For All of Our Languages We are Not Natives Here:
Challenging the Idea of the Digital Native, Rethinking the Digital Divide

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ABSTRACT

This paper seeks to explore the concept of the digital divide by critiquing the notion of the digital native and its relationship to the legal conception of technology transfer and sited knowledge. It is the contention of this paper that technology transfer is key in developmental issues currently facing the international community in general, and is the first and paramount step in bridging the digital divide specifically. In order to be sustainable, a technology transfer must include capacity building strategies in which the notion of suitably embedded knowledge is already present in other areas of international IP law; specifically in the areas of Traditional Knowledge (TK) and Traditional Cultural Expression (TCE). Finally, if this concept of embedded knowledge is further applied to the idea of the digital divide then it becomes apparent that there is a socially damaging and a potentially ecologically unsound digital divide at work, even among those who are resource rich.

Keywords: Autopoiesis, Capacity Building, CBD, Development, Digital Divide, Trips

THE THEORY OF AUTOPOIESIS

Since autopoietic theory underpins the observations made in this work it is appropriate to begin by exploring that theory and how it can be applied to law. Although we shall leave highlighting how it impacts upon the area of capacity building and technology transfer to a suitable place in the text, it is hoped that holding this body of theory in mind will facilitate the reader in tracing the author's argument.

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Autopoiesis in General

As a theory autopoiesis was first posited in the biological sciences to differentiate between the living and the non-living (Varela & Maturana, 1974). It is an explanatory theory of how entities develop and govern themselves. The influential scholar Luhmann (1986) accomplished an interesting "theory transfer" into the world of sociology; he posited the idea that self-organising and self-reproducing social systems (autopoietic systems) reproduce and maintain their structure not because of the characteristics of individuals, the demarcation

of specific roles, or even through deliberate acts but via their process of communication. This is particularly interesting when one is considering that this means that systems can be self-referential. In other words they can communicate about their communications and develop themselves reflectively in that way.

In relation to social systems autopoiesis allows us suggest that all that can ever accurately be observed is the system's communications and that through this observation, by learning to understand its language or, to use Luhmann's preferred term, the "code" it employs we can work out what a system's function is. This "code" can then develop into a "program" (a series of expressions in that language) which expand and solidify it, making it possible to do things with the code. Finally, when we examine this program we can determine what effects it has in practice, what Luhmann calls its "efficiency". Ultimately, the largest and most successful social systems outgrow simple language expressions and develop their own sphere or "medium" of communication. To give a simple example, law could be said to have the function of allowing us to order our lives by enabling us to predict the outcomes of actions to which societal norms are applied. Thus, I know if I pay for my chocolate bar in the shop I will be free to enjoy it (at least legally, my doctor may say otherwise!) because our law has clarified our social norm about possession. Using Luhmann's terms, law's code could be said to be the language of legality/illegality; its program the body of laws in place and its efficiency the regulation of conflict and behaviour. Additionally, law being a particularly large social system can be said to have its own sphere or medium in the concept of jurisdiction (Krause, 1999 p. 36).

Social systems, such as law, form part of society as we experience it and are both influential upon and influenced by their surrounding social systems. However, they can also be said to be independent from them since they depend upon their own code and media for interpreting (or perhaps more correctly creating) their own environments and their own organs. Thus, what we commonly call society is made up of open yet also discrete social systems. This discreteness is often described as meaning that the system is operationally closed, in other words, that the "realness" of anything within the system depends on its absorption or adherence to the code of that system. So, for example, if I go back to the sweet shop mentioned earlier my doctor or dentist might well happen to be on the scene to disrupt my quiet enjoyment of my chocolate bar for health reasons but any communication coming from them will not affect the legal medium. They will not have legal jurisdiction (the ability to label my actions as legal or illegal) unless they as communicators have already been absorbed into the legal realm. This is a very important distinction. Luhmann himself highlights it:

I think that the theory of autopoiesis and the theory of autopoietic systems...are underestimated in the radicalism of this approach. This radicalism goes back to the hypothesis of operational closure. This hypothesis implies a radical shift in epistemology, and also the ontology it supposes. If one accepts it and also relates it to the concept of autopoiesis and treats the latter as a further formulation of operational closure, then it is clear that it also breaks with the epistemology of the ontological tradition that assumed that something of the environment enters the understanding and that the environment is represented, mirrored and imitated or simulated within a cognizing system. In this respect the radicalism of the new approach can hardly be underestimated (Luhmann, 2002, p. 114).

Autopoiesis and Law

Up to this point we have merely been using law as the exemplar to illustrate our broader understanding of autopoietic social systems, now we shall consider briefly the work which has looked at autopoiesis and law specifically. The key issue for law as an autopoietic system is to manage inter-system conflicts -that is after all part of the function and efficiency of law.

However, if taken at face value this seems to be paradoxical; how can an operationally closed system respond to the needs of other systems like economics, health care etc., without losing its own internal cohesion and ceasing therefore to be autopoietic. Thus law would not seem to be amenable to autopoietic explanation. Two major solutions have been proffered for this problem. The first is to identify multiple autopoietic legal systems: rather than profess the unity of law, it is seen as part of the autopoietic process that the systems reproduce in a plural fashion within the context of the 'local logic' for the legal doctrine (Ladeur, 1985, p. 426). The second solution (primarily espoused by Gunther Teubner) is to take this pluralism and add it to Habermasian ideas of recursive discourse. The immediate consequence of this is that it becomes plain that systems are closed (and in that sense autopoietic) to varying degrees; this would seem to once again to severely challenge the concept of law as an autopoietic system. However, Teubner has a further enhancement of the autopoietic thesis which is the idea of inter-systemic collision law i.e. that the autopoietic systems set their own rules for how they interact with the less autopoietic systems (the partially autonomous and socially diffuse systems) and also how those other systems interact with each other inside law's domain. These rules can be seen to operate between and among various social sub-systems, between state law and other quasi legal orders and finally in conflicts within law (Teubner, 1993, pp. 100-122). To return to my sweet shop analogy, a legal system could choose to incorporate health ideas by, for example, taxing unhealthy food and that part of the law might be considered partially autonomous because it depends on medical advice to determine what is healthy. This, however, is openness at a secondary level as the core legal enterprise remains closed by determining for itself who can make laws etc., Thus, autopoiesis offers a theory of law which recognises that there can be a range of legal systems and quasi-systems interacting (communicating) together and that law can and should be responsive to these without losing its internal consistency and autonomy. The corollary of this is that the observation of these interactions can outline the nature of the law.

Having explored the theoretical underpinnings of this work we shall now move on to consider the area to which they will be applied.

TECHNOLOGY TRANSFER AND DEVELOPMENT

The Need for Technology Transfer

Intellectual Property on the global stage has combined with history, nature and economics to create an inherently unequal playing field for states seeking to undertake industrial development or agricultural reform at this point in time. The reasons for this are manifold and complex, for example, developing nations may not find it easy to lobby or assert themselves in international fora, historical colonial relationships may have inhibited their economic and industrial development, current trade relationships may make adherence to certain international agreements a matter of necessity rather than choice. However, at its most basic level the problem is, as is often observed when considering the history of intellectual property (IP) law that the developed nations had the opportunity of using "soft" or sometimes outright discriminatory regimes of IP protection at a stage that suited their industrial development an opportunity which is emphatically not available to nations developing now.

- Although developing countries make up three-fourths of WTO membership and by their vote can in theory influence the agenda and outcome of trade negotiations, they have difficulty using this to their advantage. Most developing country economies are in one way or another dependent on the US, the EU, or Japan in terms of imports, exports, aid, security, etc. Any obstruction of a consensus at the WTO might threaten the overall well-being and security of dissenting developing nations if the developed nations sought retribution in the economic

sphere. Thus, the developing nations are forced to assent to a system that assures their continued dependence and introduces a spiral of complicity and economic oppression. As Muchlinski (1997) has noted, developed countries want to impose a model of strong protection for intellectual property on developing countries in the shape of treaties and agreements which may affect their development (p. 438).

- Trade negotiations are based on the principle of reciprocity or "trade-offs", i.e., one country gives a concession in an area, such as the lowering of tariffs for a certain product, in return for another country acceding to a certain agreement. This type of bartering benefits the large and diversified economies because they can get more by giving more. For the most part, negotiations and trade-offs take place among the developed countries and some of the richer or larger developing countries. Least developed countries are effectively shut out because their already unequal position prohibits them from having sufficient incentives to offer as barter. This has allowed the South to fall further and further behind and lose the tools to compete and there have been difficulties in getting the current technology transfer system to address this (see below and Guadamuz, 2000). Countries that cannot gain technology through trade thus face a real danger of becoming a technological underclass.
- Developing countries have fewer human and technical resources. Many cannot cope with the 40 to 50 meetings held in Geneva each week. Hence, they often enter negotiations less prepared than their developed country counterparts.
- Developing countries have discovered that seeking recourse in the dispute settlement system is costly and requires a level of legal expertise that they may not have. Furthermore, the basis on which the system is run – whether a country is violating free trade rules – is not the most appropriate for their development needs (Kwa, 1998), which is part of the interpretative issue we shall explore below.

This is not to suggest that the main IP bodies are solely exclusive or biased clubs for the developed nations, genuine efforts are made to facilitate less and least developed nations and indeed this paper is concerned with one such mechanism (technology transfer) but rather to paint the practical reality of the scene. Nor does this paper intend to suggest that simple wholesale adoption of technologically modern methods is a solution to developmental issues, but rather to expand upon a core idea that choices about technology must be real and that the users of technology must be empowered to use it in a way which addresses their own self-identified social, environmental and developmental needs.

TECHNOLOGY TRANSFER IN INTERNATIONAL LAW: A RE-REVISIONIST HISTORY

Although there are a number of articles in the TRIPS agreement which discuss the promotion of technological innovation and development for the overarching public good (particularly Articles 7 and 8 which are part of the principles section of the agreement) the primary source of ideas specifically on the relationship between development and technology transfer is the Doha Declaration of the WTO. Even this simple fact hints at a lack of conceptual clarity with development being linked and inter-linked with intellectual property, trade and environmental protection within these texts. Those familiar with the subsequent manifestations and ongoing rounds of talks about the Doha declaration will have seen this uncertainty exacerbated. The tone and direction of the Doha text have been "finessed" a number of times since its original formulation and it is now much more explicitly focused on trade liberalisation and less on development and capacity building (Chang, 2007). To put it another way there has been a sharp fracturing of the lines between those who would seek to place a neo-liberal interpretation

on development as "development into markets and traders" (though given the present economic situation it is perhaps not too sceptical to suggest development as markets is the primary theme for those developed nations needing markets to buoy their economies? (Horovitz, 2009)) and those nations who equally tendentiously define it as "economic, manufacturing and social development first". It is the intention of the current paper to demonstrate that, regardless of the ultimate tone adopted, the text still has within it the seeds of successful technology transfer and the bridge over the digital divide if the nature of both concepts is clarified. One should also note that these interpretations mirror a problem already highlighted by Browne (2002) that the third element in development and capacity building, the societal element, is often overlooked but is actually vital.

The third dimension, the societal, encompasses the facilitatory processes which lie at the heart of development: the opening and widening of opportunities that enable people to use and expand their capacities to the fullest. Social capital and cohesion are at the core of societal capacity and apply both nationally and locally. Capacity development cannot ignore the critical importance of decentralised village and community-based organisations and units, right down to the individual household, where the empowerment – or "capacitation" - of women is an important consideration (Browne, 2002, pp. 2-3).

With this in mind the issue then becomes how do we achieve successful capacity building and technology transfer which marries together all three of these elements. Kariyawasam (2007) has dealt in great depth with this issue of bridging the digital divide by marrying development and trade together within an active civil society and offers legislative proposals to achieve this. Kariyawasam's work is notable within the context of this debate for two key reasons. Firstly, that it explores what would make technology transfer effective and secondly makes detailed proposals about how to achieve that state. Although much of Kariyasam's thought on what makes good technology transfer is fairly mainstream and echoes the general consensus on the need for foreign investment and development partnerships that go beyond the minimal level of sharing envisaged in most international agreements he also makes a point vital to this discussion that transfer must spillover into the community at large.

...the actual diffusion of technology into the local market is as important as the technology transfer itself. Diffusion will take place by way of various types of knowledge spillover on other firms in the local market. There is also the related issue of absorption...DCs and LDCs with limited absorption ability are much more likely to place reliance upon unpatented know-how to assure effective transfer (Kariyawasam, 2007, pp. 209-210).

Furthermore he suggests that it must be appropriate technology for that community:

To choose appropriate technology, producers in the developing world need to be intimate with the goals of their intended production processes. These goals will include not only manufacturing outputs, but also the manufacturing processes to be used and how the outputs are to be distributed amongst the local population (Kariyawasam, 2007, p. 196).

The method that he proposes to achieve these appropriate partnerships and development, including specifically ending the digital divide, is to recognise the right to development and to link it to various beneficial tax regimes. However, as well as focusing on these purely economic aspects he notes the role of the civic society in making the right to development a reality. In line with a number of UN Independent Expert Reports he states the need for:

- Fully transparent legislative procedure involving the executive, judiciary, legislature

and civil society to pass economic law to promote effective technology transfer;
- Technology transfer leads to technology being accessed and used in a fair and equitable way for the benefit of all members of the community and the target state with special emphasis on human development at the local level; and,
- The processes delivered in the technology transfer actually lead to improved access for all members of the community to food, healthcare education etc., (Kariyawasam, 2007, pp. 283-287).

This synergy between economic and social elements would give rise to hopes of a more coherent and effective development strategy that could meet the needs of all concerned parties. From the perspective of this present article the adoption of Kariyawasam's model is desirable because fits well within the autopoietic framework focusing as it does on self-generation and direction of development. However, full consideration of such detailed and specific proposals is beyond the scope of this present work except to note that his proposed solution has features which lend it a strong autopoietic flavour. Despite his lack of specific reference to autopoiesis this feature is encouraging for the thesis of this work that autopoietic theory can provide a coherent basis for action in this area. Having considered these proposals for the future let us return to examine the interpretation of capacity building in the law at present.

As the text currently stands the key portions of the Doha declaration in relation to technology transfer are articles 37 and 38-41. 37 empowers ongoing examination of the issue and 38 to 41 outline the type and quality of assistance to be given and the mechanisms for doing so. The core elements of the Doha approach can be found in article 38:

38. We confirm that technical cooperation and capacity building are core elements of the development dimension of the multilateral trading system, and we welcome and endorse the New Strategy for WTO Technical Cooperation for Capacity Building, Growth and Integration. We instruct the Secretariat, in coordination with other relevant agencies, to support domestic efforts for main-streaming trade into national plans for economic development and strategies for poverty reduction. The delivery of WTO technical assistance shall be designed to assist developing and least-developed countries and low-income countries in transition to adjust to WTO rules and disciplines, implement obligations and exercise the rights of membership, including drawing on the benefits of an open, rules-based multilateral trading system. Priority shall also be accorded to small, vulnerable, and transition economies, as well as to members and observers without representation in Geneva. We reaffirm our support for the valuable work of the International Trade Centre, which should be enhanced (http://www.wto.org/english/thewto_e/minist_e/min01_e/mindecl_e.htm).

The key aspect of article 38 is trade designed to promote capacity building and thus aid development, this in turn will increase trade generally and allow developing nations to fully engage with international organisations and standards. It is an undecided question of interpretation or perhaps more correctly emphasis among the States Party whether or not capacity building should focus on practical assistance to aid industrial and economic development in order to facilitate the creation of trade relations or whether it should focus on building institutions and expertise to facilitate full membership of trade related organisations and compliance with international legal standards. To give a simple example the choice between say educating computer programmers or assisting a state to legislate on intellectual property issues about computer programme. It is not within the remit of this paper to re-open the question of the appropriateness of linking trade and potentially non-trade values and standards inherent in the Doha Declaration and the TRIPS framework generally but it is important to point out that these linkages and the negotiation and interpretation of the agreements can be used in a strategic fashion to advance either interpretation

if the negotiators arrive sufficiently prepared (Drahos, 2000). Thus we can see in the recent report from the WTO Working group on technology transfer the observation that:

During the discussion, a number of Members expressed the view that international agreements in the area of technology transfer had an important role to play in technology transfer. In that context, a number of provisions in the WTO agreements such as Articles 7, 8, 62 and 66 of the TRIPS Agreement were cited. The importance of public policy in encouraging public-private partnership, the linkage of foreign investment with SMEs and the interface between technology and human resources were also highlighted. The role of Aid for Trade in the context of capacity building and the development of human capital was underscored. The role of public policy, linkage between foreign investment and the small and medium enterprises, and the development of human capital in a country's efforts to develop its technological base was also highlighted (http://docsonline.wto.org/GEN_highLightParent.asp?qu=%28+%40meta%5FSymbol+WT%FCWGTTT%2A%29+&doc=D%3A%2FDDFDOCUMENTS%2FT%2FWT%2FWGTTT%2F10%2EDOC%2EHTM&curdoc=3&popTitle=WT%2FWGTTT%2F10).

Nevertheless despite these positive observations which clearly mix both our interpretations of capacity building in relation to the case-studies under consideration by the Working Group there remains a difficulty in determining what exactly capacity building is generally within the technology transfer agenda. An agenda which now seems to be dominated by the rhetoric and practice of technological assistance (in the legislation about computer software sense described above) with the result have that capacity building at a strategic level is about increasing ability to understand and deal with WTO and trade processes rather than improving practical skills generally to promote development (see WT/COMTD/W/160) (http://docsonline.wto.org/GEN_highLightParent.asp?qu=%28+%40meta%5FSymbol+WT%FCCOMTD%FCW%FC%2A+and+%40meta%5FTitle+%28technical+assistance+and+plan%29%29&doc=D%3A%2FDDFDOCUMENTS%2FT%2FWT%2FCOMTD%2FW160%2EDOC%2EHTM&curdoc=3&popTitle=WT%2FCOMTD%2FW%2F160). The improvement of actual skills and knowledge (capacity building in the training programmers sense) has been moved into the remit of the Integrated Framework (IF) sometimes called the Enhanced Integration Framework (EIF) when it is dealing specifically with least developed countries and the Joint Integrated Technical Assistance Programme (JITAP).

At present the (Enhanced) Integration Framework is engaging in a process of carrying out Diagnostic Trade Integration Strategies for least developed nations to determine their capacity building needs. These do clearly identify areas where practical capacity needs to be increased for example the DTIS for Sudan (http://www.integratedframework.org/files/english/Sudan%20DTIS%20final.pdf) identifies issues with telecommunications infrastructure in the South (4.87) and improved training in the leather industry (2.38) for example but how these improvements are to be facilitated is not clear beyond a statement that multinational partnerships would be beneficial. In other words, even though practical problems of capacity building are identified the "solutions" proffered are vague and more in line with the institutional framework or compliance capacity building type; once more clouding the interpretative issue. This and the various retrenchments of the Doha declaration can be seen as a sign of the unresolved interpretative conflict at the heart of the agreements.

As far as development-related issues are concerned, the position gap between developed and developing country Members seems too wide for reconciliation. Neither side is perfectly right in their respective position. The width of the gap could be narrowed or hopefully be removed only when both sides take a big step towards the other. It is recommended that developed

country Members accept that the Doha development mandate should lead to some rebalancing of rights and obligations of current Members. Developing country Members also need to agree that such a rebalancing will not come in an automatic, open-ended, and self-invoked manner (Chang, 2007, p. 569).

OTHER MODELS FOR CAPACITY BUILDING

Other Legal Visions of Capacity Building

The scholarly work in the field has focused on macro-level adjustments of the approaches taken to compliance with TRIPS and other WTO agreements (Hoekman et al., 2003; Prowse, 2002; Stevens, 2002; Wang et al., 2002) the contention of this paper is that a more autopoietic approach operating at a micro-level is the most appropriate method for affecting technology transfer and redefining the digital divide. Kofi Annan says:

Instead of widening our choices, globalization seem to be forcing us all into the same shallow cosmetic culture giving us all the same appetites but leaving us more unequal than ever before in our ability to satisfy them... We have to manage the process of global integration in such a way that everyone can benefit and no one gets crushed... (Addo, 2001).

The legal basis for this theory can be found in an area of international law relating to the intellectual property of indigenous people. This law is different in nature to the material coming out of the WTO not just because it has human community and environmental needs at its heart but also because it strategically links them to appropriate areas, in this case intellectual property law. Essentially, this article proposes that by analogy the approach put forward by the Convention on Biodiversity (CBD, http://www.cbd.int/convention/convention.shtml) holds the answer to a clear and workable definition of capacity building in technology transfer and the answer to re-stating the digital divide. In this section we shall explore this hypothesis in two ways:

1. By exploring the what autopoietic theory can bring to this question
2. The elements of the CBD approach which make it particularly apposite for development issues.

Autopoiesis a Solution?

Autopoiesis is also a particularly compelling organisational theory for law when one is concerned with the development of communities and people where political accord is difficult to find (Nelkin, 1988) as with the present issue. It would seem that the katascopic view of organisation as embedded in the current technology transfer regimes is not a natural fit for informational transactions when compared with the potential of autopoiesis. There are three core benefits to the adoption of the autopoietic approach to capacity building and technology transfer:

- As the focus of autopoietic theory is on reflexive (or at the very least plural) law suitable to specific locales and conditions greater account can be taken of the civil society and the needs of the target state at all levels. This means that the transfers can be appropriate and generate the spillover the Kariyawasam and others see as vital.
- As a corollary of this, the target state can be seen to be more independent and self directing if it is respected as an autopoietic entity without the external bodies losing their capacity to set norms and standards (make contributions to the code and programs).
- The application of autopoietic theory to this area challenges the idea that legal systems in LDCs must always be viewed as allopoietic. Criticism of autopoietic theory of law based on the fact that many regimes

of "peripheral modernity" have codes and criteria imposed on them and therefore that allopoiesis is necessarily implied may be empirically accurate but ignore the transformative and restorative potential of the application of autopoietic theory. (For an example of such work see Neves (2001)). In other words autopoietic theory allows us to challenge this debate to move beyond the external aid model to a more fitting model of assisted self-determination.

Such principals have already shown to be practical and workable at least to some extent as they are present in the CBD. In so far as it deals with knowledge communication, the CBD is much more in harmony with autopoietic theory and could indicate future working models of good practice in the fields of technology transfer which we shall now consider.

Lessons to Be Learned from the CBD

There are three key elements of the CBD that we feel make it worthy of consideration and emulation especially in the context of technology transfer. These are:

- Consideration for human beings particularly human communities.
- It is situational
- It focuses on collective benefit sharing

The CBD is interlinked with a number of pieces of international law and soft-law dealing with intellectual property and the rights of indigenous people. Important elements of this context for our purposes are Art. 27 of the Universal Declaration of Human Rights especially 27 (2) (http://www.un.org/en/documents/udhr/)

(1) Everyone has the right freely to participate in the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits.

(2) Everyone has the right to the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author.

Thus, we have ideas of attribution, reward and some indicators of a community context. This is bolstered by Art. 15(1) (c) of the ICESCR (International Covenant on Economic, Social and Cultural Rights, http://www2.ohchr.org/english/law/cescr.htm#art15).

1. The States Parties to the present Covenant recognize the right of everyone:
   a. To take part in cultural life;
   b. To enjoy the benefits of scientific progress and its applications;
   c. To benefit from the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author.
2. The steps to be taken by the States Parties to the present Covenant to achieve the full realization of this right shall include those necessary for the conservation, the development and the diffusion of science and culture.
3. The States Parties to the present Covenant undertake to respect the freedom indispensable for scientific research and creative activity.
4. The States Parties to the present Covenant recognize the benefits to be derived from the encouragement and development of international contacts and co-operation in the scientific and cultural fields."

Again there are the themes of property protection but in the context of cultural life and development. These principles are particularly strengthened for indigenous people who are the specific topic of the CBD by various International Labour Organisation Conventions and of course the United Nations Declaration on the Rights of Indigenous People. ILO Convention 169 (http://www.ilo.org/ilolex/cgi-lex/convde.

pl?C169) is worth our especial consideration here because of the contents of Part IV which considers training and rural industry.

Article 22

1. Measures shall be taken to promote the voluntary participation of members of the peoples concerned in vocational training programmes of general application.
2. Whenever existing programmes of vocational training of general application do not meet the special needs of the peoples concerned, governments shall, with the participation of these peoples, ensure the provision of special training programmes and facilities.
3. Any special training programmes shall be based on the economic environment, social and cultural conditions and practical needs of the peoples concerned. Any studies made in this connection shall be carried out in co-operation with these peoples, who shall be consulted on the organisation and operation of such programmes. Where feasible, these peoples shall progressively assume responsibility for the organisation and operation of such special training programmes, if they so decide.

Article 23

1. Handicrafts, rural and community-based industries, and subsistence economy and traditional activities of the peoples concerned, such as hunting, fishing, trapping and gathering, shall be recognised as important factors in the maintenance of their cultures and in their economic self-reliance and development. Governments shall, with the participation of these peoples and whenever appropriate, ensure that these activities are strengthened and promoted.
2. Upon the request of the peoples concerned, appropriate technical and financial assistance shall be provided wherever possible, taking into account the traditional technologies and cultural characteristics of these peoples, as well as the importance of sustainable and equitable development."

We should note the principles of collectivity, sustainability, self-reliance and development. Although, technology transfer lacks this specific framework of the CBD it is desirable that international law adhere to similar rights standards.

If the human rights context of the CBD gives it a human and cultural focus it also has an environmental aspect which recognises the ties those communities have to specific locations. Indeed, the rationale behind the protection for human societies and their knowledge is based on their special reliance on and custodianship of particular ecosystems and regions. As stated in the preamble on the key strategies of the CBD is:

Recognizing the close and traditional dependence of many indigenous and local communities embodying traditional lifestyles on biological resources, and the desirability of sharing equitably benefits arising from the use of traditional knowledge, innovations and practices relevant to the conservation of biological diversity and the sustainable use of its components

Furthermore, the member states are obliged to promote these goals *in situ* see article 8 and in particular 8j which requires that the state shall:

(j) Subject to its national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices;

Finally, and this is perhaps where the CBD offer the most potential for resolving the issues around technology transfer as it requires prior informed consent leading to benefit sharing (in the same way that a corporation might agree to its patent being used in a new device in exchange for a share of the profits). The benefit to the developed partner is clear as they gain access to the biological material and the expertise of the indigenous people but traditionally this was at the expense of the indigenous party; the CBD attempts to ensure that that process is rebalanced. There is a parallel here with gaining LDCs as markets which has traditionally led to a one-sided if not downright exploitative trade relationship. The implementation is as the parties recognising an ongoing evolving process however they have developed the Bonn Guidelines to illustrate for the time being at least what constitutes best practice. It is notable from the perspective of this article that as well as defining the parties' roles and the principles underpinning the agreements it makes explicitly clear what the objectives of the Guidelines, and by extension the benefit sharing processes, are in article 11.

The objectives of the Guidelines are the following:

a. To contribute to the conservation and sustainable use of biological diversity;
b. To provide Parties and stakeholders with a transparent framework to facilitate access to genetic resources and ensure fair and equitable sharing of benefits;
c. To provide guidance to Parties in the development of access and benefit-sharing regimes;
d. To inform the practices and approaches of stakeholders (users and providers) in access and benefit-sharing arrangements;
e. To provide capacity-building to guarantee the effective negotiation and implementation of access and benefit-sharing arrangements, especially to developing countries, in particular least developed countries and small island developing States among them;
f. To promote awareness on implementation of relevant provisions of the Convention on Biological Diversity;
g. To promote the adequate and effective transfer of appropriate technology to providing Parties, especially developing countries, in particular least developed countries and small island developing States among them, stakeholders and indigenous and local communities;
h. To promote the provision of necessary financial resources to providing countries that are developing countries, in particular least developed countries and small island developing States among them, or countries with economies in transition with a view to contributing to the achievement of the objectives mentioned above;
i. To strengthen the clearing-house mechanism as a mechanism for cooperation among Parties in access and benefit-sharing;
j. To contribute to the development by Parties of mechanisms and access and benefit-sharing regimes that recognize the protection of traditional knowledge, innovations and practices of indigenous and local communities, in accordance with domestic laws and relevant international instruments;
k. To contribute to poverty alleviation and be supportive to the realization of human food security, health and cultural integrity, especially in developing countries, in particular least developed countries and small island developing States among them;
l. Taxonomic research, as specified in the Global Taxonomy Initiative, should not be prevented, and providers should facilitate acquisition of material for systematic use and users should make available all information associated with the specimens thus obtained" (http://www.cbd.int/decision/cop/?id=7198).

It can be clearly seen that these objectives are a mix of the goals of the CBD specifically (i.e., matters related to environmental diversity) as well as more general issues which advance

the stability of the communities which protect these biological resources. This is fully fitting with an autopoietic approach to the issue in that the communities will be enabled in their own terms to protect a resource which is of interest to them but also important globally. It should be noted that the author does not suppose that every implementation of the benefit sharing schemes has worked well indeed there have been some notable difficulties (Moran, 2000) but rather that the conceptual framework itself is stronger and more coherent.

The other element of the benefit sharing bargain, that is prior informed consent (PIC), is also of interest in light of our discussion. The need for prior informed consent in enshrined in article 15 of the CBD. Gaining consent has not only demonstrates a desire to respect the communal origins and the stewardship role involved in the holding of the traditional knowledge of plants and other genetic resources but the proviso that consent be informed means that the gaining of consent can also act as a dissemination point for knowledge of and about the genetic resource and its wider importance. Three approaches have been identified as underlying successful use of the PIC mechanism.

First, it recognizes the...implications of the communal origin and stewardship of traditional knowledge. Second, it recognizes the possibility, however remote, of harm to community interests. Third, PIC, in some cases, has become an important means of outreach to communities to raise awareness regarding potential global values of their knowledge,...the programme strongly recommends that PIC be obtained at the 'community' level prior to seeking it from individuals" (Rosenthal, 2007, p. 375).

The suggestion in terms of technology transfer is that PIC also be applied to introducing a technology into a society as opposed to taking communal knowledge from indigenous people as in the CBD. Thus, the autopoietic nature of the system can be preserved and strengthened by whole communities selecting for themselves the technologies they introduce. It is a weakness of the PIC approach that it can be difficult to determine who in fact has the capacity to grant consent. It has been noted with regard to the CBD that states may assume legal capacity to give consent when in fact they are not representative of the indigenous population who actually holds the knowledge in question. The solution offered is that the TK holder must in practice also be consulted (and should be as a matter of ethics) (Ni, 2009, pp. 267-278). Such an inclusive approach to consent is similarly required in relation to technology transfer. Adoption of a explicitly autopoietic approach would not ameliorate determining who has the power to consent as a practical difficulty but it would make it less of a conceptual one as the variety of interests could be accommodated without on a theoretical level challenging the sovereignty of the state. This may make the political case for such inclusiveness more persuasive.

As a postscript it is perhaps also worth noting in light of our previous discussion that the CBD also has its own process for capacity building which marries both the interpretations and emphasis the need for equality of bargaining power between the parties. In Decision V/26 they displayed this mixed approach:

14. Notes that further development of capacities regarding all aspects of access and benefit-sharing arrangements is required for all stakeholders, including local governments, academic institutions, and indigenous and local communities, and that key capacity-building needs include:

a) Assessment and inventory of biological resources as well as information management;
b) Contract negotiation skills;
c) Legal drafting skills for development of access and benefit-sharing measures;
d) Means for the protection of traditional knowledge associated with genetic resources" (http://www.cbd.int/decision/cop/?id=7168);

Thus, the CBD takes account of collective and community aspects, recognises that communities are rooted in particular conditions and locations and attempts to promote development (particularly technological development and capacity building in both senses) suited to both those communities and their situations which allows benefit to be shared with between all parties in the agreement.

Applying These Insights to the Digital Divide

The Internet has developed unevenly throughout the world, creating what has become known as the "global digital divide" (Castells, 2001; Kirkman et al., 2002; Mosaic Group, 1998; Norris, 2001; Rogers, 2001) The number of Internet users is one of the most widely used indicators of development of this emerging medium of communication. Less than 10 percent of the world's population uses the Internet, and the gap between developed and developing countries has continued to widen since the early 1990s. Most global views of the digital divide focus on the resources element of the digital divide.

...root cause of unequal global diffusion of digital technologies is lack of economic development, the same as the reasons for the uneven spread of old mass media like radio and television (Norris, 2001, p. 233).

As we have already noted the actual technological element of the digital divide and the technology gap generally is of prime importance. However, if the autopoietic approach outlined above and the good practices of the CBD are to be emulated and make capacity building effective despite the tension around its meaning then we need to consider technology transfer in light of our three markers AND the more prevalent model of institutional capacity building to allow states to be self managing in terms of its conflict management function at the international level by taking part in interactions within the WTO.

- Is the technology suitable for the community needs or in other words have rights to social and cultural integrity and self-determination informed the transfer? It is important to note that this can include but is not limited to the right to self-determination in the "able to make laws about computers" sense of capacity building.
- Is it suitable for the geographical and other conditions that the transferees find themselves in? This can be ensured by the use of PIC principle which means that capacity building of both kinds can strengthen the civil society and other self-generating aspects of the legal system.
- What is the shared benefit/risk for the receiving individual and or community? This is the safeguard which ensures the truly beneficial nature of the transfer. In some sense the question can be viewed as asking does this transfer maximise the potential of the recipient to operate in an autopoietic fashion at as many levels of their system as possible.

To put it simply does the technology enable the kind of self-directed, self-developing communications including legal self-management envisioned by an autopoietic approach? If this approach is adopted then it quite quickly becomes apparent that even in the developed nations there is a need for capacity building. The reason for this is two-fold:

- As many media commentators have noted a number of key companies have a great degree of control of technical standards and others have an interest in promoting certain kinds of commercial content. These media conglomerates view the Internet as an "online shopping mall" rather than as a public sphere a la Habermas (1989) and it is predicted that, unless the development of the Internet changes course and becomes driven by the needs of citizens, its current path will likely exacerbate social inequalities (McChesney, 1999; McChesney, 2000; Jones, 2000; Herman & Chomsky, 2002).

- There is a perception that the current generation of users who have grown up with technology are what are called "digital natives" (Prensky: 2001). However, despite great comfort and ability to use these technologies the vast bulk of these so called natives lack the main feature of real world indigenous people - ability to use and control the digital environment independently. Already technical commentators on the digital community have noted this skills paucity and the risk that it creates a digital divide between an information elite and an information poor even where access to technology is equal (Thompson, 2009).

If this is taken into account then perhaps developed nations would adopt a new approach "capacity building" which would address both their own needs and those of developing nations. The motivation for doing so is clear:

If knowledge gaps widen, the world will be split further, not just by disparities in capital and other resources, but by the disparity in knowledge. Increasingly, capital and other resources will flow to those countries with the stronger knowledge bases, reinforcing inequality. There is also the danger of widening knowledge gaps within countries, especially developing ones, where a fortunate few surf the World Wide Web while others remain illiterate. But threat and opportunity are opposite sides of the same coin. If we can narrow knowledge gaps and address information problems… it may be possible to improve incomes and living standards at a much faster pace than previously imagined (http://www.worldbank.org/wdr/wdr98/).

To conclude then autopoietic theory offers a clear path to resolving the tension in defining what capacity building is because it reveals more of its nature. Technology transfer must include transfer of knowledge and skills as well as technology itself, in other words it must be capacity building in every sense. Whilst they are still knowledge poor users can never become enfranchised net citizens as they are not free to make all the communications they wish to define their communities but are constrained by the software structures of others regardless of how much hardware or on-line access they have. The same is true of other forms of technology transfer, which will not assist development unless they are appropriate for the transferees and transferred in such away as promotes their independence. Unless this fundamental principle is adopted even if the whole world were to become wired or even wireless the technological divide will remain unbridgeable. To summarise, adoption of the autopoietic approach would thus have the following benefits:

- Capacity building would become a global concern not just an issue for LDCs
- Capacity building in BOTH the institutional and technological senses can coherently be worked toward for the common good if the maxim of greatest autopoiesis at as many levels as possible were adopted. Developments in one field would be reciprocated by developments in another. For example, use of PIC to disseminate technology strengthens decision making and governance processes and strengthening institutions facilitates more suitable technological development through communication and co-operation.
- All parties can have their autonomy respected and receive support suitable for their needs.

REFERENCES

Addo, H. (2001). Utilizing Information and Communication Technology for Education and Development: Issues and Challenges for Developing Countries. *IFLA Journal*, *27*(3), 143–151. doi:10.1177/034003520102700306

Browne, S. (Ed.). (2002). *Developing Capacity through Technical Cooperation: Country Experiences*. Sterling, VA: Earthscan.

Castells, M. (2001). *The Internet Galaxy*. Oxford, UK: Oxford University Press.

Chang, S. W. (2007). WTO for Trade and Development Post-Doha. *Journal of International Economic Law*, *10*(3), 553–570. doi:10.1093/jiel/jgm029

Drahos, P. (2000, September 12). *Trade-Offs and Trade Linkages: TRIPs in a Negotiating Context*. Retrieved June 1, 2009, from http://www.quno.org/geneva/pdf/economic/Occassional/Drahos.pdf

Guadamuz, A. (2000). The Future of Technology Transfer in the Global Village. *The Journal of World Intellectual Property*, *3*(4), 589–602.

Habermas, J. (1989). *The Structural Transformation of the Public Sphere*. Cambridge, MA: MIT Press.

Herman, E. S., & Chomsky, N. (2002). *Manufacturing Consent*. New York: Pantheon Books.

Hoekman, B., Michalpoulos, C., & Winters, L. A. (2003). Special and Differential Treatment in the WTO after Cancun. *World Economy*, *27*(4), 481–506. doi:10.1111/j.0378-5920.2004.00610.x

Horovitz, D. (2009). The Remedy of More Trade. *International Trade Law and Regulation*, *15*(2), 35–39.

Jones, S. (2000). The Bias of the Web . In Herman, A. (Ed.), *The World Wide Web and Contemporary Cultural Theory.' Magic, Metaphor and Power* (pp. 171–182). London: Routledge.

Kariyawasam, R. (2007). *International Economic Law and the Digital Divide: A New Silk Road?*Cheltenham, UK: Edward Elgar Publishing Ltd.

Kirkman, G. S., Cornelius, P. K., Sachs, J. D., & Schwab, K. (Eds.). (2002). *Global Information Technology Report 2001-2002*. Oxford: Oxford University Press.

Krause, D. (1999). *Luhmann – Lexikon*. Stuttgart, Germany: Enke.

Kwa, A. (1998). WTO and Developing Countries. *Foreign Policy in Focus, 3*(37). Retrieved June 1, 2009, from http://www.foreignpolicy-infocus.org/briefs/vol3/v3n37wto.html

Ladeur, K. (1985). Perspektiven einer post-modernen Rechtstheorie: Zur Auseinandersetzung mit N. Luhmanns Konzept der ``Einheit des Rechtssystems''. *Rechtstheorie*, *16*, 383–427.

Luhmann, N. (1986). The Autopoiesis of Social Systems. In Geyer, F., & van der Zouwen, J. (Eds.), *Sociocybernetic Paradoxes* (pp. 172–192). Beverly Hills, CA: Sage.

Luhmann, N. (2002). *Theories of Distinction: Redescribing the Descriptions of Modernity*. Stanford, CA: Stanford University Press.

McChesney, R. W. (1999). *Rich Media, Poor Democracy*. Champaign, IL: University of Illinois Press.

Moran, K. (2000). Bioprospecting: lessons from benefit-sharing experiences. *International Journal of Biotechnology, 2*(1/2/3), 132-144.

Mosaic Group. (1998). *The Global Diffusion of the Internet Project. An Initial Inductive Study*. Retrieved June 1, 2009, from http://mosaic.unomaha.edu/GDI1998/GDI1998.html

Muchlinski, P. (1997). *Multinational Enterprises and the Law*. Malden, MA: Blackwell Publishers.

Nelkin, D. (1988). Changing Paradigms in the Sociology of Law. In Teubner, G. (Ed.), *Autopoietic Law: A New Approach to Law and Society* (pp. 191–216). Berlin: Walter de Gruyter.

Neves, M. (2001). From the Autopoiesis to the Allopoiesis of Law. *Journal of Law and Society*, *28*(2), 242–264. doi:10.1111/1467-6478.00188

Ni, K.-J. (2009). Legal aspects of prior informed consent on access to genetic resources: an analysis of global lawmaking and local implementation toward an optimal normative construction. *Vanderbilt Journal of Transnational Law*, *42*, 227–278.

Norris, P. (2001). *Digital Divide. Civic Engagement, Information Poverty, and the Internet Worldwide*. Cambridge, UK: Cambridge University Press.

Prensky, M. (2001). Digital Natives, Digital Immigrants. *On the Horizon, 9*(5). Retrieved June 1, 2009, from http://www.marcprensky.com/writing/Prensky%20%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part1.pdf

Prowse, S. (2002). The Role of International and National Agencies in Trade-Related Capacity Building. *World Economy, 25*(9), 1235-61. Retrieved June 1, 2009, from http://www.unido.org/fileadmin/import/12962_SusanProwseDevelopmentAgenciesAndTRCB.pdf

Rogers, E. M. (2001). The Digital Divide. *Convergence*, *7*(4), 96–111.

Rosenthal, J. (2007). Politics, Culture and Governance in the Development of Prior Informed Consent and Negotiated Agreements with Indigenous Communities. In McManis, C. R. (Ed.), *Biodiversity and the Law: Intellectual Property, Biotechnology and Traditional Knowledge* (pp. 373–393). Sterling, VA: Earthscan.

So Much for the Magic of Technology and Free Market. (2000). The World Wide Web and the Corporate Media System. In Herman, A. (Ed.), *The World Wide Web and Contemporary Cultural Theory: Magic, Metaphor and Power* (pp. 5–37). London: Routledge.

Stevens, C. (May 2002). *The Future of SDT for Developing Countries in the WTO* (Working Paper 163). Falmer, UK: University of Sussex, Institute of Development Studies

Teubner, G. (1993). *Law as an Autopoietic System*. Oxford, UK: Blackwell.

Thompson, B. (2009, April 21). *A Nation of programmers?* Retrieved June 1, 2009, from http://news.bbc.co.uk/1/hi/technology/8010069.stm

Varela, F., Maturana, H., & Uribe, R. (1974). Autopoiesis: The Organization of Living Systems, Its Characterization and a Model. *Bio Systems*, *5*, 187–196. doi:10.1016/0303-2647(74)90031-8

Wang, Z. K., & Winters, A. (2000). *Putting 'Humpty' Together Again: Including Developing Countries in a Consensus for the WTO* (CEPR Policy Paper No. 4). Retrieved June 1, 2009, from http://www.cepr.org/pubs/books/cepr/booklist.asp?cvno=PP4

World Bank. (1999). *World Development Report 1998/99: Knowledge for Development* (p.14). Washington, DC: World Bank. Retrieved June 1, 2009, from http://go.worldbank.org/F80RASFGQ0

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