

Bringing the Globe into Globalization: Models of Capacity Building and Technology Transfer

Martina Gillen [\[1\]](#)

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ABSTRACT

Legal policy 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, and current trade relationships may make adherence to certain international agreements a matter of necessity rather than choice. Policy makers are aware of this problem and have tried to lessen this inequality by instituting mechanisms to transfer technology to least developed nations.

Using the digital divide as a case-study this paper looks at the efficacy of this model and argues that this approach as instituted is fundamentally flawed for a number of reasons.

1. The definition of technology transfer and capacity building promulgated by international law only addresses a limited range of the factors which cause technology gaps and in some cases the response exacerbates them.
2. The reason for this poorly formulated policy is that it is founded upon flawed economic principles and assumptions about the effect of free market economics in developing nations.

The central argument of this paper is that in order to bridge the developmental divide it is not sufficient to simply improve infrastructure and access to technology but one must also empower people to use technology in a way which addresses their own self-identified social, environmental and developmental needs. The author believes that the Open Source movement offers not only practical means of doing this but also a model for rethinking the economic and social assumptions behind our current capacity building model.

The reasons for adopting this perspective are manifold. The movement is already designed to draw us away from corporate to community based modes of thought; it is essentially a grassroots protest movement against the ethos of standard copyright allowing creators to set their own licensing criteria on their works to ensure that they remain within the creative commons. By safeguarding this openness the movement facilitates both

technology and knowledge transfer (unlike proprietary systems which usually facilitate only one of these). This is because open source systems recognize the concept of communal use as well as tailored ideas of attribution and moral rights suitable for the various contexts of use. Thus, the growth and development of the open source systems takes account of systems with lower technical capacities without precluding or discouraging the possibility of systemic advancement.

Finally, unlike other development related knowledge protections, open source is of global application and is not in that sense targeted or imposed upon least developed parties and therefore allows self-directed development by permitting them to choose if they wish to adopt it and to set the level of protection they find most beneficial. Thus, this paper hopes to take an established alternative to IP law and reveal new perspectives on how to facilitate effective technology transfer.

1. The Problem of Development: The Digital Divide Case-study

The reasons for developmental disparity are complex and varied, and yet, policy responses often ignore this complexity in favour of adopting monolithic solutions. Since the digital divide has been the major focus of most recent technology transfer policy, this paper will use it as a case-study to illustrate the practical limitations of these approaches before exploring the international law in this field in the next section. We must begin by considering the nature of the digital divide and its causes. Many commentators (and consequently many policy makers) view the digital divide purely in terms of lack of technical resources. This leads to what Mark Warschauer has called the 'devices and conduits' approach. That is, the belief that the provision of technology alone can solve the digital divide (Warschauer M, 2003, p.31). However, the problem is infinitely more complex, and indeed more person centred than this. The problems leading to real access at an individual level include but also go far beyond lack of technology alone. As Hacker and Van Dijk (2003, p.315) have noted users will also experience other access barriers. The individual must overcome the 'mental access' barrier; or to put it another way, the psychological chill factor associated with having to learn and engage with a new and unfamiliar technology. Once they overcome this barrier and become a technology user they may still experience the related barrier of 'skills access', when software fails to be sufficiently user-friendly, or there is no support mechanism available to help and encourage users learning the new skills. Finally, users may experience lack of usage opportunities such as having to go to a distant cybercafe as opposed to using the technology at home.

It is worth noting that the digital divide can even be present in societies where infrastructure is excellent and technology is comparatively cheap (by which I mean, represents a smaller investment out of the average workers wage). In their work on the digital divide in the United States Mossberger et al. (2003, p.9) highlighted elements of the digital divide which emphasise that it is not limited to the technologically poor nations. The digital divide also includes inequalities in computer and information literacy and inability to maximise the impacts of the technology in the user's life for example to improve economic status or to exercise political influence and enhance civic participation. Crampton's findings support this; in his detailed study of Atlanta he notes (Crampton JW, 2003, p.162)

that even within one city there is a great divergence in access between its urban, sub-urban and rural regions. Indeed if one contextualises the digital divide on a global scale it immediately becomes apparent that factors other than GDP to spend on technology are in play. Chadwick (2006) summarises these variables as:

'Economic development variables other than GDP, such as economic inequality, energy consumption, proportion of the workforce in the service sector, and connectedness with global markets.

Specific technology infrastructure variables, such as the penetration of telephones, computers, televisions and radios.

Relevant policy variable, such as the level of competition in a country's telecommunication market, whether or not its telecommunication infrastructure is a public or private monopoly, or national commitment to an ideology of science - and technology driven development.

Human capital variables, such as education, ethnic homogeneity, English language proficiency, population density, basic literacy, and electronic literacies, meaning the skills required to effectively and meaningfully interact, use and produce content using the Internet.

Political variables, such as differing levels of democratic development or a country's connections with international organisations.'p.64.

Thus, the digital divide is a complex social, political, economic and technological phenomenon.

Despite this complexity the legal response has been very much of the 'conduits and devices' type focusing on encouraging technology transfer under license and through foreign direct investment from major international corporations (FDI). However, this approach has a number of dangers and certainly may not have the beneficial effects that the framers hope. The first deleterious factor to note is the nature of the agreements used in technology transfers as part of a given corporation's investment. As Muchlinski (1999, p.433) notes the terms of these agreements tend to either restrict the recipient's commercial policy in respect of conducting business using the technology and/or preserve the exclusive ownership and use of the technology for the transferor. Furthermore, Rockett (1990, p.559-560) has also pointed out that often the technology transferred by foreign licensors is of a lower quality than the versions given under full commercial licenses in their home countries. This poorer quality reduces the utility that the licensee gains from the software and thus their incentive to imitate the technology by developing their own software for the purpose by reverse engineer thus both the technology and the real knowledge transferred is limited.

The second contentious issue is that of the measurement of spillover (the degree of internalisation of technology in a host country). The traditional measure used is increased productivity but as INTECH director, Mytelka (2002, p.12) has commented:

'...increased productivity may merely reflect a situation in which smaller local firms are driven out of the market by larger foreign firms in industries where scale economies are important. Unless we know more about the ability of smaller local firms to acquire financing needed for expansion, we cannot attribute the change in productivity to a technology spillover but merely to the replacement of existing capacity by more capital-intensive foreign firms. Productivity increases, moreover, are not necessarily accompanied by growing competitiveness as measured by market shares in the domestic or export markets. Measuring technology spillover is thus a problem.'

Indeed in paragraph 53 of the above speech she doubts the relation between FDI and spillover pointing out the rather mixed nature of the results of studies in the area. These flawed methodologies lead to similarly mixed results in bridging the digital divide which is one of the issues that is supposed to be remedied by this spillover effect.

Finally, and most importantly these policy responses do little or nothing to focus attention on knowledge and access disparities within hyper-developed economies because they fail to deal with the non-technological elements of the digital divide we highlighted earlier. As we shall see this is due to the assumption that market forces will resolve such issues in high GDP nations and that the role of development policy is to 'normalise' the action of market forces in LDCs. Reliance on properly balanced market forces as a panacea for all ills is an assumption which underpins much of the policy in this area and has been one of its greatest weaknesses (we shall return to this theme in greater depth in section 4). Having laid out the broad nature of the problem of the digital divide let us consider the legal responses in more detail before critiquing them further in later sections.

2. Introduction to the International Legal Framework

The Trade Related Aspects of Intellectual Property Agreement is the central World Trade Organisation concord on the trade and transfer of intellectual property goods and from which subsequent agreements emerge. Although there are a number of articles in this 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) these do not create specific obligations, rather they set the tone for interpreting the obligatory aspects of the TRIPS agreement and its subsequent ancillary agreements. Thus, the primary source of ideas specifically on the relationship between development and technology transfer is the Doha Declaration of the WTO, one of the ancillary agreements arising from TRIPS. The Doha Agreement shall be the focus of this section.

As the text currently stands the key portions of the Doha declaration in relation to technology transfer are articles 37 and 38-41. Article 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 (WTO, 2001):

'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 mainstreaming 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.'

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. The fundamental premise is that trade, and participation in international organisations (including the social, political and legal conformity that that requires), are somehow intrinsically linked to development and that all three will feed into and enhance each other. Furthermore, there is also a specific requirement in Article 66.2 which requires developed countries to put incentives in place to encourage corporations and institutions to take part in technology transfer to LDCs. However, empirical study (Moon S, 2009) of the self assessments of WTO members suggests that this process has a number of failings including lack of clarity as to what constitutes technology transfer, and, what a developed nation is, as well as a failure on the part of many developed nations to actually engage fully with the process of transfer to LDCs.

2.1 What this Approach Means in Practice

The principles of the TRIPs agreement and the terms of the Doha declaration are clearly intended to put a legal framework in place which facilitates technology transfer, encourages Foreign Direct Investment (FDI) and also other forms of capacity building which focus on legal infrastructures (as we shall see below this conflation of various form of capacity building is in itself problematic but for now we shall focus on the impacts of its purely practical forms). However this legal framework does nothing to alter the market conditions under which these transfers will take place. For example the least developed countries which have historically received an insignificant amount of FDI [2] were still identified as having difficulties attracting such investment in the latest United Nations Conference on Trade and Development report on World Development. In fact the report (UNCTAD, 2010a) went so far as to suggest that one of the key challenges for these states is still the removal of practical barriers to FDI. So after many years of operation as part of the global development regime FDI is still failing the weakest nations.

In relation to of technology transfer the TRIPS/Doha agenda has proved similarly weak UNCTAD LDC Report (2007, p.2) says that:

'The overall argument of this Report is that unless the LDCs adopt policies to stimulate technological catch-up with the rest of the world, they will continue to fall behind other countries technologically and face deepening marginalization in

the global economy. Moreover, the focus of those policies should be on proactive technological learning by domestic enterprises rather than on conventionally understood technological transfer [...] Since the 1990s most LDCs have undertaken rapid and deep trade and investment liberalization. Liberalization without technological learning will result, in the end, in increased marginalization.'

The UNCTAD material is also supported by independent research which looks at case-studies from around the world. For example, in the 1990s, Mexico's IT industry was viewed as a positive role model for globalization. Mexico threw open its borders to trade and foreign investment, embracing the North American Free Trade Agreement, and ending the government's protectionist role in strengthening domestic industry. However, although Mexico was initially successful in attracting multinational corporations, foreign investments waned in the absence of active government support and because of the external factor of China becoming increasingly competitive. Moreover, foreign investment created an 'enclave economy', the benefits of which were confined to an international sector not connected to the wider Mexican economy. In fact, foreign investment put many local IT firms out of business and transferred only limited amounts of environmentally sound technology. (Gallagher & Zarsky, 2007). [It is interesting to note that some commentators (Barry, 2002; Barry & Bergin, 2010) suggest that Ireland's recently de-clawed Celtic Tiger was a similar enclave boom caused by policies specifically tailored to attract and facilitate FDI]. Meyer's multinational study of FDI and technology transfer (Meyer & Sinani, 2009) also suggests that in fact the deciding factors in effective technology spillover are the host country's level of development in terms of income, institutional framework and human capital.

In the most recent UNCTAD report on least developed countries has argued that an entirely new development architecture is required to meet the needs of LDCs. It (UNCTAD, 2010b) identifies technology as one of the pillars of this new framework and highlights the failure of the TRIPS regime:

'New forms of international public goods are required to counter the continued marginalization of LDCs in the acquisition and use of technologies, and also to achieve a gradual realignment of incentives provided under the global IPR regime...

- (i) Regional technology sharing consortia;
- (ii) A technology licence bank;
- (iii) A multi-donor trust fund for financing enterprise innovation in LDCs; and
- (iv) Diaspora networks to pool LDC talents from abroad.

These knowledge-based global public goods would help overcome some major limitations of the innovation environment in LDCs.' (p. xix-xx)

The meaning here is clear UNCTAD are highlighting the relationship between intellectual property rights and technology transfer. Intellectual property rights are exclusionary in the

sense that they allow a creator to control access to an intellectual property good unless a license fee (determined by the creator) is paid. If left to the usual market forces then many LDCs would have only very limited if any access to these due to cost. Hence, the need for technology transfer to aid development. Therefore many corporations participant in FDI make their investment at least partially in the form of transfer of technologies subject to intellectual property control. As we have seen however, there are difficulties and inadequacies with this approach. Thus, UNCTAD's recommendations that focus on alternative ways of creating pools of intellectual property knowledge and permissions to use which come from other sources. UNCTAD is suggesting models that localise intellectual property rights and draw on the existing resources of LDCs.

Despite the positive tone of these suggestions the proposals do not offer much in the way of enforcement in terms of making Article 66.2 work but rather focus on setting up administrative infrastructures to allow LDCs to share technologies internally and gather donors on an aid for trade model. (Aid for trade is development assistance that is targeted at helping developing countries to take advantage of trade opportunities and to strengthen their ability to assess and represent their interests in trade negotiations.)

'Two important elements in the design of the initiative should be: (i) the creation of a national innovation coordinator to manage the initiative at the country level, and (ii) the creation of a multi-donor trust fund, which would provide funds to the agencies involved. Some mechanism is needed to ensure the accountability of the national innovation coordinator, which may or may not be attached to a national science, technology and innovation agency or council, and does not necessarily have to be governmental. The involvement of non-State actors might increase credibility. [...] The establishment of technology funds by earmarking part of resource rents, or a mixed approach that uses resource rents matched by outside aid, could be effective approaches for LDCs.'(UNCTAD, 2010b, p.259)

However, despite the call for new innovation this is a recycling of old ideas albeit applying them at a state level. As we shall see from the discussions in the next section, although this recognition of the special difficulties of developing nations and the flaws in our model of capacity building and technology transfer is to be applauded, it remains the case that there are many factors which mean that marginalised parties are still disenfranchised. Thus, there are still many steps to be taken before we can feel we have bridged the digital divide.

3. Difficulties with this Approach

3.1 Historical and Practical Inequalities

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. We will discuss the economic philosophies that have led to this situation in more detail in the next section. Here however, we will concentrate on the practical and political issues raised by the TRIPS model. The reasons for practical problems in implementing technology transfer as outlined in TRIPS

are manifold and complex, for example (Kwa A, 1998), 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.

The difficulties in terms of equality of arms faced by developing nations are clear. Although they make up three quarters 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. Developing countries have fewer human and technical resources so many cannot make full use of the 40 to 50 meetings held in Geneva each week. Hence, they often enter negotiations less prepared than their developed country counterparts (Kwa A, 1998). In addition to this most developing country's 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 the dissenting developing nation if the developed nations they depend upon were to seek retribution in the economic sphere. As Mearschimer (2001) comments:

'...[t]he most powerful states in the system create and shape institutions so that they can maintain their share of world power, or even increase it. In this view, institutions are essentially arenas for acting out power relationships...' p.13

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 (1999, p.438) 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. This is one of the fundamental inequalities of the system, the developed nations were often free from such legal encumbrances at the time they themselves were developing but in order to protect their interests now will not permit their developing counterparts to enjoy those same freedoms

Even if political equality of arms were to be achieved, the structure of trade negotiations leaves developing nations at a disadvantage (This is effect is well documented, see e.g. (Kapoor I, 2004 and Smith J, 2004)). Such 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 (For a fascinating overview of this process and its impacts see (Fatoumata J & Kwa A, 2004)). 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. Countries that cannot gain technology through trade thus face a real danger of becoming a technological underclass.

Finally, developing nations also find it difficult to rely on the enforcement/protection mechanisms that the international legal framework puts in place. 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 (Brown C.P., and Hoekman B.M., 2005). 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 A, 1998), which is part of the interpretative issue we shall explore below. An excellent example of this would be the recent attempts by South Africa to reform its healthcare system and introduce something like the UK model of national health insurance. Proper management of such a scheme would include not only bulk buying and price control of drugs but development of a domestic pharmaceutical manufacturing system. South Africa, however, is a TRIPS member and despite the Doha ameliorations already has a number of consultations and decisions against it in relation to its restrictive anti-dumping laws (For more detail see (Ndlovu L, 2010)).

Conversely, a good example of how legal expertise and economic power can be used to advantage in dispute settlement proceedings is the recent example of the Chinese censorship laws. Whilst the WTO has ruled that China's import monopolies on books, films and other entertainment materials violated market access rules, it also upheld its right to censor specific materials (WTO decisions DS362 and DS363). China has therefore required that censorship software called 'Green Dam' be fitted to computers in that country, ostensibly this is to prohibit pornography but is actually been used to ensure that Chinese citizens do not have ready access to online gambling or other resources the Chinese see as politically inappropriate.

Thus, developing nations find themselves trapped. Not only are the IP regimes that the TRIPS agreement mandates inherently inimical to their interests given their current stage of development but they find themselves forced to comply to keep what trade relations and influence they do have. Even if the proposals in the recent UNCTAD reports were to be adopted, this underlying market condition would not be changed.

3.2 Confusion of meanings of capacity

The next major difficulty is the increased withdrawal from the more socially and economically radical interpretations of the Doha declaration towards those which fit more comfortably within the aid for trade model. 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 focussed on trade liberalisation and less on development and capacity building (Chang S.W., 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' (Horovitz D., 2009) and those nations who equally tendentiously define it as 'economic, manufacturing and social development first'. Given the current economic situation it is perhaps not too sceptical to suggest that 'development as markets' is the primary theme for those developed nations needing new markets to buoy their economies.

It is an undecided question of interpretation, or - perhaps more correctly - emphasis, whether or not capacity building in article 38 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 of emphasis might make the difference between educating computer programmers and assisting a state to legislate on intellectual property issues about computer programmes. 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 P, 2000). Thus we can see in the recent report from the WTO Working group on technology transfer (WTO, 2009) the observation that:

'9. 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. [...]

11. 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. (WT/WGTTT/11 09-5644).'

Nevertheless, despite these positive observations in relation to the case-studies under consideration by the Working Group which clearly mix both different interpretations of capacity building, there remains a difficulty in determining what exactly capacity building is within the technology transfer agenda generally. The technology transfer agenda now seems to be dominated by the rhetoric and practice of technological assistance (in the legislation about computer software sense described above). This has the result 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 to promote development (see WTO, 2007 WT/COMTD/W/160 - 07-4787). 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 (EIF, 2008) identifies issues with telecommunications infrastructure in the South (4.87) and improved training in the leather industry (2.38), 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 which once more clouds 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 SW, 2007, p.569)

3.3 Aid For Trade Models Not Working

The aid model of development promotion has already been criticised in a number of texts (e.g. Easterly W, 2006; Collier P. 2008; Moyo D, 2009); one element of critique that these diverse texts all have in common is that both current aid and trade relations retrench existing problems; creating greater dependence and not aiding development toward economic and social stability. However, all also put emphasis on ideas of home grown development within a framework of national good governance. International efforts using aid and trade as leverage may be the only way of raising governmental standards and more responsible aid distribution is obviously required. However, an engaged citizenry contributing to mutual empowerment within the politics of open source might be the necessary seed for self-sustaining the micro-developments that all consider necessary. The economies that have managed to grow most successfully have diversified their income sources by using models which work well for them. A good example would be Botswana, which managed to creatively use its diamond income to build its manufacturing sector; a key factor in this growth maybe the traditional culture of accountability and community consultation encouraged by the Tswana cattle culture (Easterly W, 2006, p.315). Botswana is now recognised by the World Bank as one of the globe's developmental successes (World Bank Group, 2010,).

4. The Economics Behind This Approach

When the 'aid for trade' model underpinning current models of technology transfer is failing in terms of aiding development it is difficult to understand why it retains such a hold on the imagination of legislators. The answer can be found in the approaches to economic growth dominant on the world stage in the final stages of the 20th Century. The major figure to be considered is Milton Friedman, economic adviser to President Reagan and father of the Chicago School of Economics. His influence is so pervasive that Fukuyama (1989 & 1992) has described the position that political leaders should be elected and economics should be run according to Friedman's rules as the apex or end point in the human ideological evolutionary process. [3]

Indeed this in many ways sums up the essence of the Friedmanite approach; profoundly anti-Keynesian, Friedman espoused the idea that the state should essentially adopt a laissez-faire approach to the market (in other words that there should be no softening of the effects of the market for the disadvantaged) and that economic freedom was

intrinsically linked to political freedom. In his seminal work 'Capitalism and Freedom' he emphasised the idea that in states where the government controlled the means of production no free debate or political dissent could occur. Conversely where individuals have to act as free agents in the market their ability to function as citizens improves (in other words that their capacity for agency in other spheres improves). Where this coincides with the Western Neo-liberal governmental mode he espouses in the text this allows the market and democracy to strengthen each other. As Friedman himself put it:

'Viewed as a means to the end of political freedom, economic arrangements are important because of their effect on the concentration or dispersion of power. The kind of economic organization that provides economic freedom directly, namely, competitive capitalism, also promotes political freedom because it separates economic power from political power and in this way enables the one to offset the other.'(Friedman M & Friedman R, 1982, p.9)

Furthermore, in its historical context this did seem like the economic doctrine that embodied the monetary zeitgeist of the era with the Berlin wall coming down and the dissolution of the USSR. So the doctrine not only seems to combine the desirable goals of economic growth and democratisation but they also appear at this point to work.

However, Klein (2007) points out that all of the major successes of Friedman's doctrine and that of his overall school of economic and philosophical thought are preceded by violent events either against individuals or against the body politic which offer the implementers of the new economic regimes a tabula rasa on which to begin their work. The strength of the 'shock' required depends on the degree of fit between the existing economic situation and the proposed model. So, for example, Thatcherite Britain required only the comparatively mild shock of the Falklands War to bring it into line whereas socialist Chile required the horrors of the Pinochet regime (Klein, 2007 p.17-21).

Klein's argument is not without its own critics who generally stress the lack of economic proof and theory in the work [4]. However, the conclusion that this approach has tended to favour the interests of multi-national corporations able to capitalize on the vulnerable periods of destabilisation to establish themselves in the new market seems well founded, as is the observation that this growth in multi-nationals has increased disparities in socio-economic status within the states where this has occurred. This disparity increases social tensions and the enrichment of a few can come at the expense of the general wealth of the state. Klein's assertion that shock economics will ultimately be self defeating does seem to be correct.

'Once the mechanics of the shock doctrine are deeply and collectively understood, whole communities become harder to take by surprise, more difficult to confuse. The intensely violent brand of disaster capitalism that has dominated since September 11 emerged in part because lesser shocks - debt crises, currency crashes, the threat of being left behind 'in history' - were already losing much of their potency, largely because of overuse. Yet today, even the cataclysmic shocks of wars and natural disasters do not always provoke the level of disorientation required to impose unwanted economic shock therapy. There are just too many people in the world who have had direct experience with the shock doctrine...' (Klein N, 2007, p.459)

Even within the more mainstream approaches to economics which would not take on board Klein's metaphor-driven approach there are concerns about the impact of global economic policy on development. Stiglitz, a former economic adviser to the IMF, for example, shares Klein's belief that economic policy is excessively ideologically influenced (Stiglitz J, 2002). Stiglitz repeatedly claims that the IMF's policies stem not from economic analysis and observation but from ideology - specifically, an ideological commitment to free markets and a concomitant antipathy to government control (in other words a promotion of a Friedmanite model of democracy). In part his complaint is that they did not understand, or at least did not take into account, his and other economists' theoretical work showing that unfettered markets do not necessarily deliver positive results when information, market structures, or institutional infrastructure are incomplete. This lack of understanding leads to what might be called premature liberalization, that is to say the introduction of free market ideologies at a point when that is not a suitable for the individual country. Second, and more troublingly, the IMF, in Stiglitz's view, systematically acts in the interest of creditors and of rich elites more generally, in preference to that of workers, peasants, and other poor people. In terms of our area of interest, for example, he highlights that market liberalization often wipes out domestic industry and that the liberalisation of capital markets also squeezes out all but the strongest domestic companies further weakening the development potential of domestic industry. Speaking of the Doha trade negotiations and how to make them effective he comments:

'There need to be changes in institutions and mindsets. The free market ideology should be replaced with analysis based on economic science, with a more balanced view of the role of government drawn from an understanding of both market and government failures.'(Stiglitz J, 2002, p.250)

Thus it seems that recent economic commentary by both insiders and outsiders in the international trade system highlights the inappropriate ideological basis of many policies, the same ideological flaw present in the capacity building and technology transfer agenda and the need for the reform of institutions.

Thus, we have seen that the underpinning of 'shock economics' has led to an approach to capacity building which focuses on infrastructure and largely ignores the human element of the development equation. The focus on a particular model of democratisation common to 'shock economics' has meant that this infrastructure based approach fails to address the inequalities of the international political arena. Furthermore, focus on frameworks and institutions overlooks the complexity of the issue of technology transfer and capacity building and the fact that human knowledge and the creation of opportunities for self development are key to the resolution of the technology gap. In the next section we shall consider how FLOSS offers a potential to bridge these gaps.

5. FLOSS as an Alternative Model

In this section we shall consider FLOSS as an alternative to the 'devices' based approach to capacity building because it is focused on humans working and sharing together. We have reviewed the practicalities of the 'devices' approach and its economic underpinnings and found that it is flawed because on its own it can create only limited technological development and also because it is predicated on an approach to economics founded on

ideology rather than empirical evidence. FLOSS is also an ideology but an ideology whose central tenets are collective group responses to practical problems. There are also independent theoretical reasons for adopting FLOSS as a model for development.

In previous work I have critiqued the infrastructure based approach at a conceptual level through the application of autopoietic theory (Gillen M, 2010). Whilst it is inappropriate to fully rehearse those arguments here it is worth briefly reiterating the core finding of that paper that the appropriateness of any model of capacity building can only be measured by its degree of fit with the self-determined needs of the community in question. Autopoiesis is 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 as with the present issue of global approaches to technology transfer (Nelkin D, 1998). It would seem that the katasopic 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:

Firstly, 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 that Kariyawasam (2007) and other commentators see as vital to effective capacity building. Secondly, 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. Finally, the application of autopoietic theory to this area challenges the idea that legal systems in LDCs must always be viewed as allopoietic which is in harmony with the idea of rebalancing the role of external regulators and domestic governments in the field. 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. Thus capacity building is best analysed in terms of how well skills, resources and knowledge become embedded in a given community. This fits with the economic arguments and recent WTO papers which highlight that new structures need to be developed which take greater account of the needs of individuals at a local level. This paper endeavours to view the idea of capacity building in a practical light with consideration of how open source technologies and ideologies can be used to advance this important aspect of development.

The economic thinking of Amartya Sen has particularly influenced this pragmatic turn of thinking. In that his seminal work *Development As Freedom* (Sen A, 1999) highlights that development rests not just on developing infrastructures and institutions but also in allowing individuals to build their own capacities. In fact his model of poverty is capacity deprivation. This dovetails well with the autopoietic approach since capacity deprivation distorts self-actualisation. The attraction of Sen's work, however, is that it is an independent work based on a wealth of practical examples which advocates the adoption of the same methods indicated by a theoretical autopoietic approach but by using purely

practical arguments. Thus it broadens the platform of those arguing for the adoption of such policies.

Sen's work has given rise to an entire approach to development known as the capacity approach. The central tenet of this approach is the notion of substantial freedom, this means expanding the freedoms we value to lead richer and more unfettered lives. Sen's idea of freedom is twofold the first aspect is that substantial freedoms are things which can be divided up and delivered to human beings but must be distinguished from other things that we may have reason to value like money or happiness (Sen A, 1999, p.14-15). The problem therefore has often been the delineation of these substantial freedoms and thus the capacities/capabilities they foster. Sen and others have put forward competing theories. Sen has largely focused on distinguishing substantial freedom from income level, negative freedoms and happiness. His emphasis is rather on rights to active political participation, at the micro and macro levels, in determining the shape of one's social and economic environment. This participation can be achieved through guaranteeing five instrumental freedoms.

Firstly, political freedoms: - 'They include [...] opportunities of political dialogue, dissent and critique as well as voting rights and participatory selection of legislators and executives.' (Sen A, 1999, p.38)

Secondly, economic facilities: - 'the opportunities that individuals [...] enjoy to utilize economic resources for the purpose of consumption, or production, or exchange.' (Sen A, 1999 p.38). The quantity of income as well as how it is distributed is important. Availability and access to finance are also crucial. (Not being able to get credit can be economically devastating.)

Thirdly, social opportunities: - arrangements society makes for education, health care, etc. (Sen A, 1999, p.38-9)

Fourthly, transparency guarantees: - These guarantees play a clear role in preventing corruption, financial irresponsibility, and violation of society's rules of conduct for government and business. (Sen A, 1999, p.39-40)

Finally, protective security:-a social safety net that prevents sections of the population from being reduced to abject misery. (Sen A, 1999 p.40)

This is precisely the opposite of a 'shock economics' led approach as it focuses on maximising the well being of individuals through the enhancement of the opportunities available to them (in Sen's terminology capabilities; in the language of this paper the building of a human-focused model of capacity building) and not merely on structures and technologies as a means of enhancing well being. Sen's key argument is that the five instrumental freedoms link together to gradually aid societal development. Nussbaum (1999, pp.41-2) expands this human focus of the capabilities approach still further by linking it to the classic Aristotelian question of what activities are necessary to have a good life. This then leads to a delineation of the substantial freedoms as things which humans are able to do. Thus, the focus of this field is firmly on the opportunities afforded to humans

by development projects and how groups of humans can engage in development in a democratic and sustainable way.

It is worth noting that both the capacity based and the autopoietic perspectives emphasise not just the actual improvement of conditions for others but their ability to make choices about them as an essential element of the process. As Sen puts it:

'It is a characteristic of freedom that it has diverse aspects that relate to a variety of activities and institutions. It cannot yield a view of development that translates readily to some simple 'formula' of accumulation of capital, or opening up of markets, or having efficient economic planning (though each of these features fits into the broader picture). The organizing principle that places all the different bits and pieces into an integrated whole is the overarching concern with the process of enhancing individual freedoms and the social commitment to help bring that about.' (Sen A, 1999, p.297-8)

This holistic and pragmatic approach naturally points to mechanisms for individual education and growth and it is at this point that the author feels that open source ideals and products can be beneficial, particularly given that FLOSS products dovetail well with the low-cost maximum benefit ethos of micro-finance/micro-credit movements (e.g. UN, 1998). This paper is therefore going to look at FLOSS in relation to two major challenges: i.e. development in general for the poorest nations and, development for indigenous people who are often marginalised groups within such states.

5.1 FLOSS and National Development

There is a natural symmetry between the FLOSS movement and the problems faced in technology transfer. The prime reason for this is that FLOSS was initially designed to overcome the barrier that intellectual property posed to sharing technology and shared product creation on the World Wide Web. Thus, from its inception FLOSS has been about participation in, and free dissemination of, technology. Alkhatib et al (2008) identify FLOSS as a potential solution for key problems faced in technology transfer to developing nations. The problems/solutions they outline can be summarised and extended follows.

Firstly, there is the problem of asymmetric knowledge formation. In standard technology transfer the knowledge receiver does not know the importance of the transferred knowledge they are buying from the original holder and therefore find it difficult to gauge an appropriate value. The problem is minimised with FLOSS; the open development model means documentation is usually readily available (if only so that contributors can be identified). The current author would also add that the culture of FLOSS also encourages help and information sharing on on-line fora. Secondly, as well as an imbalance of knowledge there is an imbalance of market power; that is costs are inflated for the technology receptor by the need to provide the technology holder with a reasonable level of profit in order to make their transfer offers competitive. This problem too is largely removed by the FLOSS model.

The issues of imbalance are exacerbated by lack of free movement of persons. This refers particularly to internal and inward movement which could permit the diffusion of knowledge as well as the better known phenomenon of the 'brain drain'. It should be noted here that this

is not necessarily about having some legal right to movement along the EU model but can also mean logistical difficulty with movement caused by expense of geographical isolation. Critical mass needs to be developed through networking to facilitate the creation of material for local and regional needs and also to allow the developers and activists themselves to institute programs rather than rely on external intervention or governmental support.

Finally, there is the pervasive problem that FLOSS was specifically designed to address - intellectual property. Intellectual property rights may prevent the use of certain technologies by either straight-forward prohibition or through rendering use of the goods economically non-viable. This problem is obviously by-passed by the FLOSS movement where purchase costs are either nil or comparatively low and the essence of the licensing system is openness and accessibility.

Finally, the current author would observe that there is also a flexibility inherent in the FLOSS model to step outside that model and use proprietary materials where appropriate. For example, many Linux repositories have non-free sections allowing the user to choose material that is encumbered by standard copyright if they wish to take advantage of its particular properties. This flexibility and the intelligent use of product and service diversification can avoid any negative effects of the not for profit ethos of the FLOSS world that might hinder development. It has been thought that because use of FLOSS materials automatically brings with it FLOSS licensing requirements this would act as a barrier to ever commercialising - this however is based on a misunderstanding of the flexibility of FLOSS [5]. Thus, concerns about the viral nature of FLOSS licensing and the potential this has for trapping developing nations in a perpetual state of non-competitiveness can be addressed. It should also be remembered however that the proposal here is that FLOSS can offer a resolution to capacity building problems now and as a practical exploration of a new approach to capacity building. Thus, it is only natural and perfectly in accord with the intellectual framework of this paper to accept that just as the needs of individuals and communities will change so will the potential practical solutions. That being said FLOSS does seem to offer more than an immediate solution as transformation to self-sustaining competitive businesses within the FLOSS model is more than possible, this is evidenced by some of the practical examples we shall explore in this paper.

Given the pragmatic stance of this paper it is essential to consider whether the benefits so clear in theory are equally transparent in practice. In order to consider this the author has chosen to look at the work of the Shuttleworth foundation as an illustration of the practicality of the application of FLOSS technologies and ideologies to local growth and development. The Foundation has adopted Open Source philosophy to underpin its activities into what they call Open Philanthropy. They summarise their ideology in the following way:

'Taking open source thinking beyond the world of software starts at home. As a Foundation, we believe that everything we do and fund should be open. This means insisting on open licensing, actively sharing the things that we and our partners create and working collaboratively with others who share our goals. It also means learning and improving, constantly.

Of course, this isn't just about how we do things. It's also about what we do. Everything we work on - from education to intellectual property to telecommunications - is meant to demonstrate the power of openness, participation and creativity. We believe this work can help us build an open knowledge society, both in South Africa and around the World.' (Shuttleworth Foundation 03/05/11)

This statement is followed through in the projects the Foundation undertakes; two of particular interest are TuXlab and Freedom Toaster. TuXlab is a scheme whereby Open Source computer labs were rolled out across the Western Cape in schools which could not otherwise afford to have them. The scheme was so successful that it has now become a self-sustaining company bringing ICT and computer skills across the Cape region. The openness element of the project is supported by the fact that the project plans, how-to documents and all subsequent viability reports are freely accessible so that the project could be duplicated elsewhere. Thus, this project has combined individual capacity building, infrastructure development, the transition to a self supporting business and commitment to the broader societal goals of information sharing to enable replication of the project in other areas.

At a much less technologically sophisticated level but with massive practical effect was the Freedom Toaster. The toaster was a mobile disc burning kiosk that acted like a software vending machine allowing multiple CDs or DVDs of software customised to the needs of the communities they were serving. The kiosk element was vital as many of these areas had at best limited or highly expensive Internet connection. Not only was up to date software made available in areas it would not otherwise have reached but the selection of Open Source software on CD meant that many lower specification computers could be revitalised bringing the business and educational potential of ICT to many communities and individuals that would otherwise not receive it. Furthermore Freedom Toaster has now become a self-sustaining business, Breadbin Interactive. To manage the business model aspect, companies can now purchase their own kiosks for proprietary product distribution, which finances the Freedom Toaster branded kiosks which still offer 100% fiscally free content. Once again individuals and communities have benefitted a successful business has emerged and by making all the project documentation for the kiosks readily available other communities are enabled to set up such projects. It can thus be seen that successful and sustainable projects meeting local development needs can be managed under FLOSS principle. What of the more complex and less obvious use of FLOSS principles in aiding the development of indigenous peoples?

5.2 FLOSS and Indigenous Development

This section cannot offer an exhaustive analysis of this difficult issue the intention is rather to explore whether or not FLOSS can move beyond being a good general level solution to the issues of technology transfer but can also assist those who are currently the most disadvantaged within the current IP/technology transfer system. Many indigenous peoples are actually quite resource rich in terms of their traditional knowledge and the most sustainable model for their development and technological advancement would allow them to build on these existing resources in a way which harmonised with their culture.

Bowrey highlights that one of the key problems for indigenous peoples seeking to develop their resources is the problem of inter-meshing their cultural practices with juridical ideas about intellectual property. The problem being (Bowrey K., 2006, p.65-95) that it is very difficult to make customary practices mesh with formal legal concepts in a way which leaves the customary knowledge managers and practitioners with legally enforceable rights and without damaging their cultural integrity through the undermining of custom. She argues that as an ideology the FLOSS movement is capable of incorporating ideas of custom and creating legally enforceable rights because the movement itself as a recognised intellectual property regime was born out of the collective custom of its users.

'There is emancipatory potential to FLOSS, when it is considered as a political movement and as a contemporary expression of custom, (returning to the notion of custom as community-based lived experience and legal wisdom).'

(Bowrey K, 2006, p.92)

Whilst Bowrey is also quite cautious of the European cultural bias currently manifested in the global networking aims of the FLOSS movement (see also Bowrey & Anderson 2009), she recognises that much of FLOSS licensing flourishes because of community building and community sanction of transgression. For example, much software development is carried out through the freely given efforts of communities of beta testers, user assistance is offered freely by online communities, and developers who wish to transgress the community rules lose status (for example by no longer being recognised as official patch providers). Given these strong community based elements it does appear that FLOSS as a movement can offer a model for negotiation and management of interests at a local level that indigenous people could benefit from. A similar perspective is espoused by Riley (2005) who talks about the importance of gaining a clear place for tribal customary law in the field of cultural property protection. Her work is an exemplary resource on the perspectives of a number of tribes and how they act in relation to their cultural property. It is notable that she too is sceptical of the loss of identity and homogeneity implied by global intellectual property arrangements.

It is the contention of this paper that the ideologies and technologies of FLOSS could be used to build and preserve the community customs necessary to protect cultural intellectual property and to use it to aid development and individual capacity building in tribal populations. There are three areas that we would wish to consider in the practical component of this section. Firstly, the use of websites both as means of sharing cultural artefacts and as tools for political organisation. Secondly, the use of the World Wide Web to disseminate testimony about the issues faced by disadvantaged peoples and finally how FLOSS is flexible enough to be used in harmony with traditional methods of dispute resolution.

Obviously global networking and communication enable the sharing of idea and political organisation. Many tribal groupings use Open Source software and formats for this activity due to its cost effectiveness and accessibility so FLOSS is already contributing in this area. However, a natural extension of this kind of activity is using open source technology to gather information on infractions and abuses or to highlight developmental issues across a community. An Open Source project which has worked well in this area in the field and which is trying to expand its operations to include indigenous people is Ushahidi. Ushahidi was developed in Kenya to document violence there. The organisation supplies

an open source software engine to enable groups to make visual maps of reported incidents or issues themselves. It has excellent potential for mapping all kinds of human interactions in real time and thus enabling the determination of needs and interests.

Simple lack of resources however is not the only issue for indigenous people wishing to develop however. On the contrary, the World Bank has stated that indigenous knowledge (IK) already possessed as part of their cultural practices is an integral element of development. The difficulty is that one of the World Bank's goals is mainstreaming IK and for economic reasons mainstreaming is often synonymous with formal legal protection. The World Bank projects so far have focused on traditional medicines and the use of plants which already have some protection under the terms of the Convention on Bio-Diversity (Warren D.M., 1991). However, if these plans are to grow further then this is the point where indigenous people would wish to strategically interject their own controls before externally imposed formal law becomes too dominant in the field. There are already limited positive examples of industries like tourism being constrained by local custom [6] and FLOSS provides a mechanism for bringing such custom in from the margins without forcing conformity of identity on to those who wish to use it through the use of customised control that is subversive of and parasitic upon mainstream legal norms. It would then seem that FLOSS in principle and practice can offer solutions to this the most vexing of development problems. The focus on localisation but the capacity to inform regional and national behaviour and policy is the key strength of this movement.

6. Conclusions

The current existing models of technology transfer and capacity building lack clarity and can in fact cause further problems or at least are not maximised and tailored for the needs of specific communities. As we have seen they are underpinned by questionable economic models which ignore both political inequality and the practical inequalities it brings to the technology transfer arena. Furthermore, the existing models lack the human element focusing as they do on building infrastructure and not on increasing the knowledge and capabilities of individuals and groups.

FLOSS can offer practical solutions to some of these problems first of all it promotes real technology transfer in a sense not supported by the standard agreements in that it allows full access to all the knowledge about the technology. This also allows it to help people increase their store of knowledge and capacities (the entire purpose of the FLOSS movement is to encourage people to create their own goods to be part of the common store of knowledge so those using this technology are not limited to being passive receivers of technology from others). Furthermore, FLOSS technologies are ideal for use in developing environments as they are often designed to run on limited resources or on systems that have been recycled allowing this capacity for development across a wider range of cultures and locations than could participate in the current exchange based model of technology transfer.

This more 'real' form of technology transfer and capacity building is a greater aid to development, meeting the requirements of both the autopoietic and capacity based approach to development. This is largely because of the great flexibility and lack of legal complexity surrounding the use of FLOSS. FLOSS licensing frameworks exist in predefined form for all to use but they are open to tailoring and adaptation for specific cases

and specific cultures. Thus FLOSS enables the protection and documentation of IKS without excessive juridification or adherence to flawed ideologies.

The ideologies and technologies of the FLOSS movement can offer opportunities for the reconceptualising of not only the technology transfer model but the whole approach to development. It is not of course intended as a universal panacea but is certainly an instrument worth adding to the developmental toolbox. The mode of thought behind FLOSS is a marriage of human needs and technological imperatives that is designed to make the use and creation available to all in a way that best suits them. This feature combined with the collaborative and legally stable but politically inclusive nature of FLOSS make it a model that has many lessons for the wider development movement.

Finally, with regard to the potential for implementation of a FLOSS based approach the flexibility inherent in the model is key. Whilst, ideally the author would advocate the adoption of FLOSS and other more people centred models of development at an international level that is to say positive advocacy by the World Bank and UNCTAD as well as removal of barriers to its promulgation by the WTO this is not absolutely necessary. Individuals and communities can still adopt these models on their own they are entirely inclusive and being parasitic on normal intellectual property which has firm international legal protection they are unlikely to be discouraged or prohibited by national legal regimes. This then is the crux of this paper development has lost sight of persons but persons can reclaim economic power by acting together in movements like FLOSS.

[1] Dr. Martina Gillen is a Senior Lecturer at Oxford Brookes University, England. Her current research focuses on Intellectual Property and IT Law and builds on a Ph.D that focused on ideas of community/customary law being developed into practical means of regulating online environments. She is particularly interested in Computer Misuse and the impact of Intellectual Property on software use and development. Martina also has a keen interest in jurisprudence and legal anthropology particularly legal evolution and the law of tribal peoples. Current research topics include regulation of non-commercial copyright infringement and intellectual property in the folkways of indigenous cultures.

[2] All least developed countries participated with a meagre 2.1% of the FDI flows to developing countries (UNCTAD, 1994, p.10)

[3] Fukuyama expanded this hypothesis that the Western Liberal Friedmanite model was the end point of ideological evolution in his 1992 work, whilst this thesis is open to challenge on many grounds it is given here as an indicator of the prevalence of Friedmanite doctrine at the time of the formation of Trips and the signing of the Doha Declaration.

[4] Many for example find the bricolage approach that she adopts to illustrate her point of the pervasiveness of this doctrine unconvincing Rob Cole wrote in The Times that: 'Klein derides the 'disaster capitalism complex' and the profits and privatisations that go with it but she does not supply a cogently argued critique of free market principles, and without this The Shock Doctrine descends into a muddle of stories that are often worrying,

sometimes interesting, and occasionally bizarre.' Coleman, R., 'Shock and Awful Generalisation' *The Times* 13/10/07

[5] BSD used the argument that FLOSS is a barrier to commercialisation as one of the rationales for its own licensing system. (See Montague 2008 http://www.freebsd.org/doc/en_US.ISO8859-1/articles/bsd-gpl/article.html) although for the purposes of this paper the fact that the creators were able to adapt the GPL for their own purposes to make the BSD license illustrates my point

[6] e.g. <http://www.guardian.co.uk/travel/2010/mar/07/david-vann-aborigines-songs-legends-past-future> (accesses 03/05/11)

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