

SATM

Innovation & Technology Management News

Fall/Winter 1998

Volume 2, Issue 2

Alliance for

A Business Resource at
STEVENS
Institute of Technology

*Technology
Management*

Managing intellectual property is a key issue in the management of technology. Two interesting perspectives are presented here: How patent data can help determine competitor strategic directions and technological strengths, and the role and limitations of patents in transferring technology to the developing world.

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Patents for Technology Transfer To a Developing World

Marianne de Laet

In this article I propose the transfer of technology to the developing world as a problem of technology management. I claim, however, that it is not the type of problem that can be solved by the 'proper' or 'better' management of technology implementation. Tackling the problems pertaining to technology transfer may rather involve the rethinking of the categories of technology and transfer altogether – and perhaps that of management as well.

The case of patents in Zimbabwe illustrates my point.

Technology transfer: a problem of technology management

In the past few decades the assistance to developing regions has been on the agenda of the richer nations, and in particular technology has been hailed as a means to foster economic prosperity.

(Continued on next page.)

Patents for Technology Transfer (continued from page 1.)

But how to envision this link between technology and prosperity? After all, development is not always a result of the insertion of new technologies. Nor does the transfer of technology to new places necessarily mean that development follows. Instances abound where brand-new technology was implemented, only to waste away and become a rusting heap of steel.

We have all heard such stories. We may know the legend of a water pump in Zimbabwe that is installed but not used, of irrigation works in Sahelian Africa that within months fall apart, or of a fuel-effective energy generator in Costa Rica that soon after its arrival uses no fuel whatsoever and produces no energy at all. Such legends have things in common. They suggest that in the world of technology transfer failure is the norm rather than the exception. They indicate that failure has to do with technology remaining poorly maintained and unused. And they seek blame: someone, somewhere, somehow, has failed to maintain, use, or understand the technology sufficiently to make it work.

Is this, then, what is the matter with the transfer of technology? Is it the users who are to blame when transferred technology does not flourish? Is it the donors, who neglect to instruct? Is it the technologies, that are too complex? To summarize such questions: is better management of design, transfer and implementation the solution to these difficulties? Or is there something about transfer itself that prevents technologies from working in new environments? Should we perhaps ask what it means for a technology 'to work' – and why we insist that something or somebody bear the blame if it doesn't?

I will do four things. In the first place, I discuss the current development regime, as a program of transporting technology – usually in the shape of machines – to the developing world. Second, I broaden the scope of technology, proposing the patent as a technology: as an instrument for transferring knowledge to the developing world. Then, with this technology in mind, I explain the materialities of its transfer, that complicate its use in new environments. Finally, I claim that these complications stretch beyond the field of patents or even beyond the field of development cooperation: they bear on the practices of technology management in a broader sense.

Fish or tools to fish with: development regimes

When someone is hungry, it is possible to give them fish, but it may be better to furnish the tools to fish with. Tools do not bring immediate relief, but they offer a way to combat future famine, a means to improve the local infrastructure, and a vision of self-reliance. With tools, the hungry acquire a mechanism to provide for themselves, perhaps even to produce for the market – from which a

stronger position in the economic order ensues. This rationale has been driving development policy these past twenty-five years. It promotes the transfer of particular types of tools: technical objects, often machines, of varying degrees of complexity. The transfer of machines, one might say, constitutes the prevailing 'management regime'.

The policy has met with its share of criticism. A principal critique we have already encountered: once transferred, technologies may not work or last. Such failure is easily cast in cognitive terms, suggesting that there is something inherent to the South that constrains its capability to understand the intricacies of the technologies with which it is confronted. But this conclusion is disputed by recent work. A growing body of literature examines machines' resistance to transfer, pointing to local, material circumstances rather than fundamental, cognitive conditions as its source. Machines, even the simplest ones, are dependent for their operation on a network of subtle, sometimes tiny, but always crucial elements – all of which need to be in place for them to function.

Thus, one of the reasons why the fuel-efficient energy producer I mentioned worked in France (its place of origin) but not in Costa Rica turns out to be the wood. The wood it burns was dry in France and not so dry in the jungles of Central America. Since the machine doesn't take into account the humidity of wood, it is only while trying to work it in new circumstances that this sensitivity to humidity – which turns out to be a crucial feature of its operation – becomes apparent. It is not that the machine doesn't work because its new users do not understand how to operate it – it is because all of a sudden it has to deal with a different class of wood.

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Patents for Technology Transfer (continued)



Zimbabwe

It appears that such materialities are at the heart of the problems involved in transferring machines – materialities like rusting pipes that disable a waterpump, sand that encroaches upon irrigation canals, and wood that doesn't burn. Local configurations have tangible eccentricities, which the new technology isn't prepared to deal with. But why not, then, do away with such materialities altogether, and transfer knowledge rather than machines? If there is nothing inherent to the South that prevents its understanding technology; if it is a matter of developing technology that is appropriate to the new place, why not make available information that helps to identify such technology, and bring in the conceptual tools that enable the making of the proper tools to catch the fish with?

Patents for technology transfer

This is where the patent enters the development scene. Under the auspices of the World Intellectual Property Organization (hereafter WIPO), a program is under way to disseminate patents. WIPO looks at the patent as a protective instrument of intellectual property rights, and its primary goal is the globalization and harmonization of the patent system. But in regional offices where the program is actually carried out, both program and patent take on another aspect. In regional offices in developing countries, like the African Regional Industrial Property Organization (hereafter ARIPO) in Harare, Zimbabwe, the program promotes the use of patents for purposes of technology transfer. Thus, while in WIPO and most other places the patent is a protective instrument, in Harare it becomes a vehicle for knowledge and thus, a conceptual tool.

It makes sense to use patents as vehicles for knowledge. Transporting patents rather than machines seems logistically sound, for what could travel more easily than documents – on paper, on CD ROM, or even through the internet? What is more, a patent

does not have to come at great cost, because reading a patent and learning from it are free – and after the patent expires, its use is free as well. Finally, the body of existing patents encompasses all technical innovations for which protection of innovative activity was ever sought, granted and administered. Patents thus cover all manner of technical knowledge – from rudimentary to very advanced – embodying knowledge that may be (made) appropriate to all kinds of circumstances.

So it is that the WIPO program, as it is deployed in places like Harare, aspires to bring knowledge to these places. By doing that it invokes a new development regime. Modifying the adage that it is better to equip the hungry with tools to fish with than to supply fish, the program provides information to enable the production of fishing gear. On purpose or not, the program thus sets a new direction in technology management – new, at least, in the context of international collaboration for development.

The matter of more fish

But do patents indeed transport all that easily? Do documents transport better than machines? And if they do transport well, do they work after they have been moved from one place to the next? What does it mean for them to 'work'? Does the travel of patents result in the dissemination of knowledge, and does such knowledge result in the production of 'more fish'?

For patent documents to be useful as providers of information, they must be understood. But beware. Understanding is, again, not an issue of cognition; like the performance of machines, that of 'conceptual' things depends on chains of elements. Consider for instance the contents of the knowledge that is to be conveyed in a patent. For technical documents to be usable, they must encompass all there is to know about the technology they cover. But often they don't. Asking a chemical engineer in Zimbabwe whether he had ever reproduced a substance from a patent, he said: 'Of course not. They usually leave something crucial about the set-up of an assay out.' And consider the matter of building technical objects: for technologies to be reproducible, the builders must to some extent already be familiar with the object of choice. Especially for more complex objects, the people who build them must be fairly highly trained; a system of technical knowledge and engineering practice must already be in place. If knowledge is to be transferred successfully to a new place, that place must be already appropriate to it. So patents may be effective as vehicles for knowledge in some places – for instance, they do perform knowledge transfer between Columbia University and the Wellcome Institute, because these two venues are, in respects that count for the travel of knowledge, essentially the same.

Patents for Technology Transfer

But in other places, say in Zimbabwe, patents can at best be complementary to other programs of technology and knowledge transfer. They need people who are trained already present. By themselves, they can not be relied upon to do the knowledge transfer job. In those other places the patent may not be such a great vehicle to transport information after all.

Fish, or coalitions?

But it is not only complexity that accounts for the problems of transferring patents. A closer look at the travel of patents and the places they travel to, suggests that they are not everywhere the same things. WIPO – and most of the industrialized world – operates the patent as a protection device, while in other places it turns out to be a vehicle for knowledge. In the Asian late-industrializers, for instance, the patent has functioned as a vehicle for knowledge – these countries have arguably developed their industrial infrastructure in part on the basis of information from patent documents. In places like Zimbabwe, the patents do not work as successfully as a vehicle for knowledge. But in these places the patent does, and is, yet another thing.

In Zimbabwe, there is a reservoir of knowledge that is indigenous to the local culture. This knowledge of medicinal herbs and substances, passed on by traditional healers, is becoming valuable currency for pharmaceutical industries, fast. Examples are known where such knowledge is harvested by prospectors, substances purified in laboratories in New Jersey, and patented or by a Western company without acknowledgement of origin or source. Well aware of such activity, and well aware that it is an effect of the way in which the patent system operates, Zimbabwean healers have formed a new type of coalition. Organized in an association that can act as a legal person, they have started a collaboration with the University of Zimbabwe in Harare to do research and purification on medicinal plants on-site. This new type of coalition may turn out to be crucial in keeping the benefits of research and patenting at home. And the coalition in Zimbabwe is not the only one. The non-aligned countries 'as a whole' are beginning to move in this direction – attempting to form alliances over this very issue. So here the patent emerges as yet another thing: as a catalyst of new types of organization, it may play a role in the developing world's acquisition of a voice.

So these are the intricacies of transfer. It is complex and difficult to accomplish because of the materialities involved. Also, transfer is not a neutral operation. It entails transformation. It has an effect on the things transferred. In new environments, objects become new things.

Technology management: lessons to be learned

Here, then, is my argument. The transfer of technology, patents, and knowledge is dramatically complicated by the tendency of objects to assume new tasks, even to become new things, in new environments. Accordingly, their success or failure – the matter of whether they 'work' or not – can hardly be measured against some preset goal. Because even if they do not accomplish that goal, they work alright – but they may work towards some unforeseen end. So what does that tell us about the field of patents, the regimes of development, the practices of management?

I won't go into all aspects of that question, but make just one suggestion. Do patents offer a solution to the problems of technology transfer? Perhaps not: the transfer of knowledge by way of patents turns out to be as intricate as is the transfer of technology by way of machines. But does that mean that we should abort the operation altogether? Perhaps not either. For patents do new things in new places and these new things may turn out to be valuable assets in and of themselves.

My suggestion is that it is important to keep an eye out for such 'new things'. They may make the transfer of technology and knowledge more of a problem for technology management, for they make the playing field ever more complex. And this is a new set of complications, that 'proper' or 'better' management does not solve. Perhaps, then, another approach than 'managing' in the ordinary sense of the word is called for: we may need a type of management that is much more tolerant of uncertainty than our desire to exert control allows.

Marianne de Laet is an anthropologist working in the area of Science and Technology Studies. Her research is on science-technology-society interfaces and is presently focused on the introduction of the patent system in developing countries. She is a Fellow of the Dutch Organization for Scientific Research and Visiting Assistant Professor at Columbia University's School of Engineering and Applied Science. In this latter capacity she is building a Center for Technology Studies and designing a curriculum in Technology studies for engineers.