops are perhaps less in some areas of drug development, it is certainly true that most large companies orient their new product development activities towards the world's wealthier customers in high or middle income companies. Drugs and treatment regimes are oriented towards those markets. There are less likely to know about or be interested in the range of treatments or medical practices used in poorer countries and by poorer people. This of course was one of the factors behind the creation of PDPs. There is scope for PDPs to use their different connections, networks and social technologies to generate new science,

technology and products. Although this may sound to some to be naïve wishful thinking, the artemisinin story or the science around sex workers and others who have high level resistance to HIV are examples of the potential of this approach.

We have labelled this more user led innovation process involving poorer consumers in developing countries, below the radar innovation (BRI). Below the radar because the potential for productive innovation for poor users and consumers is not generally of interest to large Western companies^{iv} and is therefore not a major focus for product development activity. Large western companies are unlikely to be interested in working to adapt products on the basis of feedback from poor consumers and areas of product and service activity related to poor people's needs remain below the radar. PDPs and companies from other developing countries may be able to progress this type of innovation in much more direct ways. BRI can be found in a range of sectors but is of particular relevance in health, agriculture and energy as these are key sectors for poor people.

Feedback and adaptation requires competence and capability building. PDPs themselves have to acquire the capabilities which will let them absorb local knowledge. When working in poorer developing countries they will often also need to contribute to local capacities and capabilities. A number of PDPs have impressive records in building new scientific, technological and management capacity in developing countries (Chataway et al, 2007 and Chataway et al, 2009).

Conclusion: Evaluating PDPs as social technology innovators

Clearly the mission of most PDPs is to develop appropriate new technologies and products for global health. All activities need to be judged in relation to this mission. Yet narrow metrics looking at outputs may miss some of the real contributions that PDPs make. They may also provide perverse incentives for autonomous styles of operation when collaborative approaches may be far more suitable particularly in light of recent concerns about health systems strengthening.

If PDPs are viewed as social technology innovations and if, as we have argued, this is their *raison d'être*, they should be evaluated on the basis of their contributions to a variety of activities involved in developing new products and making them accessible to poor people in developing countries. Outcomes rather than strictly output based assessments of overall contribution might evaluate whether PDPs have positively changed the behaviour of a range of groups, individuals, organisations and institutions involved in complex interactions around getting better medicines to poor people in developing countries. For example assessment of how activities such as capacity building or advocacy activities has contributed or is likely to contribute to better outcomes for target groups' access to medicines needs to be evaluated. In turn this type of evaluation may contribute to health systems strengthening objectives by contributing parties involved in global health to view their activities as part of a complex whole.

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ⁱ Whilst there is truth in these broad characterisations there is also a good deal more subtlety in a more detailed account of the strategies that both organisations are pursuing.

- ii Technological and social innovation are used in the sense of creating new products and processes on the one hand ensuring access on the other hand.

- iii A recent article in *The Economist* about 'frugal innovators' provides excellent examples of adaptive innovation in the Indian health service.

- iv However, as Christenson (1997) has pointed out highly successful and disruptive (in the sense that it disrupts existing supply and value chains) innovation often has its roots in low income markets. In some sense the rise of the Indian pharmaceutical industry can be seen as an example of this as Indian companies have their roots in developing generic drugs for poor users.